# Journal of Educational Assessment in Africa

(Vol. 13, 2018)

A Publication of the

Association for Educational Assessment in Africa

(AEAA)

**Purpose of the Journal**

The Journal of Educational Assessment in Africa is published yearly by the Association for Education Assessment in Africa (AEAA). The main objective of the journal is to provide information to enhance research and knowledge so as to improve educational assessment in Africa. The journal publishes manuscripts that contribute to improvement of educational assessment.

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## Foreword

The Association for Educational Assessment in Africa (AEAA) is excited to introduce the 12th volume of the annual *Journal for Educational Assessment in Africa* (*JEAA*). The current edition is a compilation of papers presented at the 36th conference of the AEAA hosted by the Examinations Council of Lesotho (ECoL) on August 6th-10th, 2018 in Maseru Lesotho, under the theme: Reforming Educational Assessment: A Renewed Agenda. This theme was born out of the realization that advances in technological inventions, the ever-growing demand on the modern day learner, as well as a broadening understanding of a wide variety of learners' needs all necessitate a redefinition of learner assessment as we have known it to this end.

This realization challenges assessment institutions to view assessment of the modern day learner differently. To begin with, the time has come to consider that assessment can no longer limit its focus to cognitive skills, but should incorporate the assessment of soft skills, as per the demand of SDG 4. Furthermore, challenges like poverty and disability can no longer be allowed to deter learners' progression in life.

This necessity for a relook into the assessment of the modern-day learner, however, leaves unanswered the question of the assessment bodies' capacity to address the issues in question. It therefore becomes imperative to deliberate over issues of human, financial and infrastructural resources to implement these necessary transformations in assessment, while maintaining fairness, validity, reliability and practicability, which are synonymous with assessment.

To enable fair and equitable attention to each of the issues, the conference theme was broken down into six sub-themes as follows:

1. Assessment in the digital era: A new chapter
2. Bridging the gap between curriculum, teaching, assessment and the world of work
3. Reflections on the implementation of school based assessment
4. Advancing creative, vocational and technical skills through assessment
5. Re-thinking assessment of learners with special needs
6. The impact of assessment innovations on resources

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**SUB-THEME A: ASSESSMENT IN THE DIGITAL ERA: A NEW CHAPTER**

# The Utility of ICT in Enhancing Efficiency and Effectiveness of Capturing and Exportation of Examination Marks: Placing an Examination Board on a Techno-trajectory

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## Abstract

*Information and Communication Technologies (ICTs) are increasingly playing a critical role in educational assessment, including data management, electronic marking, computer adaptive testing, and candidate registration among other such platforms. This paper is based on experiences from a ZIMSEC project undertaken from 2016 to 2017 to capture and export examination marks from marking venues into the cloud and to the organisational database. Prior to the full implementation of the project in November 2017, two pilot studies were carried out in 2016 on two separate marking sessions with two large entry subject components. The objective of the pilot study was twofold, that is, to pilot test a home-grown marks capturing programme that was developed by ZIMSEC Information Services (IS) department and to compare the efficiency and effectiveness of this electronic marks capturing system with the traditional OMR mark sheet system. After successful pilot studies, the software was deployed full scale to capture marks for all components that had not been marked electronically in November 2017. This research took both qualitative and quantitative approaches; where data was collected using observations and questionnaires. For electronic marks capturing, a candidate's mark was captured by two examiners; one as Examiner and the other as Checker. All components (100% marks) were captured on the final day of the marking exercise. This means that cumbersome processes of scanning mark sheets and tracking missing marks and centres were eliminated, resulting in early release of results. The following challenges militated against the efficient utilization of the system; computer skills of data capturers and verifiers, internet connectivity, power outages in some institutions, and hackers trying to crack the system. In order to achieve efficiency in the utilization of the system, it was recommended that there be investment in training examiners in IT skills and internet infrastructure. There is also need to put in place a hack-proof cyber security mechanism.*

***Key words:*** *ICT utility, examination marks, efficiency, effectiveness*

## Introduction

Information and Communication Technologies (ICTs) are increasingly playing a critical role in educational assessment. ICTs have proved relevant to data management, e-registration, e-item banking, e-marking, computer adaptive testing, and, of late in Zimbabwe, marks capturing and exportation. Since time immemorial in the history of examinations in Zimbabwe, examination marks were captured using mark sheets imported into the country. The mark sheets were purchased using foreign currency, with complex lead times that frustrated prompt capturing of marks. In 2016, ZIMSEC instituted a pilot project undertaken to capture and export marks from the marking venue into the organisational database using a locally developed software.

A pilot study was carried out in two separate marking sessions with two large entry subjects; English and Integrated Science. In November 2016, English and Integrated Science had 236 556 and 217 488 entries respectively. The objectives of the pilot study were twofold, that is, to pilot test a home-grown marks capturing programme and to compare the efficiency and effectiveness of this electronic marks capturing system with the traditional OMR mark sheets system. For electronic marks capturing, a candidate's mark was captured by two examiners, one entered in the system as *Examiner* and the other as *Checker*. In case of differences, adjudication was carried out at the venue before commanding mark exportation.

The aims of the paper are to share ZIMSEC institutional experiences in its endeavour to harness the potential of ICT tools in enhancing efficiency and effectiveness of managing examination marks using locally developed platforms. The paper is also meant to encourage assessment leadership to put African examination boards on a techno- trajectory. Specific objectives of the study are outline below.

## Objectives of the study

The objectives of this study were to:

1. Compare the accuracy of the two marks capturing systems (OMR mark sheets and electronic marks capturing systems).
2. Assess the views of users (data capturers, subject managers, examination administrators) of both the old and the new systems.
3. Assess the challenges of the OMR mark sheets compared to electronic marks capturing system.
4. Observe the interaction of users with the new software in order to make recommendations where there are loop holes.
5. Share ZIMSEC's institutional experience in developing and deploying a locally developed ICT platform to enhance efficiency in examination processes.

## Research Questions

1. Which of the two marks capturing systems (OMR mark sheets and electronic marks capturing systems) captures marks more accurately?
2. What are the views of the end users (data capturers, subject managers, examination administrators) concerning the new system of capturing marks?
3. What are the challenges of the OMR mark sheets compared to electronic marks capturing system?
4. What loopholes are there in the new system that need to be addressed?

5. What experiences can ZIMSEC share?

**Software Development Conceptualisation**

Software development is a process of building clear and dependable systems, whose life cycle stages are to ensure the quality and correctness of the product (Halvorsen, 2017; Dorozhkin, Krotov, Tkacheva, Kruchkov and Korotaev, 2016). One wrong step in the life cycle can create serious challenges to the usability of the software. It is, therefore, of paramount importance that all major stakeholders know how the software is being developed, how it interfaces with functions, processes, and outcomes of the development life cycle. The processes of the development life cycle are shown in Figure 1 below.

**Fig 1: Software development cycle (Adapted from Halvorsen, 2017)**

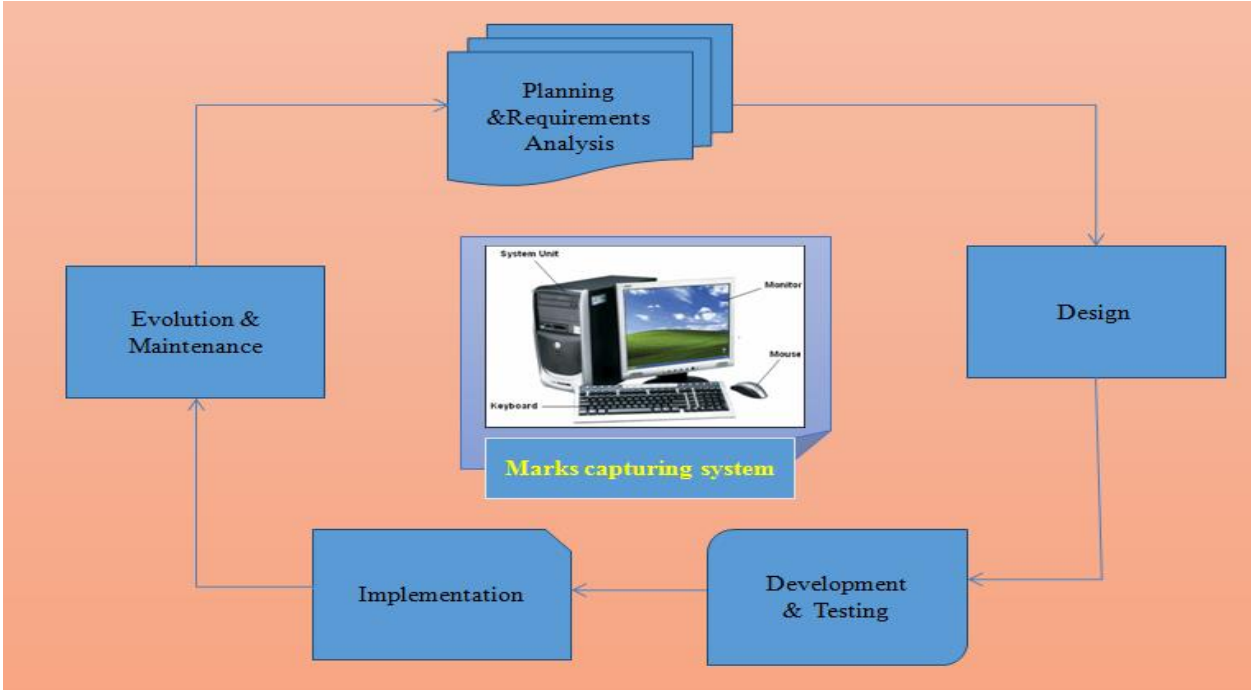



Figure 1 above shows critical stages of the software development process that should be followed to achieve intended goals. These stages are: requirements gathering and analysis, systems analysis, system design, coding, testing and implementation (Halvorsen, 2017; Dorozhkin, Krotov, Tkacheva, Kruchkov and Korotaev, 2016). For purposes of this study, we centered our discussions on just two stages that were pertinent to achieving the aims of this study. These stages are: requirements gathering, and analysis and testing.

**Requirements gathering and analysis**

This is the first critical stage or brainstorming phase in software development. It involves an important component like feasibility analysis to check to what extent ideas can be put into action for development. At this stage it is critical to establish clear communication lines between stakeholders, end users and the project team. All those involved in the project must be given an opportunity to provide inputs about their processes and functions to the development team. The development team should identify

and capture stakeholder requirements using customer interviews and surveys to gather as much information about the manual processes currently being utilized. It is also critical at this stage to build a multidisciplinary approach to describe each action that a user will take in relation to the new system (Halvorsen, 2017). At this stage, assessment leadership should have a clear sense of the techno-level they desire the organization to be at.

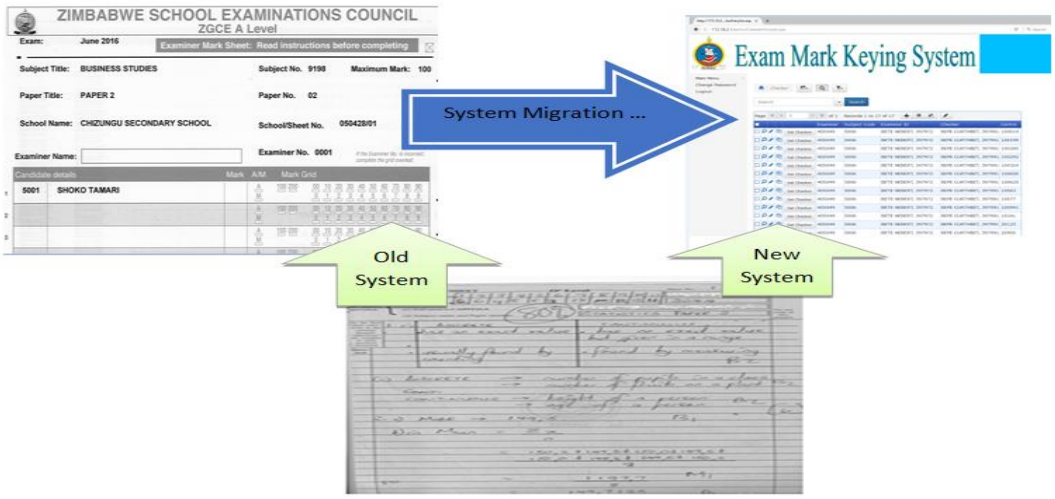
**Analysis and Testing**

This second stage is also critical. It must also take a multi-stakeholder approach for the project to be successful and for all parties to be in a position to seal all loose ends. In the case of this ZIMSEC project, the following critical divisions were supposed to be represented: Test Development; Research and Evaluation; Information Systems; and Examinations Administration. It is at this stage that all challenges dealing with mark-keying-in, interfaces, security, and output among other critical components of the system are interrogated from each division's and users' perspectives (Halvorsen, 2017). It is critical that organisational divisions have a clear conceptualisation of the system and how it impacts on their work and goals.

**Marks Capturing System Migration**

Fig 2 below shows how candidates' marks were captured in two systems after the marking exercise. The top left part shows an example of a candidate's script with 80% captured from a marking belt on an OMR mark sheet by examiners after completing marking. In the second top right corner the same mark is captured straight into the new electronic system.

**Fig 2: Migration from Scanner Sheets to e-capturing of marks (Source: ZIMSEC archived records)**




The second part of Figure 2 shows the developed e-capturing system template. This template has all the details of a candidate as found in the traditional OMR mark sheet. This information is preloaded into the system after registration of candidates, leaving out only where to key-in a mark. The latter system also has the provision of identifying private candidates and to single out absentees. This is the model that this report is based on.

## Research Methodology

Both quantitative and qualitative data collection methods were used. Information was gathered during the pilot test, the parallel change-over of English and Integrated Science, and the final deployment of the system. At the three stages, questionnaires were administered to marks capturers and other users to solicit information on their experiences in interacting with the system. Ninety respondents participated in the full deployment of the system as captured on Table 1 below. The researchers also observed data capturing in session and carried out discussions with programmers and Subject Managers, who are key system users' supervisors in their respective subject areas.

## Findings

In this section, findings are presented according to thematic strands developed, and guided by the aims, objectives and research questions of the study. The discussion of findings starts with lessons learnt during the development, pilot, changeover testing stages and system full deployment.

### *Lessons Learnt*

This section presents lessons learnt during the pilot and changeover stages. These lessons are from the system itself, human capital involved and leadership requirements. Data that informed lessons learnt was collected from both internal and external users of the system.

### *System Pilot Testing*

A trial run of the system was critical in order to have an institutional idea of how it performs against organisational goals. It was an important step that helped detect potential problems in order to prevent them from escalating during full implementation. The pilot testing was also important as it gave the project team insight to prepare for parallel changeover and full deployment. The pilot test also helped to confirm if the organisation was ready for the full-scale implementation.

The pilot testing helped the Council to determine if any adjustments to the implementation plan or adaptations to the program were necessary. It also revealed unforeseen challenges that could arise during implementation and ensured that staff was well prepared to handle issues during the full-scale implementation. The pilot testing was an opportunity for ZIMSEC to gauge major users such Examiners' and Subject Managers' reaction to the program. Through monitoring and evaluation by the research department, the pilot testing helped make decisions about how to allocate time and resources and to determine if more of the latter were needed in particular aspects of the system. For example, there was need to review recruitment requirements for examiners to include ICT skills, and also to place an age cap. The structure of marking belts was reviewed to accommodate this new system.

The pilot test gave the evaluation and the implementation teams, more than before, a chance to work together before full implementation of the ICT utility and to troubleshoot any logistical issues that might arise with the distribution and collection of the evaluation data. The core components and activities of the system were identified, and staff was equipped with the skills to carry out those activities. The pilot study also informed a work plan and timeline to guide a parallel changeover implementation program. The research unit put in place a mechanism to

monitor and capture data about how well the system was working. The pilot testing was an opportunity for the organisation to learn what goes well and what does not before full-scale implementation. A plan for soliciting feedback, tracking the activities and outcomes and recording any adjustments was put in place. The latter also helped the development and evaluation teams to establish how the system worked on such aspects as Log-in/out, System navigation and User friendliness.

**Table 1: Examinations mark capturing system functionality**

| **Functions** | **Examiners' responses expressed as Percentages (%)** | | |
|---|---|---|---|
| | **Satisfactory** | **Good** | **Very good** |
| Log-in | 12.5 | 25 | 62.5 |
| System navigation | 25 | 31.25 | 43.75 |
| Log out | 0 | 18.75 | 81.25 |
| Keying in of data | 12.5 | 37.5 | 56.25 |
| Data capturing template | 12.5 | 62.5 | 31.25 |
| User friendliness | 18.75 | 31.25 | 50 |

The data on Table 1 above indicates that more than 80% of the data capturers found that the mark key-in system, which involved log-in and log-out and keying in of data on the template, was efficient and easy to manoeuvre. A few of the data capturers (less than 20%) rated the system as satisfactory. It was observed that there were a few data capturers who had challenges in manipulating the system. Such data capturers were among those who were computer illiterate before training and so were hesitant to navigate the system, and were slow to key in marks at first but later gained confidence in capturing data after much practice. Table 2 below presents the marks capturing rate.

**Table 2: Marks capturing rate**

| Data Capturer | Start Time | Finish Time | Duration in Minutes *(X)* | No. of Scripts Captured *(Y)* |
|---|---|---|---|---|
| 1 | 13:51 | 13:53 | 3 | 17 |
| 2 | 13:54 | 13:55 | 2 | 16 |
| 3 | 13:56 | 13:57 | 2 | 19 |
| 4 | 14:00 | 14:01 | 2 | 18 |
| 5 | 14:02 | 14:03 | 2 | 16 |
| 6 | 14:04 | 14:06 | 3 | 17 |
| 7 | 14:08 | 14:09 | 2 | 18 |
| 8 | 14:10 | 14:11 | 2 | 17 |
| | | | $\sum X = 18$<br>Mean (X) = $\frac{18}{8}$ = 2.25 | $\sum Y = 138$<br>Mean (Y) = $\frac{138}{8}$ = 17.25 |

**NB.** The times indicated are inclusive.

An evaluation of the electronic examination marks key-in system revealed that it is a process which can effectively and efficiently capture examination marks. Table 2 above shows that on average, an examiner took 2.25 minutes to capture 18 scripts. This information assisted the

Subject Managers to determine the period needed to complete the capturing of all marks.

***System Change-Over***

System change over involved shifting from the traditional OMR method of capturing marks to the developed electronic platform. There are a number of mitigation measures that were put in place to avoid disruption of the examination processes during changeover. The parallel changeover method on two large entry subjects as a pilot study was used to determine the effectiveness of the system. It was also meant to identify and resolve issues within the system. Parallel changeover allowed the two systems to run concurrently while monitoring and evaluation was on-going. It gave the development team the opportunity to fine-tune the system. The parallel changeover informed the full deployment of the system in all subjects of the curriculum. Table 3 below compares the new and old systems of capturing examination marks.

**Table 3: Comparison of the new system and old system of capturing examination marks**

| Aspects | | New system (%) | Old system (%) |
|---|---|---|---|
| Speed | slow | 0 | 75 |
| | fast | 100 | 25 |
| Accuracy | accurate | 100 | 68.75 |
| | inaccurate | 0 | 31.25 |
| Efficiency | efficient | 100 | 50 |
| | inefficient | 0 | 50 |

The table above shows comparisons of the new and old systems of capturing examination marks. The ratings show that the new system is better than the old system of capturing data manually on OMR mark sheets. All data capturers concurred that the new system was faster, more accurate and more efficient. More than 50% of the data capturers indicated that the old system was slow and inefficient. A total of 31.25% indicated that the old method was inaccurate. Below, table 4 compares marks captured by the E-system and those by Mark Sheets.

**Table 4: Comparison of marks captured by the E-system and Mark Sheets**

| Candidate ID | New-Mark | Old-Mark | E-Captured Mark | Mark sheet_ Captured Mark | E-System Deviations | Mark sheet Deviations |
|---|---|---|---|---|---|---|
| **0308603006112201** | 0 | 3 | 0 | 3 | 0 | -3 |
| **70300623037112201** | 0 | 6 | 0 | 6 | 0 | -6 |
| **70907803103112201** | 26 | 27 | 26 | 27 | 0 | -1 |
| **70305333361112201** | 1 | 2 | 1 | 2 | 0 | -1 |
| **70706203035112201** | 1 | 10 | 1 | 10 | 0 | -9 |
| **70700603045112201** | 2 | 12 | 2 | 12 | 0 | -10 |
| **70300373205112201** | 2 | 21 | 2 | 21 | 0 | -19 |
| **70308583086112201** | 3 | 23 | 3 | 23 | 0 | -20 |
| **70100013107112201** | 4 | 12 | 4 | 12 | 0 | -8 |
| **70705103025112201** | 4 | 25 | 4 | 25 | 0 | -21 |

Table 4 confirms what examiners observed as indicated on table 3 above. It shows deviations made in English by two data capturing systems that were instituted for the 2016 November examinations. The third column shows marks which were originally entered into the system through mark sheets while in the second column marks were entered into the system from the scripts that were pulled for verification after an anomaly was detected. From Table 4 it is evident that there are minimal deviations committed by examiners who captured marks using the electronic marks capturing system as compared to their counterparts who used mark sheets. The deviations committed through mark sheets are frightening to say the least.

***Assessment Leadership***

In order to achieve the best outcomes from the current proliferation of ICTs in examination boards, assessment leadership is critical. Assessment leadership aspires for a winnovative (winning innovation) organisational culture set at a high techno-level. This is leadership that is hinged on two critical management attributes, which are; management strategist and operative management. Strategic and operative thinking are key factors that can propel examination boards to blue oceans business environments. A strategist must craft the path and direction that the organisation must take in order to win its market share and retain its customers and critical human capital.

Operative management makes things happen. This is a hands-on function of management that entails being on the ground where core issues of the organisation are happening, that is, where processes, operations and interfaces with customers and suppliers are interacting. Apart from other traditional rituals of management such as planning, organising, staffing, directing, coordinating and controlling, an operative manager is an actor. He/she is the one on the ground, rallying the troops towards the attainment of organisational goals.

***System full Deployment***

The system full deployment used a direct changeover model for all subject components that were not on e-marking. In this section, we discuss the results collected from the monitoring and evaluation exercise that was carried out during the implementation phase. Table 5 below indicates the distribution of the respondents.

**Table 5: Respondents' distribution**

| Roles of respondents | Frequency | Valid Per cent |
|---|---|---|
| Subject Administrators | 1 | 1.1 |
| Component Supervisors | 5 | 5.6 |
| Marks Capturers | 42 | 46.7 |
| Marks Checkers | 42 | 46.7 |
| ***N*** | **90** | |

Table 5 shows the distribution of respondents who took part in the evaluation. A total of 90 participants responded to the questionnaire that was hand-given to them. The majority of the respondents were data capturers and checkers.

**Table 6: Respondents' age distribution**

| Respondents' age range | Frequency | Valid Per cent |
|---|---|---|
| Below 35 years | 28 | 31.1 |
| 36-45 years | 49 | 54.4 |
| 46 years and above | 13 | 14.4 |
| ***N*** | **90** | |

Table 6 above shows age distribution of respondents who took part in the evaluation. The distribution shows that 54.4% of the respondents were in the age range of 36-45 years, followed by those below 35 years who constituted 31.1%. In terms of embracing ICT applications, it is the view of this evaluation that this group had minor challenges and were expected to adapt easily. Table 7 below presents levels of computer literacy among participants.

**Table 7: Respondents' level of computer literacy**

| Level of computer proficiency | Frequency | Valid Per cent |
|---|---|---|
| Basic Skills | 36 | 40.4 |
| Intermediate Skills | 42 | 47.2 |
| Advanced Skills | 11 | 12.4 |
| ***n*** | **89** | |

Table 7 above shows the computer proficiency of respondents who participated in this evaluation. The item in the questionnaire that solicited information on respondents' level of computer proficiency was responded to by 89 examiners. The data in Table 7 shows that 59.6% of the respondents have more than basic skills in computer proficiency. This is a welcome development in the implementation of on-the-venue marks capturing. The table below reflects views of respondents on the user-friendliness of the mark capturing application.

**Table 8: User-friendliness of the marks capturing application**

| User-friendliness of the system | Frequency | Valid Per cent |
|---|---|---|
| Very easy | 67 | 75.3 |
| Easy | 22 | 24.7 |
| ***n*** | **89** | |

One item in the questionnaire required respondents to pass judgement on the user-friendliness of the marks capturing application. The judgement scale had four opinion levels on interaction with the application, and these ranged from *very easy* to *very difficult*. Table 8 shows the distribution of the respondents' judgement on the user-friendliness of the application. It can be seen that 75.3% of the respondents rated the application as very easy to use. No respondents rated the application as difficult or very difficult. Below is a table indicating the user-login proficiency of participants.

**Table 9: User-login proficiency**

| User login proficiency | Frequency | Valid Per cent |
|---|---|---|
| Once | 51 | 58.6 |
| Twice | 26 | 29.9 |
| Thrice | 7 | 8.0 |
| 4 and above | 3 | 3.4 |
| ***n*** | **87** | |

Question 9 in the questionnaire sought to establish the maximum number of attempts respondents made to login to the application.

Table 9 above presents the distribution of the maximum attempts which were made by the marks capturing application users. The data shows that 58.6% of the users attempted only once and only 3.4% attempted more than four times. This signals the level of computer proficiency reached by application users after training. The proficiency of users in creating their profiles is presented on Table 10 below.

**Table 10: User-proficiency in creating own profile**

| User proficiency in creating own profile | Frequency | Valid Per cent |
|---|---|---|
| No Assistance | 46 | 54.8 |
| Minimum Assistance | 35 | 41.7 |
| Maximum Assistance | 3 | 3.6 |
| ***n*** | **84** | |

Before using the application, users are required to create their user profiles. This is a time consuming exercise if users lack basic ICT skills. Table 10 above shows that 54.8% of the respondents required no assistance while 41.7% required minimum assistance. Only 3.6% required maximum assistance from the application technicians. This is a very positive development, which expedited the creation of profiles. Creation of profiles is a critical initial stage before using the application. Table 11 below presents data relating to marks capturing skills mastery of the participants.

**Table 11: Marks capturing skills mastery**

| Views on marks capturing skills mastery | Frequency | Valid Per cent |
|---|---|---|
| Strongly agree | 50 | 58.1 |
| Agree | 36 | 41.9 |
| ***n*** | **86** | |

One item in the questionnaire required respondents to pass judgement on the mastery of the marks capturing skills. The scale had four opinion levels that ranged from *strongly agree* to *strongly disagree.* Table 11 above shows the distribution of the respondents' judgement on their mastery of marks capturing skills. It can be seen that 58.1% of the respondents strongly agreed that they had mastered the application's demands while 41.9% just agreed. No respondents disagreed or strongly disagreed with the notion that they had mastered the skills to navigate the application. This means that the group of users was up to the task of efficiently capturing accurate marks. Data presented on the table below relates to skills to lead others.

**Table 12: Skills to lead others**

| Ratings on skills to lead others | Frequency | Valid Per cent |
|---|---|---|
| Strongly agree | 42 | 53.2 |
| Agree | 36 | 45.6 |
| Disagree | 1 | 1.3 |
| ***n*** | **79** | |

Respondents were asked to rate their skills in leading others by using a scale that ranged from *strongly agree* to *strongly disagree*. Table 12 above shows the distribution of the levels of agreement or disagreement concerning participants' skills in leading others. It can be seen that 53.2% of the respondents strongly agreed to the fact that they had acquired enough skills to lead others in the capturing of marks activities. Only 1.3% disagreed with that fact. As indicated on the table below, participants' hands-on skills in capturing marks were also investigated.

**Table 13: Marks capturing hands-on skills**

| Ratings on marks capturing hands-on skills | Frequency | Valid Per cent |
|---|---|---|
| Strongly agree | 55 | 64.0 |
| Agree | 31 | 36.0 |
| **n** | **86** | |

Respondents were asked to rate their hands-on skills using a scale that ranged from *strongly agree* to *strongly disagree*. Table 13 above shows the distribution of the levels of agreement or disagreement on participants' hands-on skills. It can be seen that 64% of the respondents strongly agreed with the fact that they had acquired enough hands-on skills to enable them to successfully capture accurate marks.

***System Strengths, Weaknesses and Challenges***

Examiners were asked to identify the strengths, weaknesses and challenges they encountered during their interaction with the marks capturing application.

The following are the verbatim responses by users:

> *The application is very user-friendly, efficient and fast in capturing marks.*
>
> *The system ensures that capturer and checker enter the same mark for a candidate.*
> *Speed and accuracy is guaranteed.*
>
> *It has no errors because if there happens to be an error, capturing would not proceed until the error was corrected.*
> *Very secure since it is only accessed by those with passwords, and data is not accessed by an unauthorised person, as compared to mark sheets on which marks could be easily tampered with.*
> *More machines are needed for large groups to avoid unnecessary scrambles during the peak periods of marks capturing.*

*Network was sometimes very slow and erratic.*

*The marks capturing model disturbs the marking process and there must be people who are specifically contracted to capture marks.*

Some capturers and checkers were slow due to computer illiteracy or health challenges such as eyesight problems. Subject Managers should consider these issues when appointing capturers and checkers in future. Below is the Candidate Marks Movement Model.

**Candidate Marks Movement Model**

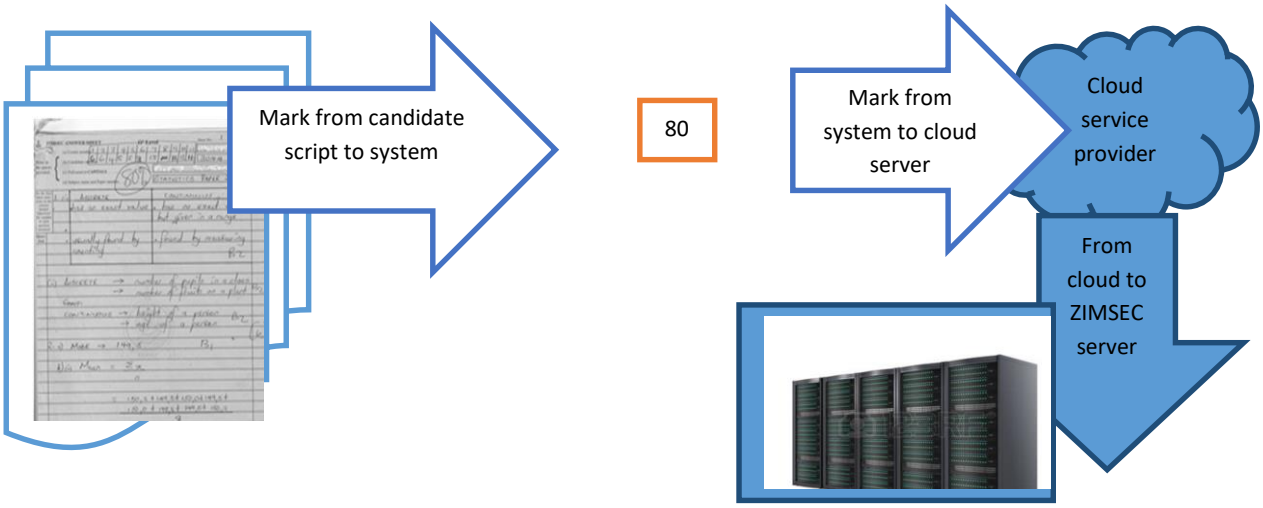



**Fig 3: Marks capturing model**

Fig 3 above shows the movement of candidates' marks in the system. It was noted that a robust cyber security model must be in place to counteract hackers. One such measure was to use the Hyper Text Transfer Protocol Secure (https), which is a secure version of http.

**Conclusions**

Based on the findings of the study, a number of conclusions are arrived at. Firstly, it can be concluded that the home-grown marks capturing application was well received by users. In the majority of cases, 100% of the marks were captured at the venue, and were captured accurately and efficiently. However, the respondents reported slow, erratic network connectivity, and power outages. It can also be concluded that with adequate training, mark capturers are able to apply the skills imparted to them during training. Therefore, assessment leadership is a critical factor in harnessing the potential of Information and Communication Technologies in assessment boards.

**Recommendations**

In light of the conclusions of the study outlined above, a number of recommendations are made. Firstly, data capturing should be done by examiners who are marking candidates' scripts because that is cost effective, and these examiners have complete accountability for candidates' marks by ensuring that they are logged into the system. Further, assessment leadership in African, SADC or other sub regional assessment boards should take advantage of these political blocks to create

ICT technical pockets to develop African systems that solve exam issues. Africans need to pool their human capital and other resources to develop home grown systems that will liberate them from inherited assessment management systems. Lastly, examination boards must closely work with internet providers, and their ICT policies should speak to their respective national ICT policies in order to set the ICT adoption trajectory to desired levels.

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# An Empirical Investigation of Goodness-of-fit of 1-, 2- and 3- Parameter Logistic Models to an Achievement Test Data in English Language

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## Abstract

*This study investigated the goodness-of-fit of 1-, 2- and 3- Parameter Logistic Models to Achievement Test Data in English Language. The increased use of achievement tasks in the selection, promotion and awards inevitably brings attention to the quality and fairness of achievement testing. To adequately address these issues requires sophisticated mathematical methods. The traditional Classical Test Theory (CTT) approaches that evaluate psychological measures at the total test scores have been complemented by the more recent Item Response Theory (IRT) approaches that focus on item level data. The purpose of this study was to investigate which of the IRT 1-, 2- and 3- Parameter Logistic Models is empirically superior to the others. The ex-post-facto research design was adopted for the study. The sample consisted of 3,000 examinees' responses, which were randomly selected from Edo and Delta States of Nigeria in English Language Multiple-Test Items of National Business and Technical Certificate Examinations conducted by the National Business and Technical Examinations Board (NABTEB) Nigeria for years 2014, 2015 and 2016. Data analysis was carried out using eirt Item Response Theory Excel Assistance Version 3.1 Software. The Pearson Chi–Square was used to test the hypotheses at 0.5 significant level. Findings from the study revealed that there was no significant difference among the 1-, 2- and 3- Parameter Logistic Models fit in 2014 and 2015 NABTEB English Language Multiple–Choice Test Items, but there exists a significant difference among the 1-, 2- and 3- Parameter Logistic Models in 2016. Based on the findings, the researchers conclude that the 1-, 2- and 3- Parameter Logistic Models fit the data across the three years under study; none is empirically superior to others. It is recommended, among other things, that Examining bodies should make sure that selected models fit the data in order to be confident of results generated from such data.*

***Keywords:*** *Item Response Theory, 1-, 2-, 3- Parameter Logistic Models, Model fit, Achievement Data*

**Background**

Educational tests are the main sources of information about students' achievements in schools and in activities. The analysis of test data is essential in determining the quality of the test and the information the test generates. The worth of any educational assessment depends on the instruments and techniques used; if the instruments are poorly designed, the results could be misleading. In educational measurement, there are two main theories by which a test and the items it contains can be analyzed. These theories are: the Classical Test Theory (CTT) and Item Response Theory (IRT). The CTT explains the link among the observed score, the true score and error score. Within this theoretical framework, models of various forms have been formulated. The most common model is known as "Classical test model". It is a simple linear model linking the observable test score (X) to the sum of two unobservable (or often called latent variables), that is true score (T) and error score (E);

$$X = T + E$$

There are two unknowns in the equation (X and E) and this makes it not easily solvable unless some simplifying assumptions are made. The assumptions in the classical test model are : (a) true scores and error scores are uncorrelated; (b) the average error score in the population of examinees is zero; and (c) error scores on parallel test are uncorrelated (Adegoke, 2015). The focus of CTT is on the test level information. Its item statistics (difficulty and discrimination) are often denoted by P and D respectively. These item statistics are important parts of the model and are used in item analysis and item selection in the development of achievement tests. CTT has been in use for many decades to solve testing problems; however, some shortcomings such as weak theoretical assumptions, sample dependent etc have been noted. To meet up with this challenge, Nenty (1996) points out that a good test theory, which is capable of addressing some of, if not all the testing problems, should be used by examining bodies in order to ensure quality assurance in educational assessment and certification.

The shortcomings of CTT gave birth to the evolution of IRT, which was first proposed in the field of psychometrics for the purpose of ability assessment. Its primary concern is on the item – level information in contrast to the CTT's primary focus on test – level information. IRT is used for the design, analysis, scoring and comparison of tests and similar instruments whose purpose is to measure unobservable characteristics of the respondents (Stata Corp, 2016). It is concerned with accurate test scoring and development of test items. Test items are designed to measure various kinds of abilities, traits or behavioural characteristics. Responses to the items can be binary (such as correct or incorrect responses), ordinal (such as degree of agreement on Likert scales) and partial credit (such as essay test). IRT is widely used in education to calibrate and evaluate items in tests, questionnaires, and other instruments and to score subjects on their abilities, attitudes, or other latent traits. During the last decades, educational assessment has used more and more techniques to develop tests. Today, all major educational tests, such as the Scholastic Aptitude Test (SAT) and Graduate Record Examination (GRE), are developed by using IRT, because the methodology can significantly improve measurement accuracy and reliability while

providing potentially significant reductions in assessment time and effort, especially via computerized adaptive testing. In recent years, IRT-based models have also become increasingly popular in health outcome, quality-of-life research and clinical research (Hays, Morales & Reise, 2000; Edelen & Reeve, 2007; Holman, Glas & Haan, 2003; Reise & Waller, 2009).

Item Response Theory (IRT) is a measurement theory and its focus is on the item level rather than on the total test score. In IRT framework, parameters are classified into two basic components: the first is related to the examinee's ability (latent trait), second to the task (test). The assumption is that each examinee responding to a test item possesses some amount of underlying ability. Thus, one can consider each examinee to have a numerical value, a score that places him or her somewhere on the ability scale. This ability scale is called latent trait and it is denoted by the Greek letter ($\Theta$). At each ability level, there is a certain probability that an examinee with that ability will give a correct answer to the item. Under IRT, $P(\Theta)$ is used to represent this probability. In case of a typical test item, this probability will be low for examinees of low ability and high for examinees of high ability. IRT is a modelling technique that tries to describe the relationship between an examinee's test performance and the latent trait underlying the performance (Hambleton & Jones, 1993).

IRT models describe the interactions of persons and test items (Reckarse, 2009). Hence, IRT is a general framework for specifying mathematical functions that characterise the relationship between a person's responses to the separate items in the instrument (DeMars, 2010). The most widely used traditional IRT models are the One Parameter Logistic Model (1PLM), Two Parameter Logistic Model (2PLM), and Three Parameter Logistic Model (3PLM). The 1PLM utilizes a single item difficulty parameter. The 2PLM incorporates an item discrimination parameter as well as an item difficulty parameter while the 3PLM utilizes item difficulty, item discrimination and pseudo-guessing parameters (Lord & Kelkar cited in Chon, Lee & Ansley, 2007). The proposed Four-Parameter Logistic Model (4PLM), which incorporates response time and slowness parameter (Wang and Hanson, 2001) has not been formally incorporated into the traditional IRT models. Moreover, the software for analysing it is yet to be readily available. Hambleton and Swaminathan, cited in Chon, Lee and Ansley (2007), suggest that model – data – fit improves with the inclusion of each additional model parameter.

Model-data-fit is regarded as a useful checking tool in model selection for a particular data set. When various models and calibration procedures are available, the question that will arise is which one to choose? One way to assess the appropriateness of the chosen IRT model(s) and calibration procedure is to conduct an analysis of model-data-fit. Several studies have examined model-data–fit utilizing 1-, 2- and 3-PLM under different conditions with PARSCALE (Chon, Lee & Ansley, 2007).

External agencies (examining bodies) like the West African Examinations Council (WAEC), the National Examinations Council (NECO), and the National Business and Technical Examinations Board (NABTEB) were established to conduct examinations for both in-school candidates and out-of-school

candidates, and award certificates to successful candidates. The National Business and Technical Examinations Board (NABTEB) is one of the foremost examining bodies in Nigeria, and it is charged with the responsibility of conducting valid and reliable examinations, leading to the awards of certificates that are recognized locally and internationally. The National Technical Certificate (NTC) /National Business Certificate (NBC) examinations have three components:

Trade related;

Trade group;

General education, where English Language is one of the general education subjects examined by NABTEB.

English Language is a core subject offered at the post basic level (secondary level) in Nigeria. It is one of the general education subjects in which hundreds of candidates are tested by NABTEB during the May /June and November /December examination series. It is one of the compulsory general education subjects. A credit pass is required in English Language before a candidate is certified by NABTEB and it is also a prerequisite for admission into tertiary institutions.

**Objectives**

The objectives of this study were to:

1. Fit the 1-, 2- and 3-Parameter Logistic Models to the 2014 NABTEB English Language Multiple Choice Test Items.
2. Fit the 1-, 2- and 3-Parameter Logistic Models to the 2015 NABTEB English Language Multiple Choice Test Items.
3. Fit the 1-, 2- and 3-Parameter Logistic Models to 2016 NABTEB English Language Multiple – Choice Test Items.
4. To empirically establish which logistic model could be preferred to others.

**Statement of the problem**

There is need to ensure that scores are an accurate reflection of students' knowledge, and the content being measured have been an unending search in the field of psychological testing. Examining bodies in Nigeria have been doing this by conducting item analysis and establishing test psychometrics through the Classical Test Theory (CTT) approach. In recent years, attention of Psychometricians in these examining bodies has been focused on Item Response Theory (IRT). Given the importance of IRT models, and the emphasis placed on the good-model-data-fit in IRT application, it is logical to expect that misfit between an IRT model and empirical data may potentially threaten the ability- parameter estimates and invariant property of IRT model parameters. The advantages claimed for item response model can be realized if only the fit between the model and the test data set of interest is satisfactory. In IRT, there are three logistic models commonly used. These are 1-, 2-, and 3- PLM. The question that has to be answered is whether in the invent that examining bodies decide to adopt the IRT procedure for item analysis, then a problem may arise as to which of the logistic models should be used? A poorly fitting model could be misleading and cannot yield invariant item and ability parameter estimates. From literature, there appears to be a research vacuum in model – data-fit. Also, studies carried out on NABTEB English Language Multiple Choice

items are scarce. To this extent, there is no empirical evidence on the superiority of any model

To guide this study, the following research questions were postulated:

1. Are there differences among the 1-, 2- and 3- parameter logistic models fits in the scores for the 2014 NABTEB English Language Multiple Choice test?

2. Are there differences among the 1-, 2- and 3- parameter logistic models fits in the scores for 2015, NABTEB English Language Multiple Choice test?

3. Are there differences among the 1-, 2- and 3- parameter logistic models fits in the scores for the 2016 NABTEB English Language Multiple Choice test?

**Hypotheses**

The following hypotheses were tested at 0.05 level of significance:

There are no significant differences among the 1-, 2- and 3- parameter logistic models fits in the scores for the 2014 NABTEB English Language Multiple Choice test.

There are no significant differences among the 1-, 2- and 3- parameter logistic models fits in the scores for the 2015 NABTEB English Language Multiple Choice test items.

There are no significant differences among the 1-, 2- and 3- parameter logistic models fits in the scores for the 2016 NABTEB English Language Multiple Choice test items.

**Review of Related Literature**

This study is hinged on the Item Response Theory (IRT). IRT is credited to Fredrick Lord. The theory models the relationship between the responses of each examinee of a given ability of each item in the test (Lord, cited in Amasingha, 2015). The main idea of item response theory is that of the item response model, that is, a mathematical function describing the probability of specified responses to an item, given some level of quantitative attributes of the respondent. This is explained by the Item Characteristic Curve (ICC), which scales items and people onto a common metric, helps in standard setting, and serves as the foundation for equating and makes meaning in terms of student ability.

ICC is illustrated by a line in a Cartesian system called Ogive, which is defined by a logistic function shown below:

$$P_{ij}(1)\,|\theta,b = \frac{\exp(\theta_j - b_i)}{1+\exp(\theta_j - b_i)}$$

Where

b is the item parameter, and

*Θis* the person parameter

The equation represents the probability of responding correctly to item *i* given the ability of person *j* while figure 1 below represents ICC, which shows the behaviour of a good item.

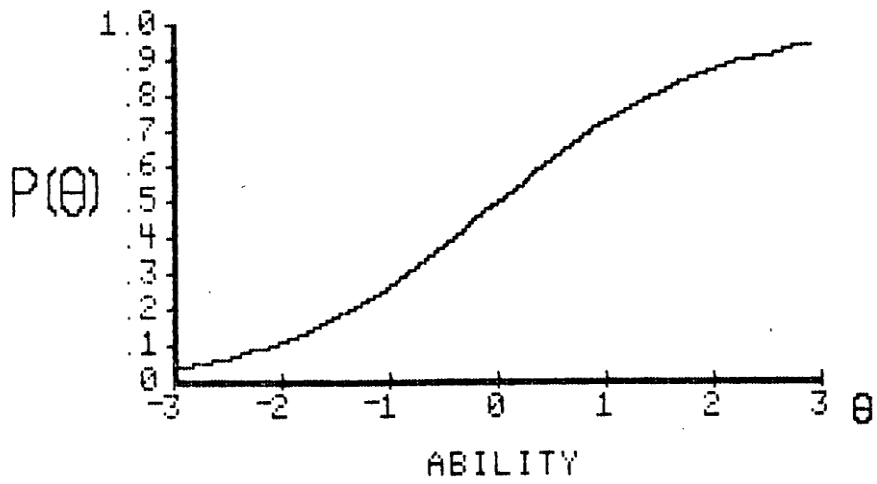


**Figure 1: Item Characteristic Curve (ICC) (Source: Baker, 2001)**

The item characteristic curve (ICC) is the basic building block of the Item Response Theory; all the other constructs of the theory depend upon this curve (Baker, 2001). The main concept of IRT is the ICC. The ICC describes the probability that a person "succeeds" on a given item that is individual test question (Corp, 2016). The vertical axis represents the probability (.0 to 1.0) of responding correctly to the item while the horizontal axis represents the latent trait/Ability (-3 to 3) of the respondents.

IRT is a set of models that, by relating the likelihood of a particular reaction by an individual with a given trait level to the characteristics of the item designed to elicit the level to which the individual possesses that trait, attempts to estimate the parameters involved, explains the process and predicts the results of such an encounter (Nenty, 2004). Models in IRT mathematically define the probabilistic relationship between individuals' observed responses to a series of items and their location on the unobservable latent variable continua reflecting the constructs being measured (De Ayala, 2009; Embretson & Reise, 2000; Hambleton, Swaminathan, & Rogers, 1991; Reckase, 2009). IRT has models for both dichotomously scored items (e.g., true/false), and polytomously scored questions (e.g., 5 category Likert-type scale). IRT item parameters are set to relate responses to the underlying trait (Embretson & Reise, 2000), thus, IRT can easily model the mixed item formats included in many surveys. Joshua (2014) states that the IRT, and its presentations in models predispose IRT to many applications in practical testing situations. Such applications include test construction (item selection), item +banking, test equating, adaptive testing, and study of item bias, to mention but a few.

The IRT is used by researchers to analyze student's performance data from one testing situation, describe it succinctly, and are able to make predictions about item and test performance in other situations. IRT has three basic assumptions. These are monotonicity, local independence and unidimensionality. These three assumptions are very important and hold irrespective of the latent model used. According to Ojerinde, Popoola, Ojo and Onyeneho (2012), a test data can only be useful for a latent trait model if these assumptions are

met. The application of goodness of fit (GOF) methods in IRT framework, informs us of the discrepancy between the model and the data being fitted (Maydeu, 2010). The Goodness of Fit (GOF) is a statistical model that describes how well it fits into a set of observations. GOF indices summarize the discrepancy between the observed values and the values expected under a statistical model. Assessing absolute model fit (that is, the discrepancy between a model and the data) is critical in application, as inferences drawn on poorly fitting models may be misleading badly (Maydeu, 2010). Researchers are also interested in a relative model fit (that is, discrepancy between two models) when more than one substantive model is under consideration (Yuan & Bentler, 2004; Maydeu-Olivares & Cai, 2006).

Chom, Lee and Arisley (2007) assessed the IRT model-data fit for mixed format tests. They examined various model combinations and calibration procedures for mixed format tests under different item response theory (IRT) models and calibration methods. The data used were data sets that consisted of both dichotomous and polytomous items, and nine possibly applicable IRT model mixtures and two calibration procedures were compared based on traditional and alternative goodness-of-fit statistics. Three dichotomous models and three polytomous models were combined to analyze mixed format test using both simultaneous and separate calibration methods. The PARSCALE's $G^2$ was used to assess goodness of fit. The findings revealed that the 1PLM had the largest misfit in items. Further, Si (2002) carried out a study on ability estimation under different item parameterization and scoring models. The study employed a 7 x 4 x 3 factorial design. Five models, including the 1-2-3-PL dichotomous logistic model, the Generalized Partial Credit Model with item discrimination $a_i$ set to a constant (GPCM-1), the Generalized Partial Credit Model (GPCM), the Multiple Choice Model (MCM), and the Nominal Categories Model (NCM), were compared. A set of polytomous item responses of 1,000 subjects to 30 items was simulated using a computer program (Monte Carlo Estimation). The results revealed that the 1-PL model (with only item difficulty) had the most accurate ability estimation, and the 3-PL model (with three types of parameters) was less accurate in ability estimation among the three different types of item parameterization models.

Kose (2014) carried out a study assessing model data fit of unidimensional item response theory models in simulated data. Responses of 1000 examinees to a dichotomously scoring 20 item test were simulated with 25 replications. Also, data were simulated to fit 2PL model. A 4 Step procedure was used for model-data fit. The study also used BILOG software. The results revealed that the 2PL model fits significantly better than the Rasch model. Similarly, the differences between the 3PLmodel and 2PLmodel were evaluated and the results showed that the 2PL model fits significantly better than the 3PL model.

**Methodology**

The Ex-post-facto research design was adopted for this study. The population of this study consisted of four thousand, two hundred and fifty three (4,253) students' responses in the 2014, 2015 and 2016 May/June NBC/NTC Examinations in English Language in Edo and Delta states, in Nigeria. The statistical population of items for this study was three

hundred (300) items, (100 each for 2014, 2015 and 2016 the three years under study). The table below indicates the distribution of the population.

**Table 1: Population Distribution of Candidates in Edo and Delta that sat for NABTEB May/June NBC/NTC English Language in 2014, 2015 and 2016 Examinations**

| YEAR | STATE | | | | TOTAL |
|---|---|---|---|---|---|
| | DELTA | | EDO | | |
| | Male | Female | Male | Female | |
| **2014** | 340 | 100 | 800 | 200 | 1440 |
| **2015** | 398 | 200 | 758 | 200 | 1556 |
| **2016** | 253 | 100 | 704 | 200 | 1257 |
| **TOTAL** | 911 | 400 | 2262 | 600 | 4253 |

Multistage sampling technique was employed for this study. The stages are highlighted below:

Stage 1: the schools were stratified into private and public schools.

Stage 2: random sampling was employed to select ten (10) schools, five (5) private and five (5) public schools.

Stage 3: in each school, one hundred (100) students were randomly selected in each year. The total number of participants in this study is three thousand (3,000) students made up of two thousand (2000) males and one thousand (1000) females. The male students enrolled more than the female students in NABTEB examinations, hence unequal numbers between the male and female responses.

The instrument that was used for this study is the NBC/NTC English Language Multiple Choice Test Items question paper for 2014, 2015 and 2016 May/June Examinations conducted by National Business and Technical Examinations Board (NABTEB). The instrument consisted of one hundred (100) items with four (4) options, each lettered A-D. The candidates were required to select one correct answer from these options. The responses to each item for all the students in the schools selected for the three years were obtained from the board. The validity and reliability of the instrument were determined by the board because it is a standardized test. The researchers prepared a person by item matrix with the horizontal axis showing the number of items and the vertical axis showing the number of persons and the cells indicating the responses of each examinee. The examinees' responses were analyzed using the IRT statistical software: eirt - Item Response Theory Assistant for Excel (Germain, Valois & Abdous, 2007), for the test items calibration to determine item parameters based on the IRT framework. The output included: Item Parameter Estimates; ability estimates, test of fit, local independence and Item characteristics curves.

## Findings

**Research question one**: Are there differences among the 1-, 2- and 3- parameter logistic models fits in the scores for the 2014 NABTEB English Language Multiple Choice test?

**Table 2: The Fit of Logistic Models in the 2014 NABTEB English Language Multiple Choice Test**

| PARAMETER LOGISTIC MODELS | | | ITEM FIT | | Total |
|---|---|---|---|---|---|
| | | | MISFIT ITEMS | FIT ITEMS | |
| | 1PLM | Count | 34 | 66 | 100 |
| | | Expected Count | 31.3 | 68.7 | 100.0 |
| | 2PLM | Count | 32 | 68 | 100 |
| | | Expected Count | 31.3 | 68.7 | 100.0 |
| | 3PLM | Count | 28 | 72 | 100 |
| | | Expected Count | 31.3 | 68.7 | 100.0 |
| Total | | Count | 94 | 206 | 300 |
| | | Expected Count | 94.0 | 206.0 | 300.0 |

Table 2 above shows the result of the chi-square goodness of fit analysis for the NABTEB certificate examinations. It can be deduced from the data on the table that 34 items, representing 34%, misfit the One Parameter Logistic Model (1PLM), while 66 items, representing 66%, fit the 1PLM. A total of 32 items, representing 32%, misfit the Two Parameter Logistic Model (2PLM) while 68 items, representing 68%, fit the 2PLM. Further, 28 items, representing 28%, misfit the Three Logistic Model (3PLM), while 72 items, representing 72%, fit the 3PLM. As the results show, the 1PLM, 2PLM and 3PLM fit the 2014 NABTEB English Language Multiple Choice test.

**Research Question two:** Which of the 1-, 2- and 3- parameter logistic models fit the scores for the 2015 NABTEB English Language Multiple Choice test?

**Table 3: The Fit of Logistic Models in the 2015 NABTEB English Language Multiple Choice Test**

| PARAMETER LOGISTIC MODELS | | ITEM FITS | | Total |
|---|---|---|---|---|
| | | MISFIT ITEMS | FIT ITEMS | |
| 1PLM | Count | 31 | 69 | 100 |
| | Expected Count | 35.7 | 64.3 | 100.0 |
| 2PLM | Count | 34 | 66 | 100 |
| | Expected Count | 35.7 | 64.3 | 100.0 |
| 3PLM | Count | 42 | 58 | 100 |
| | Expected Count | 35.7 | 64.3 | 100.0 |
| Total | Count | 107 | 193 | 300 |
| | Expected Count | 107.0 | 193.0 | 300.0 |

Table 3 above shows the results of the chi-square goodness of fit analysis for the 2015 NABTEB certificate examinations. It can be deduced that 31items (31%) misfit the One Parameter Logistic Model (1PLM), while 69 items (69%) fit the 1PLM. Also, 34 items (34%) misfit the Two Parameter Logistic Model (2PLM), while 66 items (66%) fit the 2PLM. Further, 42 items (42%) misfit the Three Logistic Model (3PLM) while 58 items (58%) fit the 3PLM. The results show, therefore, that the 1PLM, 2PLM and 3PLM fit the 2015

NABTEB English Language Multiple Choice test.

**Research Question three:** Which of the 1-, 2- and 3- parameter logistic models fits the scores for the 2016 NABTEB English Language Multiple Choice Test?

**Table 4: The fit of Logistic Models in the 2016 NABTEB English Language Multiple Choice Test**

| PARAMETER LOGISTIC MODELS | | ITEM FITS | | Total |
|---|---|---|---|---|
| | | MISFIT ITEMS | FIT ITEMS | |
| 1PLM | Count | 20 | 80 | 100 |
| | Expected Count | 28.0 | 72.0 | 100.0 |
| 2PLM | Count | 24 | 76 | 100 |
| | Expected Count | 28.0 | 72.0 | 100.0 |
| 3PLM | Count | 40 | 60 | 100 |
| | Expected Count | 28.0 | 72.0 | 100.0 |
| Total | Count | 84 | 216 | 300 |
| | Expected Count | 84.0 | 216.0 | 300.0 |

The table above shows the results of the chi-square goodness of fit analysis for the NABTEB certificate examinations. It can be deduced from the table that 20 items, representing 20%, misfit the One Parameter Logistic Model (1PLM), while 80 items, representing 80%, fit the 1PLM. A total of 24 items (24%) misfit the Two Parameter Logistic Model (2PLM), while 76 items (76%) fit the 2PLM. Also, 40 items (40%) misfit the Three Logistic Model (3PLM), while 60 items (60%) fit the 3PLM. Overall, the results show that the 1PLM, 2PLM and 3PLM fit the 2016 NABTEB English Language Multiple Choice test.

**Hypothesis one:** There are no significant differences among the 1-, 2- and 3- parameter logistic models fits in the 2014 NABTEB English Language Multiple Choice test.

**Table 5: Fit of 1-, 2- and 3- Parameter Logistic Models in the 2014 NABTEB English Language Multiple Choice test**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | .868[a] | 2 | .648 |
| Likelihood Ratio | .873 | 2 | .646 |
| Linear-by-Linear Association | .834 | 1 | .361 |
| N of Valid Cases | 300 | | |

**Significant at 0.05 level**

Table 5 above shows chi-Square Tests carried out on Fit of 1-, 2- and 3- Parameter Logistic Models in the 2014 NABTEB English Language Multiple Choice test. The Pearson Chi-Square depicts an F-ratio of .873 df 2 which is significant at p-value = .648. Comparing the p-value with the alpha level of .05, the p-value is greater than the alpha level

of .05; therefore, the null hypothesis that says, "There are no significant differences among the 1-, 2- and 3- parameter logistic models fits in the 2014 NABTEB English Language Multiple Choice test" is retained.

**Hypothesis two:** There are no significant differences among the 1-, 2- and 3- parameter logistic models fits in the scores for the 2015 NABTEB English Language Multiple Choice test.

**Table 6: Fit of 1-, 2- and 3- Parameter Logistic Models in the 2015 NABTEB English Language Multiple Choice test**

| | Value | Df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| **Pearson Chi-Square** | 2.818[a] | 2 | .244 |
| **Likelihood Ratio** | 2.800 | 2 | .247 |
| **Linear-by-Linear Association** | 2.628 | 1 | .105 |
| **N of Valid Cases** | 300 | | |

**Significant at 0.05 level**

Table 6 above shows chi-Square Tests carried out on Fit of 1-, 2- and 3- Parameter Logistic Models in the 2015 NABTEB English Language Multiple Choice test. The Pearson Chi-Square depicts an F-ratio of 2.800 df 2 which is significant at p-value = .244. Comparing the p-value with the alpha level of .05, the p-value is greater than the alpha level of .05; therefore, the null hypothesis that says, "There are no significant differences among the 1-, 2- and 3- parameter logistic models fits in the 2015 NABTEB English Language Multiple Choice test" is retained.

**Hypothesis three:** There are no significant differences among the 1-, 2- and 3- parameter logistic models fits in the 2016 NABTEB English Language Multiple Choice test.

**Table 7: Model Fit of 1-, 2- and 3- Parameter Logistic Models in 2016 NABTEB English Language Multiple Choice test**

| | **Value** | **df** | **Asymp. Sig. (2-sided)** |
|---|---|---|---|
| **Pearson Chi-Square** | 11.111[a] | 2 | .004 |
| **Likelihood Ratio** | 10.873 | 2 | .004 |
| **Linear-by-Linear Association** | 9.888 | 1 | .002 |
| **N of Valid Cases** | 300 | | |

**Significant at 0.05 level**

Presented on table 7 above are chi-Square Tests carried out on Fit of 1-, 2- and 3- Parameter Logistic Models in the 2016 NABTEB English Language Multiple Choice test. The Pearson Chi-Square depicts an F-ratio of 10.873 df 2 which is significant at p-value = .004. Comparing the p-value with the alpha level of .05, the p-value is less than the alpha level of .05; therefore, the null hypothesis that says, "There are no significant differences among the 1-, 2- and 3- parameter logistic models fits in the 2016 NABTEB English Language Multiple - Choice test" is rejected. Thus, the results show that there exist significant differences among 1-, 2- and 3- parameter logistic models fits in the

2016 NABTEB English Language Multiple Choice test.

**Discussion**

The results of this study as indicated on tables 2, 3, and 4 revealed that the 1-, 2- and 3- PLM fit the 2014, 2015 and 2016 NABTEB English Language multiple choice tests. This is contrary to findings by Chom, Lee and Arisley (2007) who claimed that the 1PLM had the largest misfit in items.

The hypothesis one test revealed that there were no significant differences among the 1-, 2- and 3- parameter logistic models fits in the scores for the 2014 NABTEB English Language Multiple Choice test. This implies that the 1-, 2- and 3- PLM fit the 2014 data. The findings are in disagreement with Chom, Lee and Arisley (2007) who claimed that the 1PLM had the largest misfit in items.

The second hypothesis revealed that there were no significant differences among the 1-, 2- and 3- parameter logistic models fits in the 2015 NABTEB English Language Multiple Choice test. The hypothesis was retained. This shows that the 1-, 2-, and 3- PLM fit the 2015 data. The findings are in disagreement with Chom, Lee and Arisley (2007), who claimed that the 1PLM had the largest misfit in items. Also, these findings are not in agreement with Si, (2002) and Kose (2014) who both claimed that the 1PLM and 2PLM were superior to the 3PLM.

The third hypothesis was tested with the Pearson Chi –Square test. The likelihood ratio value fit evidence obtained was significant, hence the hypothesis that says "there are no significant differences among the 1-, 2- and 3- parameter logistic models fits in the 2016, NABTEB English Language Multiple Choice test" was rejected. This shows that there exist significant differences among the 1-, 2- and 3- PLM fit in the 2016 data. Though they all fit the data, the 1PLM and 2PLM have fewer misfit items compared to the 3PLM. The results are in concord with the findings of Si (2002) and Kose (2014) who claimed that the 1PLM and 2PLM are superior to the 3PLM.

**Conclusions and Recommendations**

Based on the findings that the 1-, 2- and 3- Parameter Logistic Models fit the 2014, 2015 and 2016 NABTEB English Language Multiple Choice test, the researchers, therefore, conclude that none is empirically superior to others. Based on the this conclusion, the researchers, therefore, recommend that examining bodies embrace the IRT in item generation, assessment of candidates and analysis of results since it is the globally preferred method of test construction and analysis of results. Further, we recommend that examining bodies should engage the services of measurement experts who are proficient in IRT since IRT is very informative. There is the need for examining bodies to attend national workshops regularly to keep themselves abreast with advantages of the IRT over CTT and to key into its use.

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# The Assessment of IRT Model-Fit and Psychometric Parameters of 2017 National Common Entrance Examination (NCEE) Test Items Developed by National Examinations Council (NECO) in Nigeria

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## Abstract

*The study investigates the Item Response Theory (IRT) Model-fit and psychometric parameters of National Common Entrance Examination (NCEE) to establish the quality of the test items presented to primary school pupils in Nigeria for the purpose of placement into 104 Federal Government and Unity Colleges in the country. The study was aimed at determining the best Item Response Theory (IRT) Model-fit for the analysis of NCEE data and the quality of the NCEE test items. The data for the study was the pupils' item response matrix of NCEE conducted in 2017 in Nigeria by the National Examinations Council (NECO). The study employed an expost-facto research design and adopted the multistage stratified random sampling technique. From each of the 6 geo-political zones in the country, 3 states and the FCT were randomly selected to constitute the sample of the study. The 1PL, 2PL and 3PL models were deployed to investigate the IRT model-fit and psychometric parameters of the test items. The results of the study revealed that the 3PLM was the best model fit statistics for the data and that the quality of the test items, and ultimately the quality of the 2017 NCEE test, was very good. This was because the psychometric properties (Discrimination, Difficulty and Guessing indices) were very good. The DIF indices were good except for part two of NCEE paper two (Verbal Aptitude) where 38 out of 40 items functioned differentially in favour of male candidates. Based on the findings, the study recommends that examination bodies should use the IRT in validating their test instruments. Examination bodies, institutions of higher learning and researchers should determine and use the best (suitable model-fit statistics) IRT model for their data.*

**Keywords**: *Item Response Theory, Model Fit, Psychometric Parameters, NCEE, Assessment*

## Introduction

The National Examinations Council (NECO) was established in 1999 to, among other things, conduct public examinations in Nigeria. One of those examinations is the National Common Entrance Examinations (NCEE), which is conducted for primary school pupils in Nigeria in their final year for the purpose of placement into the Federal Unity Colleges in the country. The examination also covers overseas pupils who wish to gain admission into any of the Federal Unity Colleges. The objective of establishing Federal Unity Colleges in the country was to foster unity among young Nigerians with different languages, religious, ethnic and cultural backgrounds. It is worthy to note that over the years, as the number of primary school pupils that want to benefit from this scheme grew, the number of schools under this arrangement also grew, but the capacity to absorb all the pupils and satisfy the yearnings of the Nigerian parents fell short. Consequently, the admission into these schools became very competitive, making the Federal Government to introduce a quota system to ensure that all the states of the Federation are catered for.

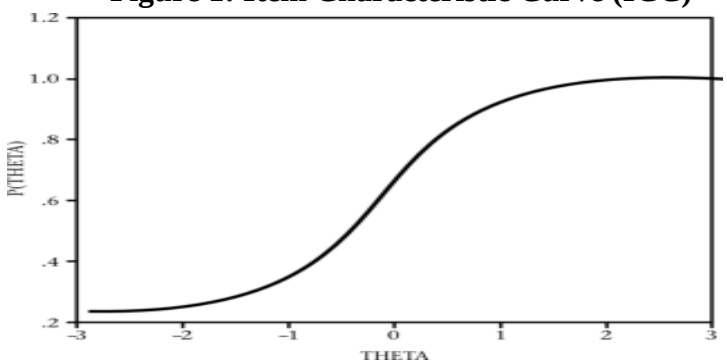
To achieve fairness in the conduct of NCEE, the Federal Government of Nigeria (National Policy on Education, 2004) stated that all national examination tests should be as valid as possible and as fair as possible to all students. Consequently, the nature and the quality of NCCE test items used by NECO need to be examined in order to find out if they meet the recommendations of the Federal Ministry Education in Nigeria. The quality of test items in any examination can only be ascertained by examining the psychometric properties of the examinees' responses in the examination. According to Adedoyin and Mokobi (2013), item analysis is a process that examines testees' responses to individual test items in order to assess the quality of those items and of the test as a whole. Classical Test Theory (CTT) was traditionally used to ascertain the proficiency of individual examinees, and usually reported in terms of number correct scores. However, now new studies have shown that there are underlying latent traits that needed to be measured. This is to say that examinees with the same number-right score may have different response patterns (i.e., correct answers on different items) and, thus, may not have the same level of proficiency measured by the test (Adedoyin and Mokobi, 2013). This is one of the weaknesses of the CTT approach in assessing the quality of test items. Also, the CTT framework usually reports the quality of test items based on the discrimination and difficulty indices without much regards to the guessing index.

## Item Response Theory (IRT)

The limitations of CTT made the IRT more useful now in assessing the quality of test items. According to Hambleton and Swaminathan (1985), the IRT indicates that, in testing, the performance of an examinee on a test can be explained by defining examinees' characteristics, known as traits, or abilities, using the traits to estimate scores for examinees and using the scores to predict or explain item and test performance. The IRT is used in carrying out a wide range of test item analysis. Its approach is embedded in a number of models, notably, the One, Two and Three Parameters Logistics Models. To determine the quality of a test item in the IRT framework, the discrimination (a), difficulty (b) and guessing (c) parameters as well as the Differential Item

Functioning (DIF) need to be examined. DIF occurs when an item functions differently for two groups of examinees after they have been matched with respect to a trait being measured. Item Characteristic Curve (ICC) is a key concept in IRT. An ICC is a monotonically increasing function that relates the relationship between examinees' item performance, $P_i$ (θ) and the traits (θ) underlying item performance. The ICC is further illustrated on figure 1 below.

**Figure 1: Item Characteristic Curve (ICC)**




(θ ,ABILITY)

According to Birnbaum, (1968) (as cited in Eng and Hoe, 2004), the equation of ICC of the three-parameter IRT logistic model is

$$P_i(\theta) = C_i + (1 - C_i)\frac{e^{Da_i(\theta - b_i)}}{1 + e^{Da_i(\theta - b_i)}}.$$

$P_i(\theta)$ is the probability that a randomly chosen examinee with ability θ answers item *i* correctly. *n* is the number of items in the test, *e* is the transcendental number with a value of 2.718, *θ* is the ability level, and *D* is the scaling factor 1.7 introduced to make the logistic function as close as possible to the normal ogive function. Where $a_i$ = is the discrimination parameter of item i, $b_i$ = is the difficulty parameter of item i and $c_i$ = is the pseudo-chance-level (guessing) of item i.

**Assumptions of IRT Models**

IRT Models have assumptions that must be met before the framework can be used. The assumptions of the IRT as given by Hambleton and Swaminathan (1991) are:

1. **Unidimensionality** - It is assumed that the examinee performance in a test can be accounted for by a single latent trait or ability.
2. **Local Independent** - An examinee's performance on one item does not affect his or her performance on the other items in the test. Assumption of local independent is equivalent to assumption of undimensionality.
3. **Item Characteristic Curve (ICC)** - ICC explains the relationship between the probability of an examinee responding to an item correctly, $P_i(\theta)$ and his/her trait or ability θ. How well the ICC explains this relationship depends on how well the chosen model fit the data.

**IRT Model Fit Analysis**

It is important to investigate data-model fit analysis before any model is applied to the data to determine its appropriateness, otherwise the researcher may reach an incorrect decision if the wrong model is used. There are many methods used for assessing model fit. In this

study, the likelihood ratio chi-square of goodness of fit statistics was used. It is contained in many IRT software like BILOG MG3 and MULTILOG.

**The Objective of the Study**

The objective of the study was to investigate the Item Response Theory (IRT) Model-fit analysis to ascertain the appropriateness of the IRT models for NCEE data, and to assess the psychometric parameters of NCEE data in order to establish the quality of the items presented to primary school pupils for admission into Federal Unity Colleges in Nigeria.

**Statement of the problem**

The quality of test items administered by examination bodies in Nigeria is often criticized by stakeholders in the education sector. The criticism is even more worrisome when it has to do with a highly competitive placement examination such as NCEE. This is at the backdrop of the policy of the Federal Government that all national examination tests should be as valid as possible and as fair as possible to all students. It became imperative to investigate the test items of 2017 NCEE to ascertain its quality using the IRT framework, which is generally considered to be superior to CTT framework.

**Research Questions**

Which of the IRT models represents the best fit for the 2017 NCEE data?

What is the quality of the discrimination parameters of the 2017 NCEE test items?

What is the quality of the difficulty parameters of the 2017 NCEE test items?

What is the quality of the guessing parameters of the 2017 NCEE test items?

What are the DIF indices of NCEE test items with respect to gender?

**Methodology**

**Research Design**

The study employed an expost-facto research design. Data for the study was Primary Six pupils' item response matrix of 2017 National Common Entrance Examination (NCEE) Multi-choice test conducted by NECO.

**Population of the Study**

The population of the study was made up of the 80,055 primary six candidates that sat for the 2017 National Common Entrance Examination (NCEE).

**Sample**

The sample was made up 31,876 Pupils who sat for the 2017 National Common Entrance Examination (NCEE). The study adopted the multistage stratified random sampling technique. From each of the 6 geo-political zones in the country, 3 states were randomly selected to give a total of 18 states. The Federal Capital Territory (FCT) and overseas candidates were also randomly selected. All the candidates from the selected states were used.

**Instrument**

The data for the research was collected from the ICT department of the National Examinations Council (NECO). The data were the responses of Pupils to 2017 NCEE test items for Papers I and II. Each paper contained two parts – A and B. Paper I consisted of Mathematics (40 Items) and General Science (10 Items) as Part A, and English Language (40 Items) and Social Studies (20 Items) as Part B. Similarly, Paper II consisted of Quantitative and Vocational Aptitude as Part A, and Verbal Aptitude as Part B.

All the two hundred (200) multiple choice items of 2017 NCEE were assessed and calibrated in the One, Two and Three Parameter Logistics

Models (PLMs) to determine the one with the best IRT Model fit statistics. The *de facto* binary software packages for IRT model estimation, BILOG-MG (Zimowski *et al.*, 2003) and Statistical Package for Social Science (SPSS) were used for the analysis.

**Test for Uni-dimensionality of IRT**

To check uni-dimensionality assumption of IRT, the Principal Component Analysis (PCA) was performed on the data to determine the degree to which each of the subtests could be considered to be unidimensional. The PCA of Mathematics and General Science, with the first un-rotated factors yielded 4 and 3 eigenvalues greater than one respectively, and accounting for 35.6% and 37.6% of the total respectively. For English Language and Social Studies, their first unrotated factors yielded 6 and 3 eigenvalues respectively, both greater than one. These respectively accounted for 39.9% and 48.9% of total variance. For Quantitative and Vocational Aptitude and Verbal Aptitude, their first unrotated factors yielded 15 and 14 eigenvalues respectively, both greater than one. These respectively accounted for 50.5% and 52% of total variance. This met the Reckase's (1979) minimum criterion of 20% needed to assure unidimensionality of data. According to Hambleton and Swaminathan (1991), if unidimentionality is met then local independence is also met.

The Chi-square goodness of fit statistics obtained from BILOG MG3 software was used to establish whether the NCEE Papers I and 2 fitted the 1PL, 2PL and 3PL models. No item was omitted from the calibration as none had its slope less than -0.15. DIF was investigated by evaluating the area between the ICCs of the two groups (Eng and Hoe, 2004). The larger the area, the greater is the degree of DIF between these two subgroups. The area computed between two ICCs should be zero if DIF is not present. Non-zero area does not indicate the presence of DIF item. A cut-off value for the area statistic was found and used to determine the presence of DIF item.

**Results and Discussion of Findings**

**Research Question One:** Which of the IRT models represents a best fit for the 2017 National Common Entrance Examination (NCEE) data?

**Table 1: Model fit information for the 2017 National Common Entrance Examination (NCEE) data**

| | |
|---|---|
| **Paper One Mathematics (40 ITEMS)** | **Paper One: Social Studies (20 ITEMS)** |
| -2Log likelihood 1-PL = 1380061.1517 | -2Log likelihood 1-PL = 685406.7318 |
| -2Log likelihood 2-PL = 1357806.8341 | -2Log likelihood 2-PL = 668677.8938 |
| **-2Log likelihood 3-PL = 1353039.9002** | **-2Log likelihood 3-PL = 668667.5297** |
| **Paper One: General Science (10 ITEMS)** | **Paper two: Quantitative Aptitude (50 ITEMS)** |
| -2Log likelihood 1-PL = 382313.5336 | -2Log likelihood 1-PL = 576398.6690 |
| -2Log likelihood 2-PL = 381721.9190 | -2Log likelihood 2-PL = 561023.2717 |
| **-2Log likelihood 3-PL = 381654.4668** | **-2Log likelihood 3-PL = 557811.0372** |
| **Paper One: English Language (50 ITEMS)** | **Paper two: Verbal Aptitude (40 ITEMS)** |
| -2Log likelihood 1-PL = 1355656.6339 | -2Log likelihood 1-PL = 428065.8337 |
| -2Log likelihood 2-PL = 1336078.8381 | -2Log likelihood 2-PL = 419941.5345 |
| **-2Log likelihood 3-PL = 1334141.9042** | **-2Log likelihood 3-PL = 413446.1992** |

**Source:** BILOG MG3 analysis results

Table 1 above shows the IRT model fit information of the 2017 NCEE data for 1-, 2- and 3- PLMs. The marginal maximum log likelihood function value obtained from BILOG MG3 after the last cycle was used for comparing and obtaining best model fit for the 2017 NCEE. The 3- parameter logistic model had the lowest -2 Log likelihood in all the subtests of NCEE papers one and two compared to 1- and 2- PLMs. This is an indication of best model fit. This is in line with the work of Awopeju and Afolabi (2016), who compared the -2log likelihood values obtained from BILOG MG3 for 1PL, 2PL and 3PL, and asserted that the one with the lowest value was the best fit. The use of the best model fit for item analysis helps to ensure the validity of the test items. Further results are presented on tables 2 and 3 below.

**Table 2: Item Parameters of the test items in NCEE Paper I based on 3PL Model**

| **MATHEMATICS PART A** | | | | **GENERAL SC1ENCE PART A** | | | | **ENGLISH PART B** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ITEM** | ***a*** | ***b*** | ***c*** | **ITEM** | ***a*** | ***b*** | ***c*** | **ITEM** | ***a*** | ***b*** | ***c*** |
| 01 | 0.781 | -0.317* | 0.024 | 41 | 0.341 | 1.337 | 0.067 | 26 | 1.654 | 1.943 | 0.052 |
| 02 | 0.522 | 1.338* | 0.019 | 42 | 0.361 | 1.706 | 0.055 | 27 | 0.691 | 0.037* | 0.008 |
| 03 | 1.036 | 0.579* | 0.082 | 43 | 0.423 | 0.014* | 0.057 | 28 | 1.107 | -0.469* | 0.017 |
| 04 | 1.009 | -0.883* | 0.016 | 44 | 0.558 | 1.224 | 0.055 | 29 | 1.081 | -0.348* | 0.018 |
| 05 | 0.827 | -0.311* | 0.043 | 45 | 0.520 | 0.008* | 0.053 | 30 | 1.026 | -0.063* | 0.049 |
| 06 | 0.569 | -0.190* | 0.021 | 46 | 0.432 | 2.224 | 0.058 | 31 | 1.291 | -0.614* | 0.009 |
| 07 | 1.404 | 0.273* | 0.075 | 47 | 0.413 | 2.030 | 0.089 | 32 | 1.305 | 0.041* | 0.035 |
| 08 | 1.313 | -0.277* | 0.037 | 48 | 0.275 | 5.413 | 0.110 | 33 | 1.551 | -1.135 | 0.009 |
| 09 | 1.697 | 0.601* | 0.141 | 49 | 0.662 | 2.259 | 0.101 | 34 | 0.902 | -1.064 | 0.010 |
| 10 | 1.297 | -0.163* | 0.057 | 50 | 0.535 | 0.147* | 0.065 | 35 | 0.569 | 0.592* | 0.017 |
| 11 | 1.536 | 0.513* | 0.095 | **ENGLISH PART B** | | | | 36 | 1.032 | 1.496 | 0.110 |
| 12 | 2.024 | 1.274 | 0.125 | **ITEM** | ***a*** | ***b*** | ***c*** | 37 | 1.000 | -0.900* | 0.007 |
| 13 | 1.254 | -0.152* | 0.043 | 1 | 1.069 | 0.975* | 0.096 | 38 | 0.667 | 0.119* | 0.013 |
| 14 | 1.112 | -0.042* | 0.023 | 2 | 0.749 | -0.806* | 0.013 | 39 | 0.667 | 0.414* | 0.024 |
| 15 | 0.810 | 0.144* | 0.065 | 3 | 1.050 | -0.449* | 0.016 | 40 | 0.510 | 1.168 | 0.017 |
| 16 | 1.275 | -0.190* | 0.060 | 4 | 1.132 | 0.470* | 0.076 | **SOCIAL STUDIES PART B** | | | |
| 17 | 0.965 | 0.760* | 0.134 | 5 | 1.897 | -0.477* | 0.015 | **ITEM** | ***a*** | ***b*** | ***c*** |
| 18 | 0.815 | 1.683* | 0.089 | 6 | 1.864 | 1.001 | 0.141 | 41 | 0.638 | -0.025* | 0.011 |
| 19 | 1.098 | 0.340* | 0.093 | 7 | 1.739 | 1.413 | 0.106 | 42 | 1.426 | -0.462* | 0.043 |
| 20 | 1.019 | 0.805* | 0.036 | 8 | 1.753 | -0.182* | 0.017 | 43 | 1.266 | -0.400* | 0.018 |
| 21 | 1.089 | 1.760* | 0.129 | 9 | 1.580 | 0.091* | 0.026 | 44 | 1.571 | -0.697* | 0.010 |
| 22 | 1.762 | 0.785* | 0.135 | 10 | 1.766 | 0.769* | 0.092 | 45 | 1.441 | -0.835* | 0.009 |
| 23 | 0.781 | 1.407 | 0.145 | 11 | 1.852 | -0.459* | 0.017 | 46 | 0.253 | 0.494* | 0.031 |
| 24 | 2.214 | 1.294 | 0.116 | 12 | 1.679 | 2.426 | 0.062 | 47 | 0.744 | -0.354* | 0.011 |
| 25 | 1.209 | 0.959* | 0.116 | 13 | 1.779 | -0.806* | 0.008 | 48 | 0.617 | 0.154* | 0.010 |
| 26 | 1.647 | 0.673* | 0.119 | 14 | 1.770 | 2.174 | 0.098 | 49 | 1.237 | -0.567* | 0.007 |
| 27 | 0.857 | 0.348* | 0.090 | 15 | 1.955 | -0.046* | 0.105 | 50 | 1.074 | -0.098* | 0.011 |
| 28 | 0.857 | 1.502 | 0.092 | 16 | 1.296 | 0.649* | 0.112 | 51 | 1.018 | -0.585* | 0.007 |
| 29 | 1.562 | 0.735* | 0.090 | 17 | 1.466 | 1.487 | 0.158 | 52 | 1.036 | -0.223* | 0.006 |
| 30 | 1.037 | 0.594* | 0.066 | 18 | 1.988 | 0.212* | 0.073 | 53 | 0.895 | 0.458* | 0.067 |
| 31 | 0.589 | 1.237 | 0.071 | 19 | 1.673 | 1.883 | 0.112 | 54 | 0.877 | 3.084 | 0.090 |
| 32 | 0.291 | 0.428* | 0.035 | 20 | 1.821 | 0.855* | 0.073 | 55 | 1.248 | -0.727* | 0.008 |

| | | |
|---|---|---|
| 33 1.440 1.607 0.169 | 21 1.933 -0.715* 0.010 | 56 1.002 -0.222* 0.007 |
| 34 0.876 2.298 0.132 | 22 1.494 -0.653* 0.012 | 57 0.389 1.148 0.015 |
| 35 0.827 1.321* 0.127 | 23 1.852 0.423* 0.059 | 58 0.917 -0.291* 0.007 |
| 36 1.016 1.959 0.072 | 24 1.450 0.490* 0.011 | 59 0.736 0.301* 0.016 |
| 37 0.995 0.560* 0.060 | 25 1.122 -0.984* 0.009 | 60 1.365 -0.671* 0.015 |
| 38 1.313 1.663 0.073 | | |
| 39 0.755 -0.458* 0.020 | | |
| 40 1.258 0.065* 0.039 | | |

**Source:** BILOG MG3 3PL analysis results.

**Table 3: Item Parameters of the test items in NCEE Paper II based on 3PL Model**

| **QUANTITATIVEVOCATIONAL APTITUTE PART A** | **QUANTITATIVEVOCATIONAL APTITUTE PART A (CONT.)** | **VERBAL APTITUTE PART B (CONT.)** |
|---|---|---|
| **ITEM *a* *b* *c*** | **ITEM *a* *b* *c*** | **ITEM *a* *b* *c*** |
| 01 2.125 -1.310 0.058 | 32 2.155 1.949 0.192 | 11 2.125 -0.810* 0.029 |
| 02 1.964 -0.548* 0.037 | 33 1.533 0.628* 0.171 | 12 1.062 0.169* 0.046 |
| 03 2.147 -0.858* 0.028 | 34 2.499 1.035 0.148 | 13 0.897 0.780* 0.036 |
| 04 2.237 -1.152 0.039 | 35 1.992 1.862 0.175 | 14 1.340 -0.854* 0.031 |
| 05 1.229 0.385 0.026 | 36 1.203 1.710 0.138 | 15 1.533 -0.649* 0.034 |
| 06 1.050 1.577 0.058 | 37 1.529 1.465 0.178 | 16 2.08 -0.597* 0.032 |
| 07 1.436 1.856 0.156 | 38 1.478 1.707 0.123 | 17 1.097 0.160* 0.030 |
| 08 2.266 0.916* 0.071 | 39 1.620 1.913 0.165 | 18 1.156 -0.072* 0.027 |
| 09 2.522 0.934* 0.073 | 40 3.747 2.367 0.260 | 19 2.050 -0.685* 0.032 |
| 10 2.331 0.895* 0.134 | 41 0.292 2.052 0.172 | 20 1.545 -0.152* 0.036 |
| 11 2.298 0.951* 0.045 | 42 0.940 -0.366* 0.070 | 21 2.348 -0.907* 0.027 |
| 12 2.168 2.332 0.139 | 43 0.609 0.240* 0.089 | 22 1.525 -0.661* 0.028 |
| 13 2.208 2.246 0.257 | 44 0.400 2.231 0.109 | 23 2.082 -0.823* 0.031 |
| 14 2.580 2.286 0.088 | 45 0.104 2.734 0.085 | 24 1.945 -0.735* 0.034 |
| 15 2.046 2.263 0.104 | 46 0.708 2.549 0.157 | 25 1.612 -0.687* 0.024 |
| 16 2.155 0.278* 0.056 | 47 0.611 2.015 0.050 | 26 2.153 -0.535* 0.058 |
| 17 1.962 0.392* 0.046 | 48 0.495 2.105 0.092 | 27 1.903 -0.622* 0.030 |
| 18 2.137 0.935* 0.072 | 49 0.426 3.613 0.112 | 28 1.572 0.344* 0.055 |
| 19 1.894 1.122 0.111 | 50 0.470 2.202 0.087 | 29 1.494 -0.393* 0.025 |
| 20 1.895 0.922* 0.125 | **VERBAL APTITUTE PART B** | 30 1.402 0.309* 0.049 |
| 21 2.101 1.038 0.095 | **ITEM a b c** | 31 1.592 0.236* 0.078 |
| 22 1.962 1.981 0.115 | 1 1.337 -1.575 0.054 | 32 1.650 0.498* 0.120 |
| 23 2.426 2.302 0.169 | 2(Not CALIBRATED LOW *R*) | 33 1.738 0.228* 0.109 |
| 24 2.511 2.267 0.183 | 3 1.079 1.843 0.128 | 34 2.266 -0.014* 0.079 |
| 25 2.203 1.164 0.227 | 4 0.846 0.831* 0.064 | 35 2.154 0.068* 0.082 |
| 26 2.996 1.263 0.137 | 5 1.383 -0.823* 0.057 | 36 0.741 2.517 0.067 |
| 27 2.312 1.036 0.110 | 6 1.647 -0.446* 0.075 | 37 1.325 -0.387* 0.027 |
| 28 2.068 0.861* 0.183 | 7 1.801 -1.188 0.035 | 38 1.313 1.527 0.083 |
| 29 2.720 0.892* 0.131 | 8 1.938 -1.025 0.045 | 39 0.129 19.381 0.024 |
| 30 2.967 0.898* 0.191 | 9 1.843 -0.846* 0.030 | 40 1.325 0.037* 0.033 |
| 31 2.391 0.913* 0.163 | 10 1.843 -1.125 0.029 | |

**Source:** BILOG MG3 3PL analysis results

**Research Question Two:** What is the quality of the discrimination parameters of the 2017 NCEE tests?

Table 2 above reveals that 9 (8.2%) items with values ranging from .01 - .49 showed low discriminating values, while 33 (30%) items with values within the range of .5 - .99 indicated moderate discriminating values, and 68 (61.8%) items within the range of $1<a<3$ indicated high discriminating values. This

shows that the test items of NCEE Paper I discriminated very well, and that the quality of discrimination parameters is good. Similarly, table 3 above shows the discriminating parameters for Paper II of NCEE. The results of the calibration of the 3PLM of IRT showed that 7 (7.8%) items with values within the range of .01 - .49 showed low discriminating values, while 7 (7.8%) items with values within the range.5 - .99 indicated moderate discriminating values and 76 (84.4%) items within the range of $1<a<3$ indicated high discriminating values. The test items of NCEE Paper II discriminated very well between the high ability candidates and the lower ability candidates. This implied that the discriminating parameters of the items were of good quality. Reeve and Fayers (2005) noted that discrimination parameter of IRT indicates how well an item discriminates between high and low ability examinees. This finding is supported by the Ani (2014) study, which found that the 3PLM of IRT can be used to estimate the discrimination parameters.

**Research Question Three:** What is the Quality of the difficulty parameters of the items of the NCEE test?

Table 2 above indicates that 2 (1.8%) items with *b*-values less than -1 showed low difficulty estimates, while 82 (74.6%) items with *b*-values within the range $-1<b<1$ indicated moderate difficulty values and 26 (23.6%) items with difficulty estimates $b>1$ are considered high difficult items. Since over 70% of the difficulty estimates of the items were within moderate difficulty, the quality of the difficulty estimates of NCEE Paper I is considered excellent. Similarly, table 3 shows the difficulty estimates of Paper II, where 6 (6.7%) items with *b*-values less than -1 showed low difficulty estimates, 48 (53.3%) items with *b*-values within the range $-1<b<1$ indicated moderate difficulty estimates and, 36 (40%) items with difficulty estimates b>1 are considered high difficult items. Since over 50%of the difficulty estimates of the items within moderate difficulty, the quality of the difficulty estimates of NCEE Paper II is considered good. Moderate difficulty range, $-1<b<1$, is considered the best for a good test. Test items with difficulty estimates of *b* greater than 1 are considered very difficult. It means low ability candidates may not be able to answer the items, while items with *b*-values less than -1 are very easy items which most candidates, including those with low ability, will have at least a good chance of answering correctly. The findings agree with the Chong (2013) study that concluded that the values of difficulty parameter of IRT indicate how difficult or easy a test item is. This is also supported by the work of Ani (2014) who used 3PL model of IRT to estimate the difficulty parameters of a multiple choice test in Economics in Nigerian secondary schools.

**Research Question Four:** What is the quality of the guessing parameters of the NCEE test items?

Tables 2 and 3 above show that all the guessing (asymptote) parameters of NCEE papers one and two were of excellent quality. They were all within the range $0<c<2$, which is the optimal range. It means that none of the test items in the NCEE test were susceptible to guessing. Any guessing parameter outside the range $0<c<2$ means the test item is susceptible to guessing.

**Research Question Five:** What are the differential item functioning (DIF) indices of NCEE test items with respect to gender?

**Table 4: IRT DIF Indices of NCEE test items with respect to Gender using IRT Approach**

| **NCEE PAPER ONE** | | | | **NCEE PAPER TWO** | | | |
|---|---|---|---|---|---|---|---|
| **Maths Paper 1A** | | **English Paper 1B** | | **Quantitative and Voc. Aptitude Paper IIA** | | **Verbal Aptitude Paper IIB** | |
| 1 | -0.045 | 1 | 0.049 | 1 | **-13.903*** | 1 | **-1.773*** |
| 2 | -0.082 | 2 | -0.225 | 2 | 0.111 | 2 | Xxx |
| 3 | -0.085 | 3 | -0.120 | 3 | 1.018* | 3 | -1.561* |
| 4 | 1.063* | 4 | -0.002 | 4 | 1.895* | 4 | -1.752* |
| 5 | -0.091 | 5 | -0.159 | 5 | 0.169 | 5 | -1.516* |
| 6 | -0.003 | 6 | 0.178 | 6 | 0.207 | 6 | -1.757* |
| 7 | -0.082 | 7 | -0.113 | 7 | 0.227 | 7 | -1.743* |
| 8 | -0.110 | 8 | -0.011 | 8 | 0.186 | 8 | -1.774* |
| 9 | 0.018 | 9 | 0.163 | 9 | 0.179 | 9 | -1.911* |
| 10 | -0.068 | 10 | 0.111 | 10 | 0.177 | 10 | 63.113* |
| 11 | -0.032 | 11 | 0.000 | 11 | 0.190 | 11 | -1.730* |
| 12 | 0.029 | 12 | 0.059 | 12 | 0.301 | 12 | -1.679* |
| 13 | -0.083 | 13 | -0.026 | 13 | 0.375 | 13 | -1.677* |
| 14 | -0.100 | 14 | 0.100 | 14 | 0.310 | 14 | -1.816* |
| 15 | -0.074 | 15 | -0.031 | 15 | 0.449 | 15 | -1.680* |
| 16 | -0.055 | 16 | 0.105 | 16 | 0.154 | 16 | -1.813* |
| 17 | 0.030 | 17 | 0.363 | 17 | 0.176 | 17 | -1.653* |
| 18 | -0.071 | 18 | 0.018 | 18 | 0.161 | 18 | -1.629* |
| 19 | -0.017 | 19 | 0.310 | 19 | 0.291 | 19 | -1.390* |
| 20 | 0.105 | 20 | 0.067 | 20 | 0.198 | 20 | -1.593* |
| 21 | -0.044 | 21 | -0.011 | 21 | 0.201 | 21 | -1.776* |
| 22 | -0.021 | 22 | -0.114 | 22 | 0.207 | 22 | -1.705* |
| 23 | -0.072 | 23 | -0.050 | 23 | 0.224 | 23 | -1.775* |
| 24 | 0.070 | 24 | -0.038 | 24 | 0.225 | 24 | -1.801* |
| 25 | -0.064 | 25 | -0.034 | 25 | 0.173 | 25 | -1.830* |
| 26 | -0.004 | 26 | 0.065 | 26 | 0.221 | 26 | -1.565* |
| 27 | -0.093 | 27 | -0.047 | 27 | 0.200 | 27 | -1.550* |
| 28 | -0.006 | 28 | -0.057 | 28 | 0.190 | 28 | -1.438* |
| 29 | -0.029 | 29 | -0.120 | 29 | 0.201 | 29 | -1.588* |
| 30 | -0.012 | 30 | 0.007 | 30 | 0.189 | 30 | -1.482* |
| 31 | -0.040 | 31 | -0.056 | 31 | 0.197 | 31 | -1.720* |
| 32 | 0.059 | 32 | 0.085 | 32 | 0.260 | 32 | -1.739* |
| 33 | 0.006 | 33 | -0.070 | 33 | 0.185 | 33 | -1.749* |
| 34 | 0.019 | 34 | -0.050 | 34 | 0.187 | 34 | -1.806* |
| 35 | 0.034 | 35 | 0.011 | 35 | 0.147 | 35 | -1.800* |
| 36 | 0.116 | 36 | 0.033 | 36 | 0.156 | 36 | -1.646* |
| 37 | -0.043 | 37 | -0.032 | 37 | 0.205 | 37 | -1.757* |
| 38 | 0.094 | 38 | -0.146 | 38 | 0.141 | 38 | -1.639* |
| 39 | -0.128 | 39 | -0.092 | 39 | 0.240 | 39 | -0.784* |
| 40 | -0.091 | 40 | -0.120 | 40 | 0.212 | 40 | -1.518* |
| **Gen. Sc Paper1A** | | **NCEE1 Social Studies** | | 41 | 0.295 | | |
| 41 | 0.114 | 41 | -0.025 | 42 | 0.159 | | |
| 42 | -0.163 | 42 | -0.042 | 43 | 0.330 | | |
| 43 | -0.376 | 43 | 0.019 | 44 | 0.364 | | |

| | | | | | |
|---|---|---|---|---|---|
| 44 | 0.072 | 44 | -0.080 | 45 | 0.083 |
| 45 | -0.044 | 45 | -0.065 | 46 | -0.120 |
| 46 | -0.010 | 46 | 0.029 | 47 | 0.367 |
| 47 | 0.080 | 47 | -0.008 | 48 | 0.219 |
| 48 | -0.114 | 48 | 0.016 | 49 | 0.671* |
| 49 | 0.244 | 49 | -0.026 | 50 | 0.800* |
| 50 | 0.195 | 50 | 0.101 | | |
| | | 51 | -0.129 | | |
| | | 52 | -0.044 | | |
| | | 53 | 0.106 | | |
| | | 54 | 0.125 | | |
| | | 55 | -0.060 | | |
| | | 56 | -0.145 | | |
| | | 57 | 0.281 | | |
| | | 58 | -0.107 | | |
| | | 59 | -0.109 | | |
| | | 60 | 0.162 | | |

*** (DIF<- 0.5 Or DIF>0.5) represent items found to be differentially functioning**.

The above table reveals that in NCEE paper I, only item 4 of mathematics was differentially functioning in favour of females. General Science, English and Social Studies had no single DIF test item. Similarly, in NCEE paper two, five items (1, 3, 4, 49 and 50) of Quantitative Aptitude were differentially functioning, all in favour of females. Thirty-nine items (39) of Verbal Aptitude were differentially functioning. Only one item (item 60) was in favour of females. The remaining 38 items, except for item 52 (not calibrated because the bi-serial correlation index was less that -15), were differentially functioning in favour of males. There may be extraneous factors that accounted for this behavour. This finding matches the findings of a study by Davis (2002) that established that sometimes items are found to behave differently in distinct groups such as gender or language. The cut-off value (range) used to determine the presence of DIF item in this study was (DIF<-0.5 or DIF>0.5). This is supported by Eng and Hoe (2004) who used a cut off value of DIF>0.5481.

**Conclusion**

The findings in this study revealed that the best model fit for 2017 NCEE data was the 3 Parameter Logistics Models (PLM). The study also revealed that the qualities of discrimination, difficulty and guessing parameters indices of 2017 NCEE using 3PL were very good. The DIF of all the subtests of 2017 NCEE were very good except for paper two of part two of NCEE (Verbal Aptitude) where some items showed very distinct behavour in the response pattern for gender, thereby manifesting DIF in almost all the test items in the paper. Therefore, based on the data analysed in this study, it can be concluded that the 2017 NCEE conducted by NECO fit the IRT model with 3PL as the best. It can be further concluded that the quality of the 2017 NCEE test items of NECO was very good.

**Recommendations**

Following the conclusions of the study highlighted above, it is recommended that examining bodies use the IRT in validating their test instruments. This will ensure that all the psychometric indices are found for effective

test development. Further, examining bodies, tertiary institutions and researchers that want to deploy the IRT framework in analyzing data should make sure that the models selected fit the data. They should also ensure that all the psychometric parameters are satisfactory. The study also recommends the use of the Item Response Theory (IRT) by examining bodies should to analyze the response of their items because it gives the guessing parameter

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# Stakeholders' Perceptions of the Integration of Digital Technology into the Conduct of Public Examinations in Nigeria

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**Abstract**

*The integration of digital technologies into the conduct of public examinations is a process that seeks to ensure that the assessment design is driven to support a high quality learning experience for students, and improve efficiency in the management of assessment in the assessment industry. Though the use of digital technology in educational assessment in Nigeria is relatively new, it is fraught with numerous challenges. In this regard, the study was designed to; determine education stakeholders' perceptions of the integration of digital technology into the conduct of public examinations in Nigeria, and describe the challenges and strategies for improving the integration of digital technology into Nigerian educational assessment. To carry out the study, a sample of 600 participants, comprising of 240 teachers, 120 principals and 240 personnel from examining bodies, were randomly selected from the six geo-political zones of the country by a means of the multistage random sampling procedure. Data collected were analyzed using descriptive statistics. The results of the study revealed that there was great support for the integration of digital technology into the conduct of public examinations in Nigeria. Paucity of funds, inadequate skilled manpower and lack of adequate telecommunication infrastructure coverage in the rural areas were among the challenges militating against digital technology integration into the conduct of public examinations. Strategies for improving the integration of digital technology into public examinations are also advanced in this study, and these include the use of Digital Technology (DT) tools to shuffle questions in examinations, E-marking of essay papers, use of digital technology for classroom instructions and assessment, training of teachers and students on the use of digital technology, establishing a Digital Technology Education Trust Fund for procuring digital technology tools and software for schools and providing Telecommunication infrastructure to rural areas and schools.*

***Keywords**: Digital Technology, Public Examinations, Education Stakeholders, Assessment*

## Introduction

The field of educational assessment is evolving rapidly with the advent of digital technology. With the aid of modern online digital technology tools, which include computers, internet facilities, teleconferencing, videophones, projectors, multimedia systems and mobile technology, teachers can now grade students' work quickly and easily, thereby saving more time for classroom instruction**.** Digital technology, especially online educational technology tools, is spreading fast into educational instruction and assessments with each passing day. Students are also getting more entangled with technology for social media interactions and research work since they enable them to search and do their assignments. Meanwhile, the teachers are beginning to use them for assessment purposes because they are more convenient and offer fast and fair assessment of students' work while providing instant feedback to students (Lin, 2018). This trend appears to have started relegating the paper and pencil testing to the background, thereby making it lose its relevance and importance. According to Lin (2018), digital assessment tools make lives easier for both the teachers and the learners because students can get answers to their questions without interrupting one another and all their activities can be tracked by a teacher on the spot. She also opined that using digital technology in assessing students makes it fun for them and creates a better learning environment.

Digital technology is a type of technology that generates, stores and processes data as a string of binary digits which consist of only zeros and ones (Lin, 2018). Initially, this technology could only be found in computers, but now they are found in a wide range of electronic devices such as cell phones, MP3, scanners, digital camera and camcorders. The beauty of this technology is that it allows manuscripts and books to be transcribed or scanned into digital form and searched via electronic devices online. This technology can be used in a wide range of areas, which include classroom instruction and assessment. Digital technology tools in education include computers and their accessories, scanners, digital camera, phones, faxes, modem, videophone, multimedia systems, disk player, recorders, radio and television, internet facilities, teleconferencing, projectors, joysticks, Ipads and devices and all the necessary softwares (Onah and Okoro, 2010; Lin, 2018).

The successes recorded in classroom assessment using digital technology made educators to extend it to large scale assessment. In many universities and higher institutions all over the world, digital technology is deployed in assessing and grading students' work. Some higher institutions in Nigeria, such as Federal University of Technology, Akure and Federal University of Technology, are maximizing the use of digital technology as tools for undergraduate and postgraduate assessments (Abubakar and Adebayo, 2014). The Joint Admissions and Matriculation Board (JAMB) in Nigeria also use digital technology to conduct placement examination for qualified candidates to be admitted into universities using digital technology (Alabi, Issa and Oyekunle, 2012).

The integration of digital technologies into the conduct of public examinations at secondary school level in Nigeria is seen to be overdue. It is a process that seeks to ensure that the assessment design is driven to support a high

quality learning experience for students by providing instant and detailed feedback regarding student knowledge, skills, and attributes; guarantees fast and fair assessment of the candidates; improves efficiency in the management of assessment by public examining bodies; and provides satisfactory assessment outcomes to the education stakeholders by producing results that are trusted for their credibility (Thurlow, Lazarus, Albus, and Hodgson, 2010; Lin, 2018). It suffices to say that though the use of digital technology into the conduct of public examinations and indeed educational assessment in Nigeria is relatively new, it is fraught with numerous challenges. These challenges include lack of infrastructure, lack of qualified ICT personnel, poor power supply, poor ICT funding, inaccessibility to the internet, etc (Aduwa-Ogiegbaen & Iyamu, 2005). Education stakeholders and policy makers in Nigeria should begin to address these challenges so as to fully integrate digital technology into the conduct of public examinations at secondary school level.

According to Adebayo (2013), stakeholders are a group of people who have vested interest in any action of an organisation. It could be an individual or group of people with an interest in the success of an organisation**.** According to Osakwe (2012) as cited in Ajegben (2016), the Federal Ministry of Education in Nigeria created ICT department in 2007 to collaborate with several government agencies and other stakeholders in the private sector to initiate ICT driven projects and programmes at all levels of education sector. Thurlow et al. (2010) suggests that the assumptions and beliefs of various education stakeholders about computer-based instructions and assessments should be given due considerations by states and education authorities towards achieving full integration of digital technology for instructions and assessments. Education stakeholders, therefore, include principals, schools administrators, teachers, and students, parents, examining bodies, school management committees, parent-teacher associations and the Ministry of Education**.** Brussels (2011) states that in the school system, stakeholders act in an advisory position, contributing funds for development, training and retraining of teachers and staff, and developing policies for the school among other things**.** Consequent upon the above, the study sought to find the education stakeholders' (teachers, principals and staff of examining bodies) perceptions of the integration of digital technology into the conduct of public examination at Senior Secondary Certificate Examination (SSCE) level in Nigeria, and the challenges and strategies for improving the integration of digital technology into the Nigerian assessment industry.

**Statement of the Problem**

Change is the only thing that is permanent in life. There are changes in all spheres of human lives, ranging from climate, agriculture, economy, technology, teaching and learning to educational assessment. Technology is changing the world and Nigeria is no exception to these changes, especially as they relate to education and assessment. In recent times, the mode of the conduct of examination in schools has begun to experience these changes. The conduct of public examination is not an exception. Observations showed that the problem of examination integrity in the Nigerian educational system has been a matter of concern to education stakeholders. The most effective ways of conducting hitch and

malpractice-free public examination have been generating serious concern among the education stakeholders. There is a great move to consider an alternate means of conducting public examinations other than the pen and paper format. This is with a view to ameliorating the challenges associated with the Pen and Paper testing. There are disagreements over the use of technology in the conduct of public examinations in Nigeria, whether the country is ripe to integrate technology into the conduct of public examinations as well as the numerous challenges impeding the integration of digital technology into the Nigerian assessment system. Therefore, this study sought education stakeholders' (teachers, principals and staff of examining bodies) perceptions of the integration of digital technology into the conduct of public examination, the challenges and strategies for improving the integration of digital technology in the Nigerian educational assessment system.

**Purpose of the Study**

The study aimed at determining education stakeholders' perceptions of the integration of digital technology in the conduct of public examinations in Nigeria. It also sought to addresses the challenges faced in integrating digital technology into the conduct of public examinations in Nigeria and the strategies for improving the integration of digital technology in the Nigerian educational assessment.

**Objective of the Study**

The general objective of this study was to explore the possibility of conducting public examinations in Nigeria using digital technology tools. Hence, the specific objectives of the study were as follows:

To examine education stakeholders' perceptions of the integration of digital technology into the conduct of public examinations in Nigeria

To examine the challenges faced in integrating digital technology into the Nigerian educational assessment system

To examine the strategies for improving the integration of digital technology into the Nigerian educational assessment system

**Research Questions**

The following research questions guided the study:

What are the perceptions of Education Stakeholders on the integration of digital technology into the conduct of public examinations in Nigeria?

What are the challenges of integrating digital technology into the Nigerian educational assessment system?

What strategies can be employed for improving the integration of digital technology into the Nigerian educational assessment system?

**Methodology**

**Design of the Study:** A descriptive survey research design was adopted in this study. **Population of the Study:** The population of the study consists of the Senior Secondary Schools in the six geo-political zones of Nigeria and 3 examining bodies in Nigeria that conduct Senior School Certificate Examination (SSCE) for senior secondary schools in Nigeria.

**Sample and Sampling Techniques**

A simple random sampling was used to select 6 States (Lagos, Niger, Kano, Bauchi, Enugu and

Rivers states), one each from the six geo-political zones in the country and an examining body (National Examinations Council). From each of the sampled states, 40 teachers, 20 principals and 40 members of staff of the examining body were selected using the random sampling technique. Therefore, a total of 600 respondents were selected comprising of 240 teachers in senior secondary schools who teach Computer Studies or use digital technology in assessing students, 120 Principals of senior secondary schools and 240 members of staff at the National Examinations Council (NECO) as education stakeholders.

**Instrument for Data Collection**

The instrument used to collect data was the Stakeholders Perception of Digital Technology Integration in Public Examination (SPDTIPE) questionnaire for the teachers, principals and staff of examination bodies. The items were constructed to answer the research questions formulated to guide the study. The questionnaire consisted of two sections: Section A elicits information on the respondents' personal data, while Section B contains three parts of items structured in Likert scale format to provide answers to the research questions.

**Validation of the Instrument**

The questionnaire was subjected to face and content validity. The face validity was carried out by an ICT expert and two measurement and evaluation experts. Their inputs were included in the final instrument. A pilot study was also carried out using twenty teachers, ten principals and twenty staffers from examining bodies (non-participating members) from the population and content validity was obtained using Lawshe's Content Validity Ratio (CVR). The CRV coefficient of 0.74 was obtained.

**Reliability of the Instrument**

The reliability of the instrument was established using the Cronbach-Alpha Coefficient for establishing reliability. The coefficient of reliability of 0.91 was obtained for the instrument. This high value shows that the instrument was reliable and suitable for the study.

**Procedure for Data Collection and Analysis**

The researchers administered 600 questionnaires to the sampled respondents in the selected senior secondary schools. Trained research assistants were used to administer the questionnaires to the respondents. Out of the 600 administered questionnaires, the completed and returned questionnaires were 205 for teachers, 101for principals and 201for staff of examining body. However, for the purpose of analysis, 200 teachers, 100 principals and 200 staffers of the examining body were used. The data collected were analysed using descriptive statistics such as frequencies, means and percentages. The items in the questionnaire were positively worded in 5 and 4 points Likert scale formats. The 5 point Likert scale format was rated thus; strongly agree=5, agree=4, Neutral=3, disagree=2 and strongly disagree=1, while the 4 point Likert scale format was rated strongly agree=4, agree=3 disagree=2 and , strongly disagree=1.

**Answers to Research Questions and Findings**

**Research Question 1:** What is the perception

of Education Stakeholders on the integration of digital technology in the conduct of public examinations in Nigeria?

**Table 1: Education stakeholders' Perceived integration of digital technology into the conduct of public examinations**

| S/N | Perception on the integration of digital technology | A (%) | D (%) | Total (%) | Decision |
|---|---|---|---|---|---|
| | DTB examination saves time and resources. | 68.8 | 31.2 | 100 | Agreed |
| | Using digital technology in preparing and declaring results minimizes clerical mistakes. | 75.0 | 25.0 | 100 | Agreed |
| | DTB examinations are a more secured technique of assessment than PPB | 65.2 | 34.8 | 100 | Agreed |
| | Results of DTB examinations are always valid | 61.4 | 38.6 | 100 | Agreed |
| | Using DT affects students positively | 60.6 | 39.4 | 100 | Agreed |
| | DTB examinations in Nigeria only should be limited to school based examination for now | 64.2 | 35.8 | 100 | Agreed |
| | DTB examination is better than PPB in conducting public examination | 51.4 | 48.6 | 100 | Agreed |
| | DTB examination is preferred formant for obtaining examination results | 71.4 | 28.6 | 100 | Agreed |
| | DTB examinations improve marking and processing of results | 83.6 | 16.4 | 100 | Agreed |
| | DT tools should be deployed now to conduct public examinations (SSCE) in Nigeria | 35.4 | 64.6 | 100 | Disagreed |
| | DTB examinations can improve ICT literacy levels of students and teachers | 72.0 | 28.0 | 100 | Agreed |
| | DT improves the quality of the public examination for students. | 85.5 | 15.5 | 100 | Agreed |
| | DT tools should be used for the conduct of public examination. | 87.9 | 12.1 | 100 | Agreed |
| | DT tools enhance the effectiveness of teaching activities. | 82.6 | 17.4 | 100 | Agreed |
| | DTB examination helps to curb the menace of examination malpractice | 68.0 | 32.0 | 100 | Agreed |
| | **Grand Mean** | **68.8** | **31.2** | **100** | **Agreed** |

**Keys: DT =** Digital technology, **DTB**= Digital technology Based, **PPB**=Paper and Pencil Based.

**Note:** Agreed and Strongly Agreed were merged to get Agreed (**A**), Disagreed and Strongly Disagreed were merged to get Disagreed (**D**).

Fifteen (15) items and percentages of responses on the perception of education stakeholders on the integration of digital technology in the conduct of public examinations in Nigeria are displayed in table 1. As can be seen from the table, that *digital technology tools should be used for the conduct of public examination* got the highest mean percentage score of 87.9%, followed by that *digital technology improves the quality of the public examination for students* (85.5%), and *digital technology based (DTB) examinations improve marking and processing of results* (83.6%), while that *digital technology tools should be deployed now to conduct public examinations (SSCE) in Nigeria* got the least (35.4%). These results generally suggest that education stakeholders believed that the integration of digital technology into the conduct of public examinations in Nigeria is a welcome development that should be pursued. However, it should not be done without adequate preparation.

**Research Question 2:** What are the challenges of integrating digital technology into the Nigerian educational assessment system?

**Table 2: Challenges of Integrating Digital Technology into the Conduct of Public Examinations in Nigeria**

| S/N | Challenges of Integrating Digital Technology | Agreed (%) | Disagreed (%) | Total (%) | Decision |
|---|---|---|---|---|---|
| | DT cannot be used to assess essay components of assessment in Nigeria | 62.2 | 37.8 | 100 | Agreed |
| | Most teachers and students are not accessible to DT tools in schools | 46.6 | 53.4 | 100 | Disagreed |
| | DTB examinations are prone to mass leakages of exam papers if not properly secured | 64.0 | 36.0 | 100 | Agreed |
| | DT has not been properly integrated/implemented in rural schools | 65.2 | 34.8 | 100 | Agreed |
| | The absence of government policy to co-ordinate and integrate DT in schools for assessment. | 81.4 | 18.6 | 100 | Agreed |
| | Insufficient funding for DT in Nigerian secondary schools | 86.4 | 13.6 | 100 | Agreed |
| | Lack of requisite telecommunications infrastructure coverage rural areas in Nigeria for the conduct of DTB examination | 60.2 | 39.8 | 100 | Agreed |
| | The lack of electric power in many parts of the Nigeria | 69.4 | 30.6 | 100 | Agreed |
| | Inadequate ICT skilled manpower in Nigeria | 64.0 | 36.0 | 100 | Agreed |
| | Poor internet services across Nigeria. | 71.0 | 29.0 | 100 | Agreed |
| | Lack of DT tools necessary for integrating DT in schools | 72.6 | 27.4 | 100 | Agreed |
| | Lack of DT software applications in secondary schools in Nigeria | 71.8 | 28.2 | 100 | Agreed |
| | **Grand Mean** | **67.9** | **32.1** | **100** | **Agreed** |

**Note:** Agree and Strongly Agree were merged to get Agree; Disagree and Strongly Disagree were merged to get Disagree.

Table 2 above shows twelve (12) items and the percentage responses on the challenges of integrating digital technology in the conduct of public examinations in Nigeria. The respondents agreed on eleven (11) of the items. Most of the respondents (86.4%) agreed

that there is insufficient funding for digital technology in Nigerian secondary schools, followed by the absence of government policy to co-ordinate and integrate digital technology in school for assessment purposes (81.4%), while most of the respondents (53.4%) disagreed that teachers and students were failing to have access to digital technology tools in schools. The import of the above is that there are challenges impeding the integration of digital technology in the conduct of public examinations.

**Research Question 3:** What are the strategies for improving the integration of digital technology into the conduct of public examinations in Nigerian?

**Table 3: Mean Responses of the Strategies for Improving the Integration of Digital Technology in the Nigerian Educational Assessment System Education Stakeholders**

| S N | Strategies for Improving the Integration of Digital Technology | Teachers | | Principals | | EBS | |
|---|---|---|---|---|---|---|---|
| | | Mean | Decision | Mean | Decision | Mean | Decision |
| | DTB examinations reduce cheating by a difficult shuffle of questions. | 3.41 | Agreed | 3.52 | Agreed | 3.58 | Agreed |
| | E-marking of essay papers should be introduced. | 1.87 | **Disagreed** | 1.79 | **Disagreed** | 3.82 | Agreed |
| | A nation-wide policy should be prepared for DTB exams at secondary school level. | 3.27 | Agreed | 3.57 | Agreed | 3.74 | Agreed |
| | Both systems of DTB and PPB examinations should be kept parallel. | 3.36 | Agreed | 3.87 | Agreed | 3.68 | Agreed |
| | **Ministry of Education should make a master plan to introduce Digital technology based examinations at national level.** | 3.35 | Agreed | 3.50 | Agreed | 3.95 | Agreed |
| | All secondary school teachers are required to improve on the use of digital technology for classroom instructions and assessment. | 3.43 | Agreed | 3.77 | Agreed | 3.81 | Agreed |
| | Teachers and students should be trained on the use of digital technology. | 3.61 | Agreed | 3.74 | Agreed | 3.96 | Agreed |
| | **A Digital Technology Education Trust Fund should be established to fund digital technology tools and software for schools** | 3.69 | Agreed | 3.88 | Agreed | 3.85 | Agreed |
| | **Telecommunication infrastructure should be extended to rural areas and schools** | 3.46 | Agreed | 3.73 | Agreed | 3.85 | Agreed |
| | **Provision of standby generators for every secondary school in Nigeria to ensure adequate electric power** | 3.32 | Agreed | 3.74 | Agreed | 3.66 | Agreed |
| | **Grand Mean** | **3.27** | **Agreed** | **3.51** | **Agreed** | **3.79** | **Agreed** |

**Keys: EB**S = Examining Bodies Staff, **S/N**= Serial Number

**Source:** Field Survey Conducted, (2018).

The mean responses on the strategies for improving the integration of digital technology in the conduct of public examinations in Nigeria are shown on table 3 above. Nine of the ten items had mean responses of between 3.27 and 3.69 for teachers showing that the respondents agreed on those identified strategies for improving the integration of digital technology in the conduct of public examinations in Nigeria. Similarly, nine of the ten items had mean responses of between 3.50 and 3.88 for principals, which showed that the respondents agreed on those strategies identified for improving the integration of digital technology into the conduct of public examinations in Nigeria. Furthermore, all the items had mean responses of between 3.58 and 3.96 for examining bodies' staff. This showed that the respondents agreed on all the identified strategies for improving the integration of digital technology in the conduct of public examinations in Nigeria. However, the teachers and principals did not agree on item 2 that e-marking of essay papers should be introduced, with the mean scores of 1.87 and 1.79 for the teachers and principals respectively.

## Discussion of Findings

The study was designed with the purpose of determining the education stakeholders' perceptions of the integration of digital technology in the conduct of public examinations, and the challenges of integrating digital technology and the strategies for

improving its use in Nigerian assessment industry. The results revealed that out of the fifteen (15) items for determining the education stakeholders' views on the integration of digital technology in the conduct of public examinations in Nigeria, fourteen (14) items had a mean percentage responses of 50% and above for agreed, which indicated positive support of the integration of digital technology in the conduct of public examinations in Nigeria. The respondents (64.5%) disagreed on item 10 as indicated on table 1, which suggests that digital technology tools should not be deployed immediately into the conduct of Senior School Certificate Examinations (SSCE) in Nigeria until adequate preparations have been made. The benefits of integrating digital technology into the conduct of public examinations as indicated by participants are that: it saves time and resources (68.2%), makes examination more secured (65.2%);it improves validity of examination (61.4%); it improves marking and processing of examination results (87.6%); and it helps to curb the menace of examination malpractice (68%) etc. This is supported by Alabi, Issa and Oyekunle (2012) who opined that using CBT for examinations has enormous benefits, which include objectivity and security of test questions for examinations as well as eliminating cases of examination malpractice. Also, a study by Okocha, Toluwani and Owolabi (2017) on students' perception of the use of CBT in assessment in Nigeria showed high acceptance rate by students.

As indicated on table 2, there are challenges in integrating digital technology into the Nigerian assessment system, especially in the conduct of public examinations. Some of the challenges identified by the education stakeholders include: difficulty in assessing essay component of any subject (62.2%); unavailability of digital technology tools in many secondary schools (53.4%); mass leakages of examination papers if not properly secured (64%); lack of rural coverage of digital technology tools (65.2%); insufficient funding (76.4%); inadequate telecommunications infrastructure coverage in Nigeria (60.2%); poor electricity power in many parts of Nigeria (69.4%); inadequate ICT skilled manpower (64%); and poor internet services across Nigeria especially in rural areas (71%). The findings are supported by the work of Bandari (2014) that advances that inadequate computers, poor ICT skills, loss of data in the process of writing Computer Based Tests and Assessments, hazard of screen reading and poor internet network were the problems affecting the use of CBT in the conduct of public examinations in Kenya. Similarly, Azubuike and Offordile (2012) state that some technology tools like internet, computers, projectors, synchronous internet, web-based training and screen images were lacking in most secondary schools in Nigeria. Though, the use of digital technology in the conduct of public examinations like SSCE in Nigeria is a welcome development, care must be taken to resolve these challenges, which are likely to make it difficult to fully integrate it into the conduct of public examinations immediately.

Further, table 3 revealed the strategies for improving the integration of digital technology into the conduct of public examination in Nigeria. The respondents (teachers and principals) agreed with nine of the ten items while the staffers of the examining body agreed with all the strategies. This showed that the respondents were in agreement with the

strategies identified for improving the integration of digital technology in the conduct of public examinations. This is supported by a study carried out by Amiaya (2014) that the education stakeholders have similar opinion on the strategies for improving the provision of ICT resources geared towards ICT application to practical work and assessment. This also agrees with the suggestion of Ojukwu and Ojukwu (2006), cited in Amiaya (2014), that ICT infrastructure should be adequately funded since lack of ICT infrastructure and poor facilities were due to poor funding. They also observed that ICT facilities do not only help students, but they also assist teachers in carrying out their teaching activities. Laaria (2013) points out strategies for improving CBT to include the provision of infrastructure, and these are: training and retraining teachers on the effective use of ICT; supporting software development; promotion of local assembly of ICT equipment and accessories; and provision of incentives for the promotion of ICT infrastructure.

**Conclusion**

The study sought to establish the opinions of education stakeholders on the possibility of conducting public examinations in Nigeria at secondary school level using digital technology tools. The study also examined the challenges facing the integration of digital technology in the Nigerian educational assessment system as well as the strategies for improving the integration. It was found that there is great support for the adoption of digital technology in the conduct of public examinations in Nigeria at senior secondary school level, though with adequate preparation before its take off. Numerous challenges were identified to be responsible for the poor integration of digital technology in public examinations. They include paucity of fund, inadequate skilled manpower, lack of adequate telecommunication infrastructure coverage in the rural areas, poor government policy on technology integration, inadequate technology tools in schools etc. Strategies for improving the integration of digital technology in public examination were also advanced, such as shuffling of examination questions for each candidate, provision of adequate technology tools, proper funding of technology, e-marking of essay papers, using digital technology in classroom instruction, etc.

**Recommendations**

The study recommends that the government and examining bodies set up plans for gradual integration of digital technology in the conduct of public examinations. DTB and PPB examinations should be kept parallel for a while before full digital technology integration into the conduct of public examination. Further, the government should make digital technology more accessible to teachers and students. This should be done by procuring all necessary DT tools for the schools. There should also be a sustained government digital technology policy to co-ordinate and integrate it into the schools for teaching and assessment purposes. It is also recommended that the government ensures that requisite telecommunications infrastructure coverage are extended to all schools, especially the rural ones.

The study also recommends that the government provides adequate funding for Digital technology in Nigerian secondary schools. It should also make provision for adequate electricity supply in all senior secondary schools. Standby generators should

be provided. We also recommend continuous training of teachers on the use of digital technology tools to enable them acquire necessary technology skills required to improve on the use of digital technology for classroom instructions and assessment. Lastly, examining bodies should ensure that when deployed, DTB examinations would employ shuffling of questions available to each student to avoid malpractice. E-marking should also be introduced for essay papers to improve marking and ensure early release of results.

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# 21st Century assessment in Nigerian secondary schools through Digital Media

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## Abstract

*This study examined the current trends towards utilization of digital media in 21st century school assessment. A sample of 200 senior secondary school students and 50 teachers were randomly selected for the study from a population of all secondary school students and teachers in Lagos State. A descriptive survey design was utilized for the study. An opinion survey questionnaire was developed for the study. It consisted of two sections tagged Section A and Section B. Section A included items that focused on students'/teachers' bio-data, which included school, class, gender, age. Section B consisted of: (i) a structured table highlighting various social media platforms that can be utilized for teaching; (ii) an array of time spent on social media; and (iii) ten question items on a 5point rating scale (SA, A, D, SD, U) for students and teachers to elicit their knowledge of ICT and utilization of digital learning platforms. The questionnaire items were subjected to face and content validation and its empirical validity was ensured through a pilot testing in a neutral school. Its reliability coefficient r was calculated as 0.78 using Cronbach alpha. Five research questions guided the study. The results gathered from the field were analyzed using frequency counts, percentages, descriptive statistics tools and the bench mark mean analysis method. The results of the study showed that Facebook was the social learning platform utilized the most by teachers and students; teachers and students spent between 30 minutes to 1 hour each day on social media; teachers utilized computer based test platforms for their classroom teaching. Students and teachers were well equipped with relevant knowledge of ICT. Therefore, the researcher recommends that schools should be structured in such a way as to cater for both teachers' and students' progressive skills and technical knowledge acquisition so as to help sustain them for the 21st century digital assessment procedures. To this end, seminars, workshops and other relevant programs should be put in place to help achieve this vision and ideal.*

***Key words:*** *Digital Media, Digital learning platforms, teacher's bio-data*

## Introduction

To ascertain the level of understanding or knowledge acquired by learners, appropriate tools or mechanisms that give a representation of what the learners already know with respect to set instructional aims, goals or objectives must be utilized. Assessment involves the techniques, tools, methods or mechanisms employed by evaluators to measure, and document the academic readiness, learning progress, skill acquisition, or educational needs of students. It also gives a representation of the existing state of an observable phenomenon. In the classroom environment, the teacher is expected to elicit responses from the students, by way of obtaining feedback as regards the approaches, methods or techniques employed in the class. Assessment as a major subset of evaluation, oftentimes involves decision making, judgment of worth, amount, number, or value of something. Evaluation is a systematic determination of the merit, worth and significance of something, using laid down criteria governed by a set of standards and usually acceptable by those involved in the decision making process. However, both assessment and evaluation do not exist in isolation; they co-exist. Also, for a decision to be made, an accurate representation of the object, item or commodity to be judged must be measured. Thus, assessment involves measurement, a way of obtaining numerical equivalence of the worth of an item. Usually associated with measurement is a test, a set of stimuli presented to respondents.

Assessments are often associated with traditional tests typically designed to measure specific elements of learning or instruction. The former can entail evaluating the level of knowledge or skills students already have of what the teacher plans to teach. They may help to identify individual student's weaknesses and strengths either formatively or summatively. In formative assessment, the teacher is solely interested in the level of knowledge the learners have prior to presentation of a new lesson or it may be for the teacher to get a picture of the effectiveness of an on-going program.

Summative assessments are given at the end of a program to get feedback about the success levels of a program. Summative assessment has become routine and has influenced the focus and contents of tests. Results from large-scale summative assessments, along with other measures of achievement, are regularly used to determine whether students can advance to the next class, and to judge the quality of schools, instructions and educators. Other forms of assessment include diagnostic, dynamic, synoptic, criterion referenced, teacher-made, standardized, and summative assessment.

Based on technological advancements, the teaching and learning processes have gradually witnessed a transition from the traditional teacher-dominated classrooms to the all-inclusive setting. The outcome of the traditional school is a widening gap between the knowledge, skills students are acquiring in schools and the knowledge and skills needed to succeed in the increasingly global, technology-infused 21st century workplace. While current assessment measures knowledge of core content areas such as language arts, mathematics, science and social studies, there is a comparative lack of assessments and analyses focused on 21st century skills.

As identified by the Partnership for 21st Century Skills (2009), current paper and pencil based tests fall short in several key ways:

- The tests are not designed to gauge how well students apply what they know to new situations or evaluate how students might use technologies to solve problems or communicate ideas.
- While teachers and schools are being asked to modify their practices based on standardized test data, traditional tests are not designed to help teachers make decisions about how to assess their daily instructions.
- Current testing systems are rarely designed to measure a school or district's contribution to a learner's total education history.

In recent times, students do not fully rely on their teachers for instruction. The presence of digital technology has affected the teaching and learning situation. Lecture notes, study materials, learning resources among others are readily available online. Students can also form study groups over the internet, since distance is no longer a barrier to learning. The emergence of new technologies has been revolutionary by giving people more access, choice and power.

Social media, also called Web 2.0 based applications, include online chat forums, wikis, blogs, social networking sites, etc. These platforms make knowledge sharing easy and unobtrusive for the user. As opined by Mondahl and Razmerita (2014), the former facilitate communication, sharing of information and online socialization. Web 2.0 users may easily express or share their opinions, 'think by writing', seek others' opinions and feedback and be connected with the others. Furthermore, multimedia production in the forms of audio (e.g. podcasting using mobile technology) or video (vodcasting, YouTube) continues to grow and offer new opportunities for teaching, learning and assessment (Mondahl and Razmerita 2014.)

The digital age presents the educational sector an avenue to utilize learning materials, which were not easily assessable in the traditional era. Teachers are no longer referred to as the sole custodians of knowledge, but as facilitators (Arikewuyo, 2017). Various teaching approaches have been developed to cater for these changing trends in the educational setting, and some of these techniques or approaches include; cooperative learning and constructivism, project/experimentation among others. The emphasis of learning in the digital world is solely centered on pragmatism, utilitarianism, and experimentation. Thus, hands-on and practical activities are fully encouraged by schools.

Similarly, the evaluation or assessment procedure utilized in schools must also reflect the changing trends in the educational sector; hence the need for assessment procedures such as portfolio, which measures how well students have acquired or mastered a set of skills upon completion of a set of instructions over a period of time.

Despite the numerous benefits associated with the digital age, most developing countries cannot fully utilize 21st century approaches to assessment. Most schools in developing countries do not have a functional Information Communication and Technology (ICT) unit; those who do may be poorly equipped, while some may be equipped but are saddled with irregularities in power supply. Furthermore, schools may not have qualified teachers to utilize some of the gadgets readily available in schools. In a similar instance, the teacher-

students ratio is often so large that the teacher finds it difficult to organize a practical session with the students. Hence, most developing countries do not fully utilize and benefit from the advent of digital technology.

**Statement of the Problem**

It is no news that students' performances in internally and externally conducted tests and examinations have nose-dived over time. Most failures are often attributable to teachers' methodology, test procedures, as well as students' readiness, disposition to learning, and attitudes, among other reasons. Many a times, students misinterpret the test items, thereby presenting wrong answers during tests and examinations. A faulty understanding of the assessment modality can as well affect students' performance.

A noticeable instance is the recent transition from the Paper and Pencil Based Test to the Computer Based Test (CBT) as being conducted by the Joint Admissions and Matriculation Board (JAMB) in Nigeria. Students from areas that lack adequate infrastructure usually find this examination boring or stressful. The students undergo a crash program on how to utilize the CBT for their examinations. Students struggle to utilize the keyboard, and control the mouse. To minimize these issues, JAMB, in the 2017 examinations, limited the keyboard usage to 8 keys, that is, all the candidates for the examinations need to do is to press the letters A, B, C, D for responses to questions, and keys: P, N, S and R representing; Previous question, Next question, Submit and Reverse respectively.

It is expected that educators are fully trained on how to make their classroom teaching and learning processes technologically enhanced, as this will not only pave the way for apt transmission of information and ideas between the teacher and the students, but to also prepare students for the challenges of an uncertain future.

**Objectives**

It was the intention of this study to carry out a survey of teachers and students in Nigeria to determine which and how social media are utilized in schools. Specifically the objectives of this study were to:

Find out which social learning platforms were most utilized by teachers and students

Find out how much time was spent on social media by teachers and students

Find out if teachers utilized computer based test platforms for their classroom teachings

Find out if students and teachers were well equipped with relevant knowledge of ICT.

**Research Questions**

What social learning platform is utilized the most by teachers and students?

How much time is spent on social media by teachers and students?

Do teachers utilize computer based test platforms for their classroom teaching and learning processes?

Are students and teachers well equipped with relevant knowledge of ICT?

**Conceptual Framework**

Digital learning platforms and their associated tools enable students to individually store their own information, give and receive feedback,

reflect on their progress and present selected evidence for particular purposes. According to the Partnership for the 21st Century skills (2009), a relevant new model of assessment must:

- Measure students' mastery of 21st century skills.
- Diagnose where students require intervention in terms of 21st century skills.
- Measure the educational system's effectiveness in teaching 21st century skills.
- Permit students to demonstrate their proficiency in 21st century skills to educational institutions and prospective employers.

**Significance of the Study**

This study is of importance to students, teachers as well as school administrators. Findings from the study should help identify ways in which assessment can be utilized to reflect the yearnings of the 21st century students and also the requirements of the digital age. It is expected that the results gathered are useful in harmonizing the contents of schools' curricula to readily meet the demands and requirements of the digital age. Similarly, the results would afford policy makers, researchers, curriculum developers as well as all stakeholders in the educational sector an opportunity to see the need for drifting towards, and embracing, the 21st century assessment procedures, so as to be able to produce a global student that can fully fit into the ever changing society and world of work.

**Methodology**

This study utilized a descriptive survey design. The population for this study comprised all Senior Secondary School II Physics students and teachers in Badagry Local Government area of Lagos State, Nigeria. The sample comprised 200 SS II Physics students and 50 teachers randomly selected from 10 different Schools. A questionnaire consisting of two Sections (A and B) was used, with Section A focusing on student-teacher bio-data and Section B seeking respondents' views on the utilization of various social media platforms for teaching on a 5 point Likert scale (SA, A, D, SD, U). The questionnaire also sought to elicit participants' knowledge of ICT and digital learning platforms. After face and content validation, the questionnaire reliability coefficient r was calculated at 0.78 using Cronbach alpha.

**Procedure for Data Collection**

The researcher visited the sample secondary schools to administer the questionnaire to the respondents with the help of their respective teachers/administrators. The completed questionnaires were collected from the students immediately after completion. They were collated and compiled for analysis.

**Data Analysis Method**

The data were analyzed using frequency counts, percentages, descriptive statistics tools and the bench mark mean analysis method.

**Results &Discussion**

**Research Question One:** What is the social learning platform most utilized by teachers and students?

A total of 28 social media platforms that can be adapted to digital learning were identified.

These are;

Coursera (C)
Edmodo (EDM)
TedEd
Google+ (G+)
Facebook (FB)
Twitter (TWT)
Instagram (INS)
Vimeo (VIM)
Wordpress (WP)
logger (BLG)
Skype (SKYP)
Daily motion (DM)
Rebel mouse (RM)
Hootsuite (HS)
Pinterest (PI)
Youtube (YT)
Teachertube (TT)
Academia.edu (A.E)
Linkedin (LI)
Labroots (LR) Researchgate (RG)
Labforculture (LFC)
Cultureinside (CI)
Gogoyoko (GY)
Sgrouples (SGR)
Twiducate (TW)
Edu2.0 (EDU)
Wikispaces classroom (WIKI)

**Table 1: Social Media Utilized by Teachers (N = 50)/Students (N = 200)**

| S/N | Social Media | Symbol | Frequency (f) | | Percentage (%) | |
|---|---|---|---|---|---|---|
| | | | Teacher (N=50) | Student (N=200) | Teacher (N=50) | Student (N=200) |
| 1. | Facebook | FB | 39 | 184 | 78 | 92 |
| 2. | Google+ | G+ | 38 | 171 | 76 | 85.5 |
| 3. | Youtube | YT | 32 | 168 | 64 | 84 |
| 4. | Instagram | INS | 19 | 134 | 38 | 67 |
| 5. | Twitter | TWT | 12 | 99 | 24 | 49.5 |
| 6. | Teachertube | TT | 10 | 21 | 20 | 10.5 |
| 7. | Skype | SKYP | 8 | 51 | 16 | 25.5 |
| 8. | Academia.edu | A.E | 6 | 35 | 12 | 17.5 |
| 9. | Linkedin | LI | 6 | 22 | 12 | 11 |
| 10. | Researchgate | RG | 6 | 22 | 12 | 11 |
| 11. | Wordpress | WP | 3 | 26 | 6 | 13 |
| 12. | Blogger | BLG | 4 | 35 | 8 | 17.5 |
| 13. | Daily motion | DM | 2 | 11 | 4 | 5.5 |
| 14. | Twiducate | TW | 4 | 15 | 8 | 7.5 |
| 15. | Edu2.0 | EDU | 3 | 9 | 6 | 4.5 |
| 16. | Pinterest | PI | 2 | 21 | 4 | 10.5 |
| 17. | Wikispaces classroom | WIKI | 3 | 28 | 6 | 14 |
| 18. | Labroots | LR | 3 | 11 | 6 | 5.5 |
| 19. | TedEd | | 1 | 4 | 2 | 2 |
| 20. | Sgrouples | SGR | 1 | 3 | 2 | 1.5 |
| 21. | Hootsuite | HS | 0 | 3 | 0 | 1.5 |
| 22. | Labforculture | LFC | 0 | 6 | 0 | 3 |
| 23. | Cultureinside | CI | 0 | 3 | 0 | 1.5 |
| 24. | Gogoyoko | GY | 0 | 11 | 0 | 5.5 |
| 25. | Vimeo | VIM | 0 | 7 | 0 | 3.5 |
| 26. | Coursera | C | 0 | 0 | 0 | 0 |
| 27. | Edmodo | EDM | 0 | 0 | 0 | 0 |
| 28. | Rebel mouse | RM | 0 | 0 | 0 | 0 |

From Table 1 above, it is indicated that Facebook is the social media platform most utilized by teachers and students, that is, 78% and 92% respectively, followed by Google+ at 76% for teachers and 85.5% for students, and then YouTube with 64% and 84% for the teachers and the students respectively. The following media were sparingly utilized by teachers, TedEd, Twitter, Instagram, Wordpress, Blogger, Skype, Daily motion, Pinterest, Wikispace classroom, Teachertube, Academia.edu, Linkedin, Labroots, Researchgate, Sgrouples, Twiducate and Edu 2.0, while 8 were not utilized, including Coursera; Edmodo; Vimeo; Rebel Mouse; HootSuite; LabforCulture.org; Culture Inside and Gogo Yoko.

Students fairly utilized Instagram (67%) and Twitter (49.5) while 16 platforms, TedEd, Vimeo, Wordpress, Blogger, Skype, Daily motion, Pinterest, Wikispace classroom, Teachertube, Academia.edu, Linkedin, Labroots, Researchgate, Sgrouples, Twiducate and Edu 2.0 were sparingly utilized. Finally three patforms were not utilized at all, and these were; Coursera, Edmodo and Rebel Mouse.

**Research Question Two:** How much time is spent on social media by teachers and students?

From Table 2 below, it can be seen that 40% of teachers and 35% of students spent between 30 minutes to 1hour on social media platforms, while 2% of the teachers and 8.5 % of the students spent between 3 to 5 hours on social media.

**Table 2: Time spent on Social Media by Teachers and Students**

| | Teachers (N=50) | | Students (N=200) | |
|---|---|---|---|---|
| | f | % | f | % |
| Less than 30 Minutes | 14 | 28.0 | 49 | 24.5 |
| 30 Minutes to 1hour | 20 | 40.0 | 70 | 35 |
| 1hour to 3hours | 13 | 26.0 | 43 | 21.5 |
| 3hours to 5hours | 1 | 2.0 | 17 | 8.5 |
| More than five hours | 2 | 4.0 | 21 | 10.5 |
| Total | 50 | 100 | 200 | 99.5 |

**Research Question Three:** Do teachers utilize computer based test platforms for their classroom teaching?

To determine if teachers utilized computer based test platforms for teaching, the benchmark mean method was utilized. The benchmark mean is obtained as follows:

**Bench Mark Mean** = $\frac{Minimum+Maximum}{2}$ = $\frac{5+25}{2} = 15.$

Table 3 below shows that a mean of 17.2800 greater than the bench mark mean of 15, demonstrated that teachers utilize computer based test platforms for their teaching.

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Teachers | 50 | 5.00 | 25.00 | 17.2800 | 5.97969 |

**Research Question Four:** Are students and teachers well equipped with relevant knowledge of ICT? Table 4 below shows that the calculated means on students and teachers

with relevant knowledge of ICT are greater than the bench mark mean of 15. This implies that both students and teachers were well equipped with relevant knowledge of ICT.

**Table 4: Students' and teachers' proficiency in knowledge of ICT**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Students | 200 | 5.00 | 25.00 | 18.2100 | 3.41823 |
| Teachers | 50 | 5.00 | 25.00 | 18.6200 | 4.65500 |

The use of digital platforms in schools is often limited to the popular social media platforms. As revealed in this study, Facebook is the social medium most utilized by teachers as well as students. This finding is in line with those revealed by Seaman and Tinti-Kane (2013), Mendez, Le, De La Cruz (n.d); Nielsen (2010) cited in Barczyk and Duncan (2011). The study also revealed that teachers utilized computer-based test platforms for their classroom teaching. This revelation is in line with the submissions of Seaman and Tinti-Kane (2013). However, this contradicts the findings of Alfaki and Alharthy's (2014) study and Buta, Smith and Tabor (2012), whose findings revealed that a great number of teachers still utilized the conventional traditional paper and pencil test for the assessment of learners. In a similar vein, Abderaheem and Ahmed (2015) revealed that Facebook is an important social medium tool preferred by the majority of students to fulfill their learning activities. This study also revealed that both teachers and students spent time on social media and possessed relevant ICT skills, which are imperative for assessment in the digital era.

**Summary of Findings**

The study established the following;

The social learning platforms most utilized by teachers and students in Nigeria were Facebook, closely followed by Google+ and Youtube.

Both teachers and students spent between 30 minutes and 1 hour each day on social media.

Teachers utilized computer based test platforms for their classroom teaching.

Students were well equipped with relevant knowledge of ICT

Teachers are were equipped with relevant knowledge of ICT

**Implication for Policy Advocacy**

With the above findings, it is advocated that the school assessment procedures should be structured to in-corporate the usage of social media as this is imperative for a digital learning environment. Policy makers cum school administrators should set up on the most utilized digital platforms school pages as well as groups geared towards assessment training, test trials and examinations for use by both teachers and students. Similarly, the study found that both teachers and students have an understanding of ICT. The inherent benefits attainable from this digital media mastery can also be built into the school system, as various studies previously conducted revealed that learners find the use of digital media fun, interactive and they can easily control their learning to fit with their individual pace. However, despite the Digital Technology in schools, most common limitations include lack of or inadequate ICT facilities, poor electrical

connections, inconsistent electricity supply, and inadequate man-power, amongst others. To this end, for the successful implementation of assessment powered by digital media, the afore-mentioned bottlenecks should be reduced or eliminated.

## Conclusion

The social learning platform most utilized by teachers and students is Facebook, and time spent on social media varies for individuals, but is pegged between 30 minutes and 1 hour each day. Most teachers seemed to utilize computer based test platform for their classroom teaching. Students and teachers also seemed to be well equipped with relevant knowledge of ICT. Schools should be structured in such a way as to cater for both teachers' and students' progressive skill and technical knowledge acquisition to facilitate their mastery of 21st century digital assessment procedures. These may be achieved through seminars, workshops and other relevant programs.

## Recommendations

Teachers and students should be exposed to Web 2.0 learning platforms. The knowledge of most learning based digital platforms is limited and as such respondents are not readily benefitting from such platforms. For effective implementation of a digital based assessment procedure, the time spent on digital media platform should be increased as most teachers and students usually spend between 30 minutes to 1 hour on the latter, which may not be sufficient. The study further recommends that basic digital learning facilities be readily available, and additional ICT gadgets be made available to schools. There is also need for constant power supply in schools, provision of generators or solar sets for schools that have no access to the electrical grid. Lastly, the study recommends the training and retraining of both teachers and students towards acquisition of relevant technical know-how on the use of ICT.

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# Effective Digitalization in Advancing Assessment Processes in the Nigerian Educational Sector

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## Abstract

*Any examining body that must remain relevant and responsive to its mandate should be greatly concerned about the deployment of technology in its operations. This becomes imperative in the light of the growing departure from the analogue and manual systems. Globally, digitalization plays an enormous role in educational operations, and this cuts across virtually every aspect of human lives including assessment. In Nigeria presently, emphasis is on entrepreneurship skills acquisition by students and hence the reform in the educational sector to teach and examine more trade subjects than before. This comes with attendant costs and administrative challenges to most examining bodies in the country, hence the need to embrace technologies to enhance effectiveness and efficiency, given the low candidature for most of these courses and scarce resources. This study investigated the role of effective digitalization in advancing assessment processes in the Nigerian Educational Sector. The respondents of the study were 130 students and 75 teachers randomly selected from Lagos Educational District 2, comprising Somolu, Kosofe and Ikorodu LGA. A survey design was used and the questionnaire served as the instrument for data collection. Descriptive and inferential statistics were used to analyze the data obtained. The outcome of the study revealed that digitalization enhances the generation of a quality database and item bank, effective/real time feedback mechanism and reliability in the assessment process. In addition, reduced manpower cost and a drastic reduction in administrative and operational costs of conducting examinations – occasioned by the elimination of the cost of printing examination papers and other material, logistics cost, storage cost and security costs are also realized. Adoption of digitalization in assessment processes is highly recommended in order to ensure effectiveness and efficiency, as well as keep pace with global trends.*

***Keywords:*** *Digitalization, Feedback Mechanism, Assessment, Educational Operations*

## Introduction

Digitalization has carved a niche for itself in virtually every aspect of human endeavor. This is witnessed in the indispensable roles it plays in boosting effectiveness and efficiency of human activities. Its advent has brought the world into a new era; an era of phenomenal change where e-mails have taken over letters and electronic money transfer has taken over postal orders. The indispensability of digitalization in today's world thrives on the inherent competitiveness among individuals, and even among organizations to stay ahead. Every individual and organization strives to stay ahead.

In education, the impact of digitalization has been overwhelming, judging from its deployment to deliver classroom lectures without the lecturer being physically present in class, registering for an examination, writing and scoring an examination and even processing of results data. Of particular interest is the introduction of technology into assessment processes, which gave birth to e-assessment or Technology Enhanced Assessment (TEA). The use of technology in assessment and even the need to expand its current scope is without argument judging from the overwhelming role assessment plays in education and the society.

In most cases, learning processes are organized and pursued with assessment in focus, especially, in recent times where significant emphasis is placed on paper certification. Assessment has without doubt taken centre stage in the education value chain. Many scholars share this viewpoint, including Oldfield, Broadfoot, Sutherland and Timmis (2015) who argue that assessment sits at the heart of the learning process. In justifying this claim, they lay claim to the ability of the assessment process to provide observable evidence of learning, determine student progress and demonstrate understanding of the curriculum. In a broader sense, it could be inferred that an institution or a society depicts its conceptualization of learning and ideal future citizens by how it conducts assessment and uses its results.

The role of assessment in education can thus not be overemphasized, especially when considered in the light of its relevance to stakeholders – the students, teachers, parents, schools, employers, government and the examining bodies. Winter (2003) crowns this view in his position that assessment is the "core business" of education and is often used to convert learning into credentials.

Despite the glaring and indispensable role of assessment particularly in education and society in general, it is appalling to note that assessment processes do not get as much attention as other aspects of education, especially in the area of technological advancement. Campbell (2010) observes that while many aspects of education abandoned the analog world and moved towards the digital world, assessment has not been transformed especially in developing countries. Consequently, this lack of digitalization of assessment is holding back what is learnt and taught in all fields of education, the reason being that what is learnt and taught is driven by the form of assessment. The incorporation of technology into assessment is inevitable (Bennet, 2002). This goes beyond thinking, as failure to do so is a prescription for failure and calamity in education in the nearest future.

Suffice it to say that frantic effort in this respect by some examining bodies such as the West African Examinations Council (WAEC) have been witnessed in recent times, though not in all areas of the process. This is in line with Campbell (2010) who believes that digitalization of the assessment process is being implemented throughout the world but often haphazardly, only within specific aspects of the assessment process.

**Research Problem**

The main objective of assessment, whether formative (assessment for learning) or summative (assessment of learning), is to aid the learning process. This noble fact lends importance to the need to use the right methods and tools to carry out the assessment processes for utmost results.

In the past two decades, the use of digital technology within assessment has gained popularity globally. Technology Enhanced Assessment (TEA) has been in use in one form or the other around the world, and it offers assessment practices that could serve as a potential catalyst for change. Technologized assessment is capable of responding to growing assessment challenges. Despite the new developments and lofty potential of e-assessment or Technology Enhanced Assessment, the traditional pen and paper assessment method is still prevalent in Nigeria, even amidst criticism of the method as being capable of driving learning towards directions that are often detrimental to the goals of learning and education.

Considering the significant disadvantages of the pen and paper assessment method, especially towards the realization of learning objectives, it becomes questionable why the majority of educational assessment in this part of the world is still being conducted using this method, despite the availability of a digital option.

It is based on the foregoing that this study sought to know the extent that assessment processes have been digitalized in the Nigerian educational system and what role digitalization can play to enhance the entire learning process and not just the assessment process.

**Research Questions and Hypothesis**

The study sought answers to the following questions:

i. Are there benefits derivable from digitalization of assessment processes in the Nigerian educational sector?
ii. Are there new methods of assessment in Nigeria?
iii. Is there effective feedback to students from the assessment processes?
iv. What are the challenges associated with assessment processes resulting from digitalization in the Nigerian educational sector?

The following null hypotheses were tested at the probability level of 0.05

i. There is no significant difference in the stakeholders' perception on the benefits derivable from digitalization of assessment processes in the Nigerian educational sector.
ii. There is no significant difference in the stakeholders' perception of the methods used in the assessment processes in Nigeria.
iii. There is no significant difference in the stakeholders' perception on the feedback

mechanism adopted by teachers in digital assessment processes in Nigeria.

iv. There is no significant difference in the stakeholders' perception of the challenges of digitalization in the assessment processes in Nigeria.

## Methodology

A survey design was adopted for the study and the questionnaire served as the instrument for data collection. Respondents for the study were 130 students and 75 teachers randomly selected from Lagos Educational District 2, comprising Somolu, Kosofe and Ikorodu LGA. Seventy two (72) questionnaires were administered. Descriptive and inferential statistics were used to analyze the data obtained from respondents on their perceptions with respect to benefits derived from digitalization of the assessment process; methods of the assessment process; effectiveness of feedback mechanisms in the assessment process; and the challenges associated with the assessment process as a result of digitalization in the Nigerian educational sector.

**Table 1*:* Distribution of Respondents Bio-Data**

| | Category | Frequency | | Percentage | |
|---|---|---|---|---|---|
| | | **Students** | **Teachers** | **Students** | **Teachers** |
| Gender | Male | 62 | 31 | 47.7 | 43.1 |
| | Female | 68 | 41 | 52.3 | 56.9 |
| | **Total** | **130** | **72** | **100.0** | **100.0** |
| Years of Experience | Nil | 84 | 0 | 64.6 | 0 |
| | 1-5 Years | 29 | 15 | 22.3 | 20.8 |
| | 6-10 Years | 10 | 20 | 7.7 | 27.8 |
| | 11 -15 Yrs | 6 | 17 | 4.6 | 23.6 |
| | 16 & Above | 1 | 20 | 0.8 | 27.8 |
| | **Total** | **130** | **72** | **100** | **100** |
| Educational Qualification | Student | 91 | 1 | 70 | 1.4 |
| | NCE/OND | 15 | 8 | 11.5 | 11.1 |
| | B.Sc/HND | 18 | 37 | 13.9 | 51.4 |
| | M.Sc/M.A | 6 | 26 | 4.6 | 36.1 |
| | Ph.D | 0 | 0 | 0 | 0 |
| | **Total** | **130** | **72** | **100** | **100** |

***Source: Field Survey, 2018***

As shown in Table 1, 45.4% and 54.6% of the respondents were respectively male and female, 87.5 % of the teachers possessed a first degree and above. 79.2% of the teachers had over five (5) years of experience. This is an indication that respondents are educated and experienced and, therefore, would make meaningful responses.

## Analysis of Data

In proffering answers to the research questions, views of respondents were sought and their responses are analyzed. The formulated hypotheses were also tested and presented as follows.

**Research Question 1: Are there benefits derivable from digitalization of assessment processes in the Nigeria Educational sector?**

Items 1, 2, 3 and 4 in the table below show the perception of stakeholders in an attempt to answer the Research question 1.

**Table 2*:* Stakeholders' Perception on the Perceived Benefits Derivable From Digitalization of Assessment Processes in the Nigeria Educational Sector**

| Items | SA | A | D | SD |
|---|---|---|---|---|
| Digitalization results in less space requirement (strong rooms) for storage of question items. | 81 (40%) | 111 (55%) | 10 (5%) | 00 (00) |
| Great reduction of cost in printing of question paper and booklets. | 75 (37.1%) | 103 (51%) | 24 (11.9%) | 00 (00) |
| Removal of haulage expenses in distribution of papers to examination halls. | 68 (33.7) | 115 (56.9) | 19 (9.4%) | 00 (00) |
| With digitalization, processing time for release of resultwill be greatly reduced. | 87 (43.1%) | 93 (46%) | 21 (10.4%) | 01 (0.5% ) |

***Source: Field Survey, 2018***

**Table 2b: Stakeholders' Perception on the Perceived Benefits derivable from Digitalization of Assessment Processes in Nigeria continued.**

| Item | Agree | |
|---|---|---|
| | Teacher | Student |
| Digitalization results in less space requirement (strong rooms) for storage of question items. | 88.9% | 98.5% |
| Great reduction of cost in printing of question paper and answer booklets. | 76.4% | 94.6% |
| Removal of haulage expenses in distribution of papers to examination halls. | 88.9% | 91.5% |
| With digitalization, processing time for release of results will be greatly reduced. | 76.4% | 96.2% |

Table 2 above reveals that the majority (95.0%, 88.1%, 90.6% and 89.1% for items 1,2,3, and 4 respectively) of the respondents (teachers and students) agree that there are benefits from the digitalization of assessment processes in the Nigerian Educational Sector. These benefits impact on the speedy release of results and reduction in cost of conducting examinations. It can be argued that it is in the light of its overwhelming benefit that Bennet (2002) considered the incorporation of technology into assessment as inevitable. Failure to do so would, as noted by Campbell (2010), hold back what is learnt and taught; since forms of assessment drive teaching and learning.

**Hypothesis 1: There is no significant difference in the stakeholders' perception on the benefits derivable from digitalization of assessment processes in the Nigerian Educational sector.**

**Table 3: Chi Square Analysis of Respondents' Perception on the Benefits Derivable from Digitalization of Assessment Processes in Nigeria Educational Sector.**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 32.069[a] | 8 | .000 |
| Likelihood Ratio | 34.228 | 8 | .000 |
| Linear-by-Linear Association | 20.862 | 1 | .000 |
| | 202 | | |

Table 3 above presents the Chi-square analysis of stakeholders' opinions. The p-value is 0.000 from the calculated chi-square ($\chi^2$) which is less than the significance level of 0.05. Hence, the $H_o$ is rejected and the alternate hypothesis is accepted, which implies that there is a difference in the perception of stakeholders regarding the benefits derivable from the digitalization of assessment processes in Nigeria.While 95.2% of students agree, 82.6% of teachers that agree.

**Research Question 2: Are there new methods of assessment in Nigeria?**

Items 1, 2, 3 and 4 in Table 4 below show the perception of stakeholders in an attempt to answer research question 2.

**Table 4: Stakeholders' Perception on new Methods being used in Assessment Processes in Nigeria**

| Item | SA | A | D | SD |
|---|---|---|---|---|
| Most examinations in Nigeria are done using paper and pencil | 64 (31.7%) | 95 (47%) | 32 (15.8%) | 11 (5.5%) |
| CBT and CAT question delivery is a replica of the paper and pencil style/format | 33 (16.3%) | 96 (47.5%) | 66 (32.7%) | 07 (3.5%) |
| CBT and CAT incorporates the use of YouTube, videos, games, audio in the delivery of questions | 21 (10.4%) | 79 (39.1%) | 81 (40.1%) | 21 (10.4%) |
| Examinations are scheduled to be completed at certain places (e.g. examination halls) and certain times (e.g. April/May). | 61 (30.2%) | 116 (57.4%) | 25 (12.4%) | 00 (00) |

***Source: Field Survey, 2018***

**Table 4b: Stakeholders' Perception on new Methodsbeing used in Assessment Processes in Nigeria.**

| Item | Agree | |
|---|---|---|
| | Teacher | Student |
| Most examinations in Nigeria are done using paper and pencil | 81.9% | 76.9% |
| CBT and CAT question delivery is a replica of the paper and pencil style/format | 54.2% | 69.2% |
| CBT and CAT incorporates the use of Youtube, videos games, audio in the delivery of questions | 54.2% | 46.9% |
| Examinations are scheduled to be completed at certain places (e.g. examination halls) and certain times (e.g. April/May). | 84.7% | 89.2% |

Table 4 reveals that the majority of the respondents, 78.7%, 63.9%, and 87.6% agree to items 1,2 and 4 respectively while item 3 shows a 1.0% difference between those that agree and disagree. This closeness in values may be due to an increasing paradigm shift from paper and

pencil to digitalization by most institutions of learning and examining bodies, and in few years to come the percentage of those that agree may be more than those that disagree. Judging from the stakeholders' responses, displaying the multiple-choice questions (MCQ) on a computer just as they usually appear on the paper and pen form is not enough. There is also a need to incorporate media such as YouTube, audio, games and others into the form when developing the test items before they can be seen to be fully digitalized. What Nigeria has, currently, can be referred to as partial digitalization. This outcome corroborates McCann's (2006) opinion that most cases of digital or online assessment are a mere replication of paper and pen tests in an online environment.

**Hypothesis 2: There is no significant difference in the stakeholders' perception of the new methods being used in assessment processes in Nigeria.**

**Table 5: Chi Square Analysis of Stakeholders' Perception on the new methods being used in assessment processesin Nigeria.**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 13.893[a] | 8 | .085 |
| Likelihood Ratio | 14.123 | 8 | .079 |
| Linear-by-Linear Association | .224 | 1 | .636 |
| N of Valid Cases | 202 | | |

Table 5 above presents the Chi-square analysis of stakeholders' opinions. The p-value is 0.085 from the calculated chi-square ($\chi^2$) which is greater than the significance level of 0.05. Hence, the null hypothesis is hereby accepted. The implication of this is that both teachers (68.8%) and students (70.6%) agree that there are no new methods of assessment processes in Nigeria. This view was shared by Alistair (2010) that digitalization of the assessment process is already occurring throughout the world in the field of education; however, this process is often taking place by default and haphazardly, and the limited aspects that are being digitalized are often only a replication of the paper process.

**Research Question 3: Is there feedback to students from the assessment processes?**

Items 1, 2, 3 and 4 in the table below indicate the perception of stakeholders in an attempt to answer research question 3.

**Table 6: Stakeholders' Perception on Feedback to Students from the Assessment Processes.**

| Items | SA | A | D | SD |
|---|---|---|---|---|
| Teachers grade class participation | 51 (25.2%) | 118 (58.4%) | 33 (16.4%) | 00 (00) |
| Assigning responsibilities such as discussions and projects to students by teachers, enhances students' understanding of what is expected of them | 105 (52%) | 76 (37.6%) | 21 (10.4%) | 00 (00) |
| Only class tests and terminal examinations are used in grading students | 41 (20.3%) | 72 (35.6%) | 67 (33.2%) | 22 (10.9%) |
| Teachers help to support students to take responsibility for their own learning | 62 (30.7%) | 116 (57.4%) | 21 (10.4%) | 03 (1.5%) |

***Source: Field Survey, 2018***

**Table 6b: Stakeholders' Perception on Feedback to Students from the Assessment Processes continued**

| Item | Agree | |
|---|---|---|
| | Teacher | Student |
| Teachers grade class participation | 73.6% | 89.2% |
| Assigning responsibilities such as discussions, projects, and so on, to students by teachers enhances students' understanding of what is expected of them. | 86.1% | 91.5% |
| Only class tests and terminal examinations are used in grading students. | 37.5% | 66.2% |
| Teachers help to support students to take responsibility for their own learning. | 88.9% | 87.7% |

Table 6 above shows that the majority of the respondents (83.6%, 89.6% and 88.1% for items 1, 2 and 4 respectively) agree that there is feedback to students from assessment processes. However, on item 3, there seems to be a difference of 11.8% in the perception of respondents that agree and disagree. This difference may be due to the programme of study (Science, Commercials, Arts) of the students.

There exists a database because of digitalization from which quality analysis of students work and items can be derived for effective feedback to students and teachers to improve on the quality of assessment. This outcome was buttressed by the findings of Winkley (2010) that technology enhanced assessment incorporate into its function the management and processing of results, leaving analytics and tools that enable instant formative feedback and collaboration on feedback processes.

**Hypothesis 3: There is no significant difference in the stakeholders' perceptions on the feedback mechanism adopted by teachers in digital assessment processes in Nigeria.**

**Table 7: Chi Square Analysis of Respondents' Perception on the feedback mechanism adopted by teachers in digital assessment processes in Nigeria.**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 35.538[a] | 8 | .000 |
| Likelihood Ratio | 38.284 | 8 | .000 |
| Linear-by-Linear Association | 22.808 | 1 | .000 |
| N Valid Cases | 202 | | |

Table 7 above presents the Chi-square analysis of stakeholders' opinions. The p-value is 0.000 from the calculated chi-square ($\chi^2$) which is less than the significance level of 0.05. Hence, the Ho is rejected and the alternate hypothesis is accepted. It can be concluded that there is a significant difference in the stakeholders' perceptions on the feedback mechanism adopted by teachers in digital assessment processes in Nigeria.

**Research Question 4: What are the challenges associated with assessment processes resulting from digitalization in the Nigeria educational sector?**

**Table 8: Stakeholders' Perception on the challenges associated with assessment processes resulting from digitalization in Nigerian educational sector**

| Items | SA | A | D | SD |
|---|---|---|---|---|
| There is a possibility of hardware/software failure during examinations | 83 (41.1%) | 93 (46%) | 21 (10.4%) | 05 (2.5) |
| Receiving results immediately after examination has psychological effects on the students. | 67 (33.2%) | 83 (41.1%) | 40 (19.8%) | 12 (5.9%) |
| Students sometimes feel a sense of isolation during examinations. | 35 (17.3%) | 120 (59.4%) | 38 (18.8%) | 09 (4.5%) |
| Digitilization favours students from elite backgrounds | 32 (15.8%) | 74 (36.7%) | 57 (28.2%) | 39 (19.3%) |

***Source: Field Survey, 2018***

**Table 8b: Stakeholders'Perception on the challenges associated with assessment processes continued.**

| Item | Agree | |
|---|---|---|
| | Teacher | Student |
| There is a possibility of hardware/software failure during examinations | 81.9% | 90.0% |
| Receiving results immediately after examination has psychological effect on the students. | 51.4% | (86.9% |
| Students sometimes feel a sense of isolation during examinations. | 51.4% | 90.8% |
| Digitilization favours students from elite background | 66.7% | 44.6% |

Table 8 above illustrates that the majority (87.1%, 74.3% and 76.7%) of the stakeholders agreeing to items 1, 2 and 3 respectively. However, on item 4, there seems to be a difference of 5.0% in the perception of respondents that agree and disagree that digitalization favours students from the elitist background. This may be due to exposure to more electronic gadgets by this group of students.

There are risks and challenges associated with assessment processes in Nigeria because of digitalization. This outcome is in line with the findings of Oldfield et al(2016), that while the changing offers many potentially creative opportunities for innovation for assessment purposes, there are also numerous risks and challenges.

**Hypothesis 4: There is no significant difference in the stakeholders' perception of the challenges of digitalization in assessment processes in Nigeria.**

**Table 9: Chi Square Analysis of Stakeholders' Perception on the challenges associated with assessment processes resulting from digitalization in the Nigeria educational sector**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 41.797[a] | 10 | .000 |
| Likelihood Ratio | 48.740 | 10 | .000 |
| Linear-by-Linear Association | 20.949 | 1 | .000 |
| N of Valid Cases | 202 | | |

Table 9 above presents the Chi-square analysis of stakeholders' opinions. The p-value is 0.000 from the calculated chi-square ($\chi^2$) which is less than the significance level of 0.05. Hence, the Ho is rejected and the alternate hypothesis is accepted. Therefore, there is a significant difference in the stakeholders' perception of the challenges of digitalization in assessment processes in Nigeria.While 66.7% of the teachers were of the opinion that digitalization favours students from elitist background, 55.4% of the students disagree.

## Summary, Conclusions and Recommendations

### *Summary of Findings*

The study was conducted with the general objective of assessing the impact of digitalization on educational assessment processes in Nigeria, using Lagos State as a case. The results of the study reveal that there are benefits derived from digitalization of assessment processes by examining bodies in Nigeria. There are no new ways of conducting examinations in Nigeria other than the digitalization of existing and well-known examination forms. The method of feedback to students in the digital assessment processes has not changed, and there are risks and challenges associated with teaching, learning and assessment processes as a result of digitalization.

### *Conclusions*

Based on the findings, the following conclusions were drawn. There are benefits derivable from digitalization of assessment processes by examining bodies in Nigeria. These benefits manifest on the speedy release of results and great reduction in cost of conducting examinations, and there are no new methods of assessment processes in Nigeria, rather, technology is being used to augment existing and well-known examination processes.

### *Recommendations*

Based on the conclusions of the study presented above, the following recommendations were made. There is the need to deploy the use of media such as YouTube, games, audio and other forms into teaching procedures in the classroom. This is because if students are not taught with such media, it would be morally wrong assessing them using such. Examining bodies should incorporate the use of different media into syllabuses to make acquisition of such devices mandatory for school owners. Finally, further study in this area that would elicit the various challenges and risk associated with digitalization of assessment is suggested.

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## SUB-THEME B: BRIDGING THE GAP BETWEEN CURRICULUM, TEACHING, ASSESSMENT, AND THE WORLD OF WORK

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# The Predictive Validity of Continuous Assessment in Pre-preparatory Program in Ethiopia: The case of Grade 10 Addis Ababa Administrative city public and private schools

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## Abstract

*This study investigated the score interpretation that assumes a positive correlation between student scores in continuous assessment and their scores in Ethiopian General Secondary Education Certificate (EGSEC). Its main purpose was to examine the predictive validity of Continuous Assessment in the Pre-preparatory Program both in public and private schools.* ***In*** *this study, students' grade 10 continuous assessment results were correlated with their grade 10 leaving examination in the 2017 academic year. The predictive validity of assessment was investigated in groups of schools (private and public). In the study, different theories and assumptions related with the stated issues were examined and used. For the purposes of this study, 205 students' scores in Mathematics and English were selected both from 2050 public and private schools. This was done with the help of the simple random sampling technique. Data were collected from six schools (three from private and three from public sector) within the selected region. In the data analysis, both descriptive and inferential statistics were used based on two types of statistical analyses, namely correlational analysis using Spearman's rho and the difference in means analysis using Mann Whitney's U test and the Kruskal Wallis Test. The findings showed that the predictive validity of both Mathematics and English continuous assessment had a significant but weak correlation with the students' grades in EGSEC. However, students' results in written examinations showed a slightly stronger correlation coefficient with their results in EGSEC than did their result in non-written continuous assessment. Moreover, the predictive validity of continuous assessment was stronger for the participants from private schools than it was for those from the public. It is recommended that in administrating and scoring specifically non-written exam needs, there is need for a clear criteria and great care so as to improve the quality of both continuous assessment results and their predictive power.*

***Key words****: Continuous Assessment, Correlation and Predictive validity*

## Introduction and Background

As has been indicated by many scholars, educational assessment plays an important role in measuring and evaluating students' performance. According to Gemechu (2014), assessment mainly consists, fundamentally, of taking a sample of what students do, making inferences and estimating the worth of their actions. From this, one can easily understand that the main role of assessment is to provide authentic and meaningful feedback for improving student learning, instructional practice and educational options.

Ntiko (2001) has also defined assessment as a process for obtaining information that is used for making decisions about students, curricula and programmes, and educational policy. These two definitions simply tell us that assessment helps in measuring students' ability in acquiring certain behavior or a specific knowledge for a particular subject, and provides the basis for determining the quality of education at all levels. Moreover, as McAlpine (2002) observed, assessment can be conceived as a form of two-way communication in which feedback on the educational process or product is provided to any stakeholders. In this regard, continuous assessment is an important part of the evaluation of students' achievement at all levels of their educational career. Here, continuous assessment can be seen as a means of carrying an assessment formally and informally within the classroom, yet at the same time, making valid decisions about a given student's progress within a particular subject area (Abera, 2012).

In Ethiopia, the Ministry of Education has introduced continuous assessment as a mechanism to achieve quality of education both in higher institutions and other education sectors within the education policy of the country for the purpose of bringing a paradigm shift from the old traditional system of assessment that was judgmental in orientation to a new and developmental assessment (Gemechu, 2014). Moreover, national or public examinations have been provided for students at the end of Primary and Secondary school levels by an external body. However, there is an assumption from scholars that a one-time final examination does not bring a complete or true picture of students' performance that includes their higher order thinking skills. Thus, the use of school records and results of national examination in combination could be a powerful predictor of students' performances, ability to analyze, synthesize and evaluate. But the question is whether this school based continuous assessment is a good predictor of student's achievement or not. Based on the above assumption, this study set out to explore the score interpretation that assumes a positive correlation between student scores in continuous assessment and their scores in Ethiopian General Secondary Education Certificate (EGSEC). In this study, students' grade 10 second semester continuous assessment results were correlated with their grade 10 leaving examination in the 2017 academic year. The predictive validity of assessment is investigated in groups of schools (private and public).

The continuous assessment mechanism is divided into two major parts, continuous assessment based on project work (non-written exam) and assessment made on written exam (midterm and final exam). For the purposes of this study, students' scores in Mathematics and

English were selected both from public and private schools.

**Objectives of the Study**

The general objective of the study was to examine the predictive validity of continuous assessment in a Pre-preparatory Program, both in public and private schools. The specific objectives were:

1. To examine the correlation between student's performances obtained from continuous assessment in grade10 and Ethiopian General Secondary Education Certificate (EGSEC).
2. To identify the link between scores made by none written continuous assessment mechanism and written exam.
3. To assess the difference in the correlations between continuous assessment and academic achievement in Ethiopian General Secondary Education Certificate (EGSEC) both in private and public schools.

**Literature Review**

***Validity of the Test***

The idea of validity has been used by many researchers in the area of education to assure the usefulness of test scores in predicting future performances. The validity of the test is the most important attribute of a test and concerns what the test measures and how well it does so (Ukwuije, 2009). According to Freeman (2006), validity indicates the degree to which a test measures what it is intended to measure, based on an accepted criterion. On a test with high validity, the items will be closely linked to the test's intended focus.

There are different types of validity: Operational or Content Validity; Functional or Concurrent Validity; Factorial Validity, Face Validity and Cross Validity (Patel, 2011). On one hand Anastasi & Urbina (2002) have seen validity from the following three perspectives or procedures: Content Description Procedures, which comprises Representation of Content and Face Validity; Criterion Prediction, which encompasses Concurrent Validity and Predictive Validity; and Construct Identification Procedures which mainly focused on Factor Analysis, Internal Consistency, Convergent and Discriminant Validation and Structural Equation Modeling. This study interested itself with predictive validity.

**Predictive Validity**

Prediction can be categorized into three types, namely: classification, selection and guidance (Glaser, 1960). According to Glaser, classification means the assignment of an individual into the category to which he/she belongs while selection involves categorizing individuals to indicate the probability of success on a desired task. Then, guidance provides information regarding the abilities, interest and the chance of success in reaching various goals.

On the other hand, predictive validity is concerned with the usefulness of test scores in predicting future performances (JAMB, 2009). According to Osadebe (2003), predictive validity can be seen as the extent to which one test scores relate to a criterion score. Predictive validity suggests the degree to which a test accurately predicts future performance. For example, if we assume that a student who does well in a particular mathematics aptitude test should be able to undergo a physics course successfully,; predictive validity is achieved if the student does well in the course. Predictive validity can provide framework for determining the degree of accuracy or credibility that can be rendered students' performance (Orubu, 2012).

According to Brown and Coughlin (2007), predictive validity is seen as a tool to predict future performances either in some activity or on another assessment on the same paradigm. It simply refers to the degree to which one measure can predict with other of the same concepts that are being measured at some time in the future (DeVellis, 2011). It is the correlation between the measure of concept and some future performance of the same concepts that it requires all assessments to have evidence of the reasonableness of the proposed interpretation.

Validity is a form of criterion in which the validity of a test is established by measuring it against known criteria. Within the predictive validity, a test is said to be valid if there is a statistically significant correlation between test scores and the criterion being used to measure validity. Therefore, investigation into the predictive validity of examinations on students' future academic achievement in various contexts is basic (Gonnela & Rothstein, 2004).

**Continuous Assessment**

The main purpose of an educational assessment is to collect adequate information about students' capacity or learning behaviors; knowledge, ability, skills, and attitudes. According to Safarath and Kingtin (2014), the primary role of assessment is to provide authentic and meaningful feedback for improving student learning, instructional practice and educational options. In this regard, continuous assessment can be seen as a good source of information within the classroom so as to provide the required feedback. Such types of assessment make valid judgments about a given student's progress within a particular subject area (Abera, 2012).

Continuous assessment occurs on a regular and continuous basis. It is both an ongoing formative and summative process that involves the monitoring of pupils. It refers to the daily practice by which teachers seek information about learners' progress in achieving the curriculum's learning targets (Namibia Ministry of Basic Education, Sport and Culture, 2003). Such assessment uses many ways to determine what a learner knows, understands, thinks, and can do. It is meant to be a part of daily teaching and learning in order to improve teaching and learning. It can be conducted in different ways like daily class work, course related project, term papers, homework, practical works etc. Moreover, it is systematic, formative, guidance oriented, and diagnostic in nature.

The process of continuous assessment is not only an examination of pupil achievement but also a powerful diagnostic tool that enables pupils to understand the areas in which they are having difficulty. It allows learners to concentrate their efforts on those areas, and it supports teachers in monitoring the impact of their lessons on pupil understanding so they can modify their pedagogical strategies (USAID, 2003).

The importance of continuous assessment is not limited to pedagogical purposes like the provision of students' feedback learning outcomes requirements and motivation, but it also provides academics with more control over the assessment within the classroom rather than leaving it in the hands of the central system (Hernandez, 2012). According to Quansah (2005), continuous assessment has two main purposes: firstly, it improves the validity and reliability of students' results in particular tests

and exercises; and secondly, it helps a learner to develop effective learning and work habits. Nitko (2004) has also added that continuous assessment promotes frequent interaction between learners and teachers, which enables the teachers to know the strengths and weaknesses of learners. It also allows learners to be able to receive feedback from teachers based on their performance which allows them to focus on their deficiency areas.

Continuous assessment also has disadvantages. For example, most teachers over depend on measuring students' progress in the cognitive domain in a school-based assessment with total neglect of the affective and psychomotor domains of learning. According to Awofala and Babajide (2013), this problem is more serious in the higher or tertiary institutions where little or no effort is made to assess the students' affective domain of behavior.

## Research Method

In this section, a brief description of research design, selection of respondents, data collection instruments, data collection procedures and data analysis procedures of the study is made.

### *Design of the Study*

The design used in this study was correlation. This design was preferred to investigate the predictive validity of continuous assessment by correlating students' scores in grade 10 assessment and their scores in Ethiopian General Secondary Education Certificate (EGSEC) both in private and public schools. The relationship among students' scores was scanned through Spearman's rho correlation.

### *Selection of Respondents*

In Addis Ababa, there are 56 public and 148 private General Secondary schools. Out of these, six schools (three from private and three from public schools) were selected and included in the study. The simple random sampling technique was used.

Once the schools were identified, out of 2050 students both from public and private schools, 105 students from public and 100 students from grade 10 private schools were selected for the purpose of this study, again using the simple random technique. Thus, the total of public and private students that participated in the study was 205.

### *Data Collection Instruments*

The instrument that was used in the data collection was document analysis. In this method, both students' 2nd semester Mathematics and English continuous assessment results and EGSEC scores were taken from the registrar. One complication encountered was that the students' scores in the EGSEC were only available in a grade point system, while their scores in continuous assessment were available in a numeric system. To overcome this, scores in continuous assessment were converted to grade points utilizing the scale used in the Ethiopian National Educational Assessment and Examination Agency. For example, if a student's score is between 34 and 49 in English, this score was converted to a grade point of 3.0.

**Table 1: Conversion of Scores**

| Subject | | Cut off points out of 100 | | | | |
|---|---|---|---|---|---|---|
| | | A | B | C | D | F |
| **English** | Range | 50-100 | 34-49 | 26-33 | 20-25 | 0-19 |
| | Grade Point | 4 | 3 | 2 | 1 | 0 |
| **Math** | Range | 52-100 | 33-51 | 25-32 | 18-24 | 0-17 |
| | Grade Point | 4 | 3 | 2 | 1 | 0 |

***Method of data analysis and interpretation***

In the study, in order to reach reliable information on the predictive validity of continuous assessment in a pre-preparatory program, quantitative analysis of the data has been employed. Specifically, both descriptive and inferential statistics were used based on two types of statistical analyses, namely correlational analysis using Spearman's rho and the difference in means analysis using Mann Whitney U test and the Kruskal Wallis Test. This has been supported by the statistical package for social sciences (SPSS) computer program.

**Results and Discussion of Findings**

The findings related to the predictive validity of continuous assessment in a Pre-preparatory Program are clearly presented and explained according to their priorities. This is done to answer the research objective posed in the background section. At the very beginning, grade 10 students' second semester continuous assessment results and their EGSEC average grades were tested for normality of distribution using Kolmogorov-Smirnov, Shapiro-Wilk tests and histograms. The results show that the students' scores were all negatively skewed. For this reason, only nonparametric statistical tests were used to explore the dataset.

The continuous assessment mechanism is divided into two major parts; continuous assessment based on project work and assessment made on written exam (midterm and final exam). Here, students' Mathematics and English scores in continuous assessment and the Ethiopian General Secondary Education Certificate (EGSEC) grades were considered. The results show a highly significant, but weak correlation between the two variables, rho=0.32, $p < 0.05$. In addition, the difference in the predictive validity of each of the continuous assessments (i.e. assessment based on written exam and assessment made on written exam) was explored. The students' grades in the written exam correlated weakly with their average grades in the EGSEC, rho =0.41, $p < 0.05$.

However, the correlation between the students' grades in the project work and in the EGSEC average grades was weaker, rho=0.25, $p < 0.05$. In other words, the students' grades in the continuous assessment were generally a weak predictor of their grades in EGSEC.

As indicated on table 2 below, student scores in project work assessment were much higher than their scores in written exam assessments. However, the predictive power of written exam assessment is higher than project work assessment. A possible reason for the higher correlation between students' scores in written exam assessment and EGSEC average grades is the type of assessment instrument used (i.e.

written exam). It is worth remembering at this point that the written exam assessment, like EGSEC average grades, consisted of the standardized type tests while the project work assessment consisted of performance assessment tasks.

**Table 2: Correlations between students' grades in EGSEC, continuous assessment, assessment based on project work and written exam**

| Assessment type | Grades in EGSEC | continuous assessment | assessment made on written exam | assessment based on project work |
|---|---|---|---|---|
| Grades in EGSEC | 1.00 | 0.32** | 0.41** | 0.25** |
| continuous assessment | 0.32** | 1.00 | 0.76** | 0.81** |
| assessment made on written exam | 0.41** | 0.76** | 1.00 | 0.42** |
| assessment based on project work | 0.25** | 0.81** | 0.42** | 1.00 |

**Correlation is significant at 0.05 levels (2-tailed)

**Comparing the Predictive Validity of continuous assessment across the schools**

The predictive validity of continuous assessment was stronger for the participants from private schools than it was for those from the public schools. As indicated on Table 3 below, the Spearman coefficients for the students' grades in continuous assessment and EGSEC average were rho = 0.51, p = 0.003 for private school and rho = 0.23, p = 0.078 for public school.

**Table 3: Correlation between Scores in continues assessment and EGSEC Assessment by schools**

| School | Correlation | p-value |
|---|---|---|
| Public | 0.23 | 0.078 |
| Private | 0.51** | 0.003 |

** Correlation is significant at the 0.05 level (2-tailed).

**Differences between Gender Groups**

The correlation between students' scores in continuous assessment and their grade in the EGSEC was not very different between the gender groups. The Spearman coefficient for the male group was rho = 0.33 and for the female group was rho = 0.31.

**Table 4: Correlation between scores in continues assessment and EGSEC by Gender**

| Sex | Correlation | p-value |
|---|---|---|
| Male | 0.33 | 0.000 |
| Female | 0.31 | 0.000 |

**. Correlation is significant at the 0.05 level (2-tailed).

**Differences among the two subjects**

The strength of the predictive validity of continuous assessment is varied depending on subjects. As shown on Table 5 below, the students' grades in continuous assessment for English were significantly different in predicting their grades in the EGSEC than were their grades in Mathematics. The predictive validity of continuous assessment in the two subjects were rho = 0.18, p = 0.12 for English and rho = 0.64, p = 0.002 for Mathematics.

**Table 5: Correlations between Scores in the continues assessment and EGSEC by subjects**

| Subject | Correlation | P-value |
|---|---|---|
| English | 0.18 | 0.012 |
| Mathematics | 0.64** | 0.002 |

**Correlation is significant at the 0.05 level (2-tailed).

## Discussion

In this section, mainly two important findings are discussed, namely; the general findings on continuous assessment predictive validity and the differences in predictive validity across schools. Regarding predictive validity of continuous assessment, results showed a significant but weak correlation between the students' grades in assessment and their EGSEC grade. Students' grades in written exam assessment showed a slightly stronger correlation coefficient with their EGSEC grades both in the two subjects than did their grades in the assessment based on project work. This finding suggests that assessment does not predict academic achievement as needed.

On one hand, this indicates that the predictive validity of assessment accounts only for about 16% of the variance of students' performance in the two subjects' assessments. On the other hand, this finding stimulates consideration by the Ministry of Education and other stakeholders to revise their assessment techniques both in the private and public sectors. The difference in the strength of the predictive validity of written exam assessment and assessment based on project work raises some questions about the reliability of performance assessment and consistency in using marking scales.

Concerning predictive validity of assessment across subjects, this study reported that the strength of the correlation between the students' assessment and EGSEC grades varied considerably depending on the subject. These different predictive validity values for the subjects could be partly explained by the nature of the courses. Moreover, assessment instruments and test tasks in Mathematics assessment instruments and test tasks seemed to draw upon students' skills more than did that of English assessment instruments. In Mathematics, students are required to work on arithmetic and practical activities, both of which require a certain level of skills that is less required by the assessment tasks in English.

## Conclusions and Recommendations

In this study, the predictive validity of assessment was explored by correlating students' scores with assessment in the EGSEC. The findings revealed that assessment is a moderate predictor of EGSEC. However, the strength of the predictive validity was found to vary according to subjects, but not according to gender or college. The predictive validity of assessment was strong for the Mathematics and less-significant for English. Considering the findings of this study, the study recommends that continuous assessment be given serious consideration by teachers and school administrators and be improved by using different forms, that is daily class work, course related projects, term papers, homework and practical works so as to improve the quality of the assessment at all levels

Further, the study recommends transparency in implementing continuous assessment, both from the teachers' and learners' sides. Continuous awareness should be created for teachers and school administrators on the

utilization of continuous assessment. A clear guiding document on continuous assessment should be developed and distributed through the Ministry of Education for both public and private schools. The balance between the project based assessment result and written exam should be revised so as to minimize grade inflation from non-written exam.

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# Competency-based curriculum: a framework for bridging the gap in teaching, assessment and the world of work

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## Abstract

*In this era of creative and flexible learning, most vocational education and training (VET) institutions in developing countries still adopt a passive approach to learning, where students' success in examination is based on their ability to reproduce a credible portion of their notes from memory. Although the curricula and teaching methods have remained largely unchanged over the years, employers are increasingly demanding technical competencies, analytical thinking, problem-solving, communication, risk taking and entrepreneurial skills. Essentially, the study sought to find out how curriculum development processes of competency-based training (CBT) provides framework for aligning teaching and learning processes to equip trainees with requisite skills and competencies to perform in the world of work. The study examined relevant literature and policy papers from several databases together with key stakeholder consultations to obtain insights into CBT curriculum development processes, teaching methods and assessment strategies towards the achievement of relevant skills and competencies required to perform professional tasks. The study concludes that although mastery of a job-specific task is important, it does not ensure a competent employee, particularly in the context of rapid pace of technological changes and high labour mobility.*

***Keywords****: Competency-based, Assessment, Workplace, Curriculum, Skills.*

## Introduction and Background

Ever increasing technology and demanding forces of globalization have introduced new discourses into curriculum development to bridge the link between curriculum with teaching, assessment and the world of work**.** In this era of creative and flexible learning, most vocational education and training (VET) institutions in developing countries still adopt a passive approach to learning, where students' success in examination is based on their ability to reproduce a credible portion of their notes from memory. Although the curricula and teaching methods have remained largely unchanged in developing countries over the years, employers are increasingly demanding analytical thinking, communication and entrepreneurial skills (Brown, Lauder & Ashton 2008). Both technical and core competencies have become increasingly valuable in the rapidly changing labour market that requires employees to adapt to new developments in technology and working operations. Against this background, it is crucial for developing nations to adopt a more innovative view of learning that emphasizes active intellectual engagement, participation discovery, rather than passive absorption and reproduction of facts. This reform requires re-design, review and implementation of new curricula and academic programmes that would transform the teaching and learning processes. It also requires development of competencies for each discipline and subsequent means of measurement and performance of assessment. Thus, Competency-based training (CBT) is one major teaching and learning approach that is believed to have a strong potential to increase skill levels, reduce unemployment rate, increase productivity and to achieve international competitiveness (Smith & Blake, 2005). The introduction of the CBT curriculum has become necessary because of the increasing number of students passing out from institutions of higher education without the requisite skills to work in the real-world environment.

## Concept of Competence and Labour Market

The terms 'competence' and 'competency' are confused in the literature and are defined from several viewpoints by different researchers. Most of these definitions are centred on "descriptions of work tasks" i.e.; what a person has to do in a job and "description of behaviour" i.e; how a person does one's job. For these descriptions, some authors view competence(s) as 'ability based on work task' and competency with plural as 'ability based on the behaviour' (Whiddett and Hollyforde, 2003). Further, Armstrong (2005) argues that while competency is a person-related concept, competence is a work-related concept. Supporting the argument, Kouwenhoven (2003) contends that 'Competency' is the capability to apply an integrated combination of knowledge, skills and attitudes to perform a task in a given context whilst competence connotes the capacity to accomplish 'up to standard' the key occupational tasks that characterise a profession. Simply put, competences are usually role or job-specific while competencies can cover a wide range of different jobs (Whiddett & Hollyforde, 2003). It can be deduced from the foregoing that competency defines the necessary knowledge, skills, experience and attributes to carry out specific functions effectively whilst competence connotes the capability to effectively perform a given task at both individual and organisational levels using

required skills, traits, characteristics and behaviours.

In recent times, the economy of every nation needs adaptable and flexible workers, supervisors, trainers, bureaucrats and managers. Therefore, the need for routine, technical task skills is declining and economic aims of every nation are becoming more strategically focused with holistic work approach. Many progressive employers are recognizing that the narrow specific approaches to job training are far from adequate to meet their future strategic needs. Competence, therefore, should be described in general terms as being able to perform whole work roles rather than just specific skills and tasks to the standards expected in employment in real working environments. It must be emphasized that acquiring and developing competences is more than learning a set of skills (Kouwenhoven, 2009). Generally, the term Competency-based education (CBE) describes the acquisition and development of competences while 'training' as in Competency-based training (CBT) is more concerned with the mastering of specific knowledge and skills.

In this study, however, competence and competency are used interchangeably in a broader sense to mean the ability to use required knowledge, skills and attitude to perform a task in a given context.

- *Characteristics underpinning the curriculum development of Competency-Based Education*

Based on the foregoing views about the concepts of competence, the following characteristics are said to underpin the development of competence-based education (CBE) curriculum (Kouwenhoven, 2003; NCVER, 2009).

- CBE is oriented to the professional practice. This means that future occupational practice of the student must be the pivot around which the curriculum should evolve.
- CBE is learner-centred and the learning process is central. Therefore, the learning approach must involve individualized materials, flexible learning time and continuous feedback to the learner (Guthrie, 2009; Hattie, 2009)
- CBE is based on the constructivist approach, and on the belief that the individual must be actively involved in the acquisition of knowledge and skills.
- In CBE, the teacher's role is that of a 'cognitive guide' that encourages students to engage in active inquiry in the learning activities
- CBE provides learning environments that promote the development of competencies
- CBE includes the development of generic competencies that are integrated in the curriculum to stimulate transfer in a variety of settings.
- Assessment of CBE focuses on competencies and includes both formative and summative.
- CBE curriculum development is based on the elaboration of profiles and identification of competencies required in the performance of a professional task.

The characteristics of CBE require new teaching and learning roles of both teachers and students in the instructional processes. As teachers shift away from the traditional 'chalk

to talk' to become a facilitator, an adviser or coach (Mitchel, 2003), learners need to be active and exploratory in the training programmes (Swailes & Roodhouse, 2004; Creamers et al., 2005).

- *Competence based training*

Competence-based training (CBT) has been defined as an approach to training that places emphasis on what a person can actually do as a result of training (ACCI, 1992). NCVER (2008) also defines CBT as training that develops the skills, knowledge, and attitudes required to achieve competency standards. The main idea behind the introduction of CBT in the VET of many countries is to move away from the time-served approach of training to one based on the mastery of competency standards. Secondly, it is a shift from the supply or producer/educator-driven approach to an industry-led training system (Misko & Robbinson, 2000). The other reason is that training activities in most VET systems do not match with the skill needs of the industry.

The pressure for change in teaching and learning in the vocational and educational training (VET) systems has become even more necessary due to reasons such as global economics, industry restructuring and policy initiatives from the government (OECD, 2000; Curtain, 2004). Though socio-political factors may account for the introduction of CBT in some countries, the demand for well-educated and innovative workforce at all occupational levels has been a major reason for CBT reforms in the VET systems of many countries**.**

- *Differences between CBT and traditional training methods*

The methods of CBT are regarded as suitable alternatives to the traditional forms of training for several reasons. In CBT, training is divided into learnable units or elements of competence targeted towards specific skill development. Traditional training is often generic, and not so much focused on bridging specific skill gaps to improve job performance. Furthermore, CBT training is flexible, not time-based and learning is student-centred, where learners progress through modules individually or in small groups at their own pace while the role of the instructor is that of a coach, mentor or facilitator (Hobart & Lundberg, 1995 cited in Smith & Lowrie, 1998; Eggink & Werf, 2006). In the traditional programmes, training is centred on the subject content, the instruction is time-based and teacher-centred, the role of the instructor is typically restricted to that of the expert, the class size is large, and the teaching style is lecture-oriented. Unlike in the traditional training, trainees in CBT who already possess special skills through previous formal training, work or life experience can receive credits for or exemption from modules which contain those specific competencies.

Assessment in the traditional training is primarily based on performance of written test and practical assignment and achievement is compared with other students taking the course (norm-referenced). In CBT, assessment is geared towards clearly specified criteria or standards in the industry and the outcome of the training is measured against a single performance criterion (criterion-referenced) which can either be demonstrated as competent (pass) or not yet competent (fail).

**CBT implementation issues**

The introduction of CBT in the VET system of many countries has been controversial as many authors and researchers have different views about this learning innovation. In countries such as Australia, the United States, Britain and the Netherlands among others, the main criticisms can be summarized as follows; lack of consensus on conceptual definitions for competence, too behaviouristic and narrowly-focused on skills training, inadequate resources, low motivation among students to learn on their own, lack of career guidance systems, and inadequate professional and staff development (Sullivan, 1995; Mulder, 2004). The involvement of multiple assessors, coupled with lack of grades in CBT, do not only discourage the pursuit of excellence but also make the teachers lose their professional autonomy and raise questions on the reliability and validity of assessment practices (Jellema, 2003; Allais, 2003; Hellwig, 2006). These factors have resulted in different kinds of CBT curricular, models, principles and characteristics, learning processes, assessment practices and operationalisation of the concepts (Merriënboer, Klink and Hendricks, 2002).

In spite of these concerns, CBT is believed to have transformed the VET sectors and economies of many countries through increased skills and productivity, efficiency, effectiveness and quality products (Mulahly & James, 2000). In the teaching and learning process, for instance, CBT is said to have increased strong linkage between theory and skills, industry-focused, student-centredness, active and exploratory forms of learning among trainees (Swailes & Roodhouse, 2004; Cremers et al., 2005).

**Changing trends in the labour market demands**

The world of work has changed significantly since the 1980's. Commerce and industry, public and private sectors are all operating in the world of continuous change driven by the information revolution, as well as the growing need to be responsive to stakeholders and the increased pressure from global competitors. It is reported that within the next decade or so, migrants from African countries will be at risk because most factory jobs in USA would be taken over by robots, which are cheaper to operate than to hire workers (*Daily Graphic*, Tuesday, March 20, 2018). Falling automation costs are predicted to cause job losses with serious implications on most migrant workers from African countries to most developed economies in Europe and America. This trend, however, presents important opportunities for African countries by improving its labour productivity in manufacturing and technological sectors. This can be achieved by increasing investment in technical skills and technological innovation to convert our raw materials to finished goods. Although new technologies eliminate some jobs at the workplace by automation, they also create certain jobs that cannot be performed by machines but through human beings. They include interactive attributes-communication skills, interpersonal skills and team working, personal attributes - intellect, problem solving, analytic, critical and reflective, willingness to learn and continue learning, flexibility, adaptability and risk-taking. Essential to all occupations, these competencies are embedded in all study programmes to equip individuals to function effectively in a wide range of social settings, professions and workplaces as well as

pre-requisites for self-employment and life-long learning

**Problem Statement**

In Ghana, one of the major challenges confronting the tertiary education system is the relevance of training programmes to the changing needs of students, industry and society. In a study of the labour market about the performance of tertiary graduates in Ghana, Boateng and Ofori-Sarpong (2002) observed from the employers that most of the graduates lacked basic skills to complete simple routine assignments. As a result, some employers take prospective employees through longer orientation and probation schemes, after which the best performing candidates are selected.

Like other professional institutions, the Polytechnics, now technical universities in Ghana, were established to provide career–focused education, skills training and opportunities for conducting practical research in collaboration with business and industry. However, a report by the Japanese International Cooperation Agency (JICA, 2001) on the Technical and Vocational Education and Training (TVET) in Ghana revealed that "the curricula of the HND in the Polytechnics are more theory-oriented with theory-based form of assessment" (p. 49).

A tracer study on the performance of polytechnic graduates in the Ghanaian labour market revealed skills deficiencies in some specific study programmes (Boahin, Kamphorst and Hofman, 2010). These inadequacies have resulted in the migration of graduates who are in desperate search for jobs, which are not even existing, increasing rate of unemployment, and graduates who undertake further training after completing their study programmes. Almost half (43.8%) of the graduates undertake professional training to either improve their job skills and knowledge, or to learn new skills to overcome deficiencies in their skills training. Changes in the global economy and the desire of firms and industry to reduce cost of production and increase their profit margins have led to continuous refinement of their production processes, which do not align with the training system of the VET institutions. As a result, there is a continuous demand for skilled workers due to what is commonly referred to by economists as 'technological bias'. Technology bias, a concept used to refer to a situation where new technologies eliminate some jobs through automation and create a new demand for higher skilled labour and requiring the job seekers to up-skill for the existing jobs (Brown et al., 2008). Although Henrich (2016) posits that CBE is a 'true workforce solution' with the potential to close the widening gap between the workforce and TVET institutions, Franklin and Lytle (2015) argue that many employers have low awareness about CBE, which makes it difficult for wider acceptance of CBE programmes. Given these realities, innovation in the training delivery system, through the development and implementation of the CBT curriculum in the TVET institutions should focus on teaching methods and assessment strategies that will promote the skills and attitudes required in the labour market.

**Research question**

The intent of this research was to find out how CBT curriculum provides a framework for aligning teaching and learning processes with assessment and workplace demands. The main research question was; to what extent does the curriculum development processes in CBT

equip trainees with requisite skills and competencies to perform in the world of work?

**Significance of the study**

Mismatch of training programmes in the technical universities and labour market needs has been a topical issue in the political platforms by government, students, parents, and relevant stakeholders. This has been linked with rates of graduate unemployment in developing nations. This study is, therefore, significant to the TVET sector, government, and trainees to produce highly skilled personnel for national development in the field of manufacturing, commerce, science, technology and engineering applied social sciences. Providing detailed, step-by-step processes of development of the CBT curriculum brings out the relevant knowledge, skills and competencies that are marketable to secure greater employability in the wider world of work. This enables training curricula to become practical-oriented, strengthening linkages and engagement with industry and leading to efficient schemes of industrial attachment, technical teachers with applied experience from industry, adequate job placements and smooth transition of graduates from school to work.

**Methodology**

The main aim of the study was to examine how the competency-based curriculum provides a framework for bridging the gap between teaching and learning processes and the world of work. The basic premise of CBE is that there is a direct link between attainment of learning outcomes and teaching and learning processes (Goodman et al., 2006). Burke (1990) argues that while traditional curricula design begins to meet assumed needs (bottom-up) approach, the development of CBT curriculum reverses the traditional approach and adopts the top-down or backward design/forward implementation of curriculum. In seeking to obtain clarity on these assertions, relevant literature and policy papers from several databases including Academic Search Elite, Science Direct, Educational Resources Information Centre (ERIC) and Web of Science were examined together with key stakeholder consultations to identify main issues to be investigated in the study.

In evaluating key questions about the link between CBT curriculum, teaching and learning processes and the world of work, a series of Google searches were also performed for deeper exploration of CBT curriculum development processes, linkages between the curriculum and teaching, and learning process and CBE design tools with Bloom's taxonomy of educational objectives. Using the content analysis, relevant scholarly literature and policy documents were thoroughly examined to obtain insights into development processes of CBT curriculum, the underlying assumptions, philosophies, assessment practices and outcomes and their eventual effects on the achievement of relevant skills and competencies required to perform professional tasks.

A number of technical universities and polytechnics in Ghana, such as College of Technology Education (COLTEK), Accra Technical Training Centre (ATTC), and Accra Technical University (ATU) which are running CBT programmes were visited to obtain information on occupational standards development, applying DACUM methodology to analyse basic work duties and tasks into procedural steps, performance based work functions and assessment criteria. Further

interviews were conducted with Employers Associations, Labour Unions and regulatory agencies such as the Ghana Institute of Engineers (GhIE), Council for Technical and Vocational Education and Training (COTVET) and the National Accreditation Board (NAB) to glean information on their role in Curriculum development and review processes in higher education institutions to ensure relevance of study programmes to latest developments, current trends and labour market needs. The outcome of the review was used to generate conclusions to provide a framework for developing CBT curricula towards labor market needs.

## Results

### *Curriculum development process*

One of the reasons for the importance of detailed prescriptive syllabi in the VET sector is its public and accountable nature to the users of the system, namely students, professional associations, employers, higher education institutes and thus, a very close nexus between training and work. Unlike traditional curriculum with a high theory component, CBT courses need to be reviewed at least every five years due to rapidly changing industrial settings and workplace practices. In this wise, developing or reviewing an existing programme of study requires questions such as (a) how has an industry or occupation changed over the last five years? (b) how is it likely to change over the next five years (c) what training is required for whom and by whom? Answers to these questions involve the following procedures:

- Establishment of need and demand
- Identification of workplace competencies
- Syllabus writing
- Accreditation
- Implementation
- Review

Establishing the need and demand is to do with the allocation of limited public resources in relation to programmes. Assessment of needs and demands requires information gathering. It involves consultation with relevant stakeholders, employer organisations, Labour unions, government agencies with a view to seeking information about short-term and long-term needs, alternative avenues, and resources required among others.

The next stage is to identify and document workplace competencies or tasks, duties or performances that a worker actually does to perform his/her job in a specific industry or occupation and for which s/he is hired and paid for. Identifying specific occupational titles leads to obtaining specific job titles (job profiling), broad categories of job tasks, duties, blocks or major units (job descriptions). The focus on specific occupation or jobs is that trainees will be recruited, hired, and paid for and that should be the basis on which programmes should be organized. Students who wish to master only tasks required for specific occupations are not forced to struggle through the entire programme or areas they may be ill-prepared for or uninterested in. However, students must be encouraged to remain enrolled in the training programme as long as they can master the skills needed for all the specific job titles for which the training is being offered. Furthermore, analysing the tasks in each job provides skills, knowledge and competencies upon which the training programme is built. The processes involve (a) observing workers on the job for a length of time and recording the

tasks they actually perform, (b) meeting with a group of workers from an occupation and together identifying tasks performed, usually referred to as DACUM (developing a curriculum) or (c) submitting a tentative task listing to workers in an occupation for validation. Each learning task contains a lecture, practical training, self-learning /study, a personal development plan and a complete assessment procedure ranging from simple to complex tasks for each job description.

After identifying specific job titles, each one of the job needs to be fully described to paint a clear picture of the occupation, as it exists in the world of work. A typical job description provides the major activities in the factory or business performed by the worker in the occupation. They may include general working conditions, equipment or infrastructure used, special abilities, aptitudes, traits needed to work successfully in the occupation, level of training required, and so on. Describing the job is concerned with only the job in the factory/business and not how the occupation is taught. A comprehensive, accurate and up-to-date job description is able to address the skills students will need to successfully function on the job. Also included are essential student pre-requisites for entry into the training programme. Pre-requisites are characteristics, traits, or abilities that students should possess to be successful on the job.

Each task has a terminal performance objective (TPO) which is a brief statement describing exactly what a trainee must do to show the task has been mastered and it describes the situation (condition) under which performance must be demonstrated, exactly what performance is required and how well the trainee must perform to reach mastery (criteria) (Blank, 1982). A well-written TPO helps trainers to develop appropriate learning/instructional materials, media, activities and related learning resources to master required competencies. It also assists in task sequencing to ensure a smooth transition from one task to another especially where one task is an essential pre-requisite for learning another task.

## Instructional Processes

### *New roles of teachers in CBT*

The introduction of CBT demands new roles and pedagogical skills in the teaching profession. Teachers in CBT need to change their traditional role as an information provider to become an expert, coach, assessor, educational developer, researcher and manager (Seezink, 2009, Wesselink, 2010). Beyond knowledge in their subject matter, teachers need to keep abreast with current developments in businesses, organizations and society, initiate regular interaction and feedback dialogue with students, diagnose and monitor students' learning, cooperate with relevant stakeholders and keep abreast with the rapidly changing knowledge-based economy. More significantly, the instructional processes in CBT are based on constructivist learning principles that allow students to be actively involved in the learning process within authentic learning conditions (Loyens and Gijbels, 2008).

### *Relationships between CBT and Bloom's Taxonomy*

Instructional units in CBT are designed to maximize trainees' attainment of desired outcomes. For these reasons, other researchers believe that Bloom's taxonomy of educational objectives presents valuable tools for implementing CBT for two main reasons. First,

it describes distinct levels of learning in concrete, observable, measurable and behavioural terms by linking instructions directly to desired outcomes through effective assessment tools. In addition, the taxonomy sequences the teaching and learning process from relatively simple to more complex outcomes that are dependent on the success of earlier stages. Learning from lower levels to higher skills helps trainees to develop critical thinking skills by attaining mastery of higher order cognitive and affective learning outcomes (Goodman, Henderson & Stenzel, 2006). Higher order thinking skills are acquired through modeling, demonstration, practice and critique.

***Learning Packages***

As a self-paced learning, CBT instruction is delivered by the use of learning packages that provide wide variety of learning resources and activities such as books, media, or hands-on practice that are appropriate for the task being learnt. A learning package is a well-designed and carefully developed learning aid that gives students detailed instructions to guide them through the learning process and provides them with appropriate learning materials when and how long needed, which results in each student having as much time on a task as needed to reach mastery. Notable among the approaches are the *student direction sheet, learning guide* and *self-contained module.* While the *student direction sheet* is a single sheet with a list of student directions for accomplishing a learning task, the *learning guide* is self-instructional which involves the use of a wide variety of commercially produced and instructor–developed materials, media (book, slides, instruction sheet, and so on) and references as well as hands-on practice including self-checks and tests. A *self-contained module* provides detailed instruction in performing the task, workplace activity, pictures, diagrams, self-tests, pre-tests and post-tests.

The final review of the curriculum document is course accreditation. This process is usually organised by an outside body, usually employers, employee bodies, government authorities or experts with broad training requirement from the industry. The review may consist of several committees that may consider the document alone or may include site visits, consultations with trainers or professional bodies. The outcome of the accreditation process may be to accredit a course for a specified period, recommend accreditation dependent on amendments or refuse accreditation. After an expert review, the final document is accredited as a curriculum blueprint or set of competency standards for an occupation, which also forms the basis for the training delivery and assessment procedures (Eggink and Werf, 2006).

***Assessment***

The only way to ensure that students have acquired the tasks is to develop appropriate performance tasks to assess the mastery of each task. As CBT is industry driven, assessment has to do with demonstrable outcomes and proven competence which means that the assessment instruments need to provide that proof. A number of creative ways of allowing students to demonstrate their competence include self-assessment, peer assessment, team teaching, on-the job, off-the-job, during the training, at the end of training, Recognition of Prior Learning (RPL) or Recognition of Current Competencies (RCC) and the integration of learning and assessment. Outcome of

evaluation of student assessment requires 'competent' 'not yet competent' with regard to each competency or learning. It uses criterion referencing that measures how each trainee scores compared to a pre-determined standard or criterion level. Evidence collected may be direct, such as observation of workplace performance, indirect such as assessing qualities of final product, review of previous work or supplementary evidence such as references from employers or reports from supervisors. As argued by Blank (1982), assessment drives the process of learning; that is learning begins with assessment (diagnosing entry-level competence or prior learning), guided through the training by assessment (formative with immediate feedback and intervention) and is measured by assessment (summative).

## Discussion

### *Conceptual differences and implementation issues*

The introduction of CBT in the VET system of many countries has been controversial as many authors and researchers have different views about this learning innovation. Chief among these criticisms are lack of consensus on conceptual definitions for competence, training is too behaviouristic and narrowly focused on skills, inadequate resources and low motivation among students to learn on their own (Mulder, 2004). These factors have resulted in different kinds of CBT curricular, models, principles and characteristics, learning processes, assessment practices and operationalization of the concepts (Wesselink et al, 2010, Boahin & Hofman, 2012).

### *Industry Involvement*

The world of work keeps changing due to changes in science and technology, which means that industry's role in CBT implementation demands continual adaptation. It is imperative for industry to engage in innovative forms of collaboration to improve linkages between VET systems and industry. Most industries in Ghana tend to be medium and small scale, making it difficult to offer adequate internship placements for students. Therefore, developing the workplace, enterprise or factories as learning sites or combined production units provides opportunities for both students and lecturers to engage in real-life practical training and exercise their skills in meaningful and productive jobs. Thus, relevant companies like mining, railways, agricultural cooperatives, architecture and construction firms, commerce entities, garment factories, tourism agencies, or electronic industries might run training institutions. While the polytechnic institutions benefit from equipment and learning facilities, specialised expertise and workplace training, industry gains through industry–demand driven form of training, smooth transition of students from school to work, lifelong learning among workers, advancements in technology and increased production.

### *Assessment and Grading*

In a fast changing, technologically oriented world, specifying a single criterion in assessments restricts assessors' judgment and limits the successful and effective participation of students in a wider range of job settings. As global economics change so do workplace operations, which imply that assessment criteria must be broadened to cover not only the

current job-based competencies but also future skill needs and innovations. In addition, outcomes and interpretations of the assessment must involve short, written comments and corrective advice to address how and what students understand and misunderstand, along with directions and cues to improve processes that can lead to the achievement of learning goals (Hattie & Timperley, 2007). The assessors' roles in CBT do not only involve 'assessment of learning' (i.e. summative assessment) but also 'assessment of and for learning' (i.e., formative assessment) to evaluate, diagnose and provide task-oriented feedback and strategies to encourage students to self-regulate their learning and thus close the gap between intent and effect.

***Periodic Review of Curricula from Industry–driven Data***

In view of the rapidly changing industrial settings or workplace practices, there is the urgent need for the review of CBT curriculum at least every five years. However, it is crucial for practitioners to capture and utilise data from industries and workplaces on a regular basis to promote curricula and assessment adaptation. Enhanced data systems can provide opportunities for data-driven decision-making throughout the learning process (Ferdig, 2014). This will help practitioners to avoid one-size-fits-all instructional strategies and rather use just-in-time content to improve learning.

***Continual Professional Development***

The new roles of teachers as transforming agents in CBT offers opportunities for continual, sustained growth and professional development related to curriculum, assessment and technology. Beyond meeting institutional demands for professional development, teachers may undertake periodic, part-time internships or workplace training to acquaint themselves with current and future workplace operations and professional practices. Teachers with workplace experience or who work on a part-time basis as professionals in an enterprise have significant and relevant workplace experiences (Seezink, 2009; Wesselink, 2010, Ferdig, 2014).

**Conclusion**

Competency-based education is described as 'a true workforce solution' with the potential to close the increasing gap between the workforce and training institutions (Henrich, 2016). In this changing labour market, however, the potential of CBT can be realized only when training programmes move away from 'knowledge and skills for performing at the workplace' towards 'knowledge and skills for performing beyond the workplace' (Kodiappan, 2011). Such a broader perspective of CBT is believed to equip students to acquire range of soft skills, professional competencies and attitudes to continually adapt and transfer skills and knowledge in different contexts.

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# Linking curriculum, teaching, assessment and the world of work in Uganda

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## Abstract

*The study examined the linkages between curriculum, teaching, assessment, and the world of work with specific emphasis on two specific objectives; the influence of curriculum on the world of work in Uganda, and the impact of teaching and assessment methods on the world of work in Uganda. The study used a cross sectional survey design involving teachers and head teachers of secondary schools. The study used a questionnaire for data collection and data was analyzed using descriptive statistics in the form of means, frequencies, and interferential statistics through correlations and regressions. In the findings, it was revealed that there is a positive significant relationship between curriculum and the world of work in Uganda though strategies for curriculum implementation remain poor, an issue that influences the world of work. The content of the curriculum is rarely identified. Therefore, sometimes the curriculum does not first assess the needs of the world of work and this greatly leaves a gap in the implementation process. There is also a positive significant relationship between teaching and assessment methods and the world of work in Uganda. In a situation where there is effective teaching there is likelihood that learners will have relevant long term skills adapted to world of work exigencies. It was concluded that the methods of curriculum presentation and teaching are not very effective. Therefore, it was recommended that there is need for resource allocation to ensure effective curriculum implementation with minimal gaps; stimulating instructional quality by adopting effective teaching and assessment methods to sustain education quality and relevance in Ugandan secondary schools.*

***Key words:*** *curriculum, teaching, assessment and world of work*

**Background**

Education changes the values and attitudes of individuals. The change has a direct impact on the economic situation. Economic growth is associated with improved public education and public literacy; job training together with in-service instructions are also effective in job efficiency and economic development (Cheng, 2012). A curriculum which is based on efficiency and competency can provide stakeholders with necessary qualifications to gain successful employment in the global arena (Van Zulingen, 2007). Curriculum helps to guide distribution of education in society to rhyme with social choices and needs (Williams, 2006). As noted by Jenkins (2004) and White (2013), curriculum is the foundation of any education system, and thus it often requires frequent revisiting for improvement of prescribed standards and to reduce inconsistencies, as well as to feed into the needs of society.

One of the primary roles that teachers are expected to perform is that of designer and implementer of instructions (Bush & Bell, 2012). The teaching process must pave the way for an effective assessment process that creates good outputs that are relevant to the world of work.

Summative assessment for example, refers to summarized evaluations of students' performance, which include tests, examinations, and end-of-year marks (Scriven, 2007). Summative assessment takes place at the end of a cycle, that is, Primary (7 years), Lower Secondary (4 years) and Upper Secondary (2 years). There are a number of assessment bodies in Uganda; Uganda National Examinations Board (UNEB), Uganda Business and Technical Examinations Board (UBTEB), and Directorate of Industrial Training (DIT) among others that were put in place to assess different categories of learners at different levels. Assessment information may be used for promotion, certification or admission to higher levels of education. Summative assessment is sometimes referred to as assessment of learning, and formative assessment as assessment for learning (Bloom, Hasting, & Madaus, 2011).

Formative assessment, by contrast, draws on information gathered in the assessment process to identify learning needs for adjusting teaching. Its strategies are used to check for understanding of student learning and to make decisions about current and future instruction (Torrance, 2012). Results of formative assessment drive instruction (Wiliam& Thompson, 2007).

Of vital importance are "soft skills" that are centrally important for human capital development and workforce success. A growing evidence base shows that these qualities rival academic or technical skills in their ability to predict employment and earnings, among other outcomes (Kautz, Heckman, Diris, terWeel, &Borghans, 2014). As the workplace has modernized around the world, the demand for such skills has increased over the past 20 years (Balcar, 2014; Carnevale, 2013; Eger & Grossmann, 2004; International Labour Organization, 2008). Nevertheless, many employers around the world, who report that job candidates lack the soft skills needed to fill available positions (Manpower Group, 2013), note a soft skills "gap". In conclusion, there appears to be a close linkage between

curriculum, teaching, assessment, and the world of work.

**Research Problem**

Uganda's education system is guided by different sets of curricula as specified by the Ministry of Education and Sports (MoES). The curricula have rules, regulations, guidelines and policy documents to ensure proper teaching and assessment methods for the effective education process to be carried out (MoES, 2015). Despite these measures, the relevance of education in the job market of Uganda remains a challenge as unemployment in Uganda stands at 2.10% in 2017 from 0.94% in 1991(Economics, 2018). Uganda has a great number of qualified graduates who are mostly looking for the limited white-collar jobs. One advertised job in Uganda attracts more than 1,500 applications. Very few graduates are self-employed while others are under-employed selling for example airtime cards. Thus, unemployment and under-employment still exist, despite all efforts to manage the country's education system. Therefore, it is important to find out the linkage between curriculum, teaching, assessment and the world of work.

**Main Objective of the Study**

The main objective of the study was to examine the linkage between the curriculum, teaching, assessment, and the world of work in Uganda.

**Specific Objectives**

The specific objectives were to:

i. Examine the influence of curriculum on the world of work in Uganda.
ii. Establish the influence of teaching on the world of work in Uganda.
iii. Examine the influence of assessment methods on the world of work in Uganda.

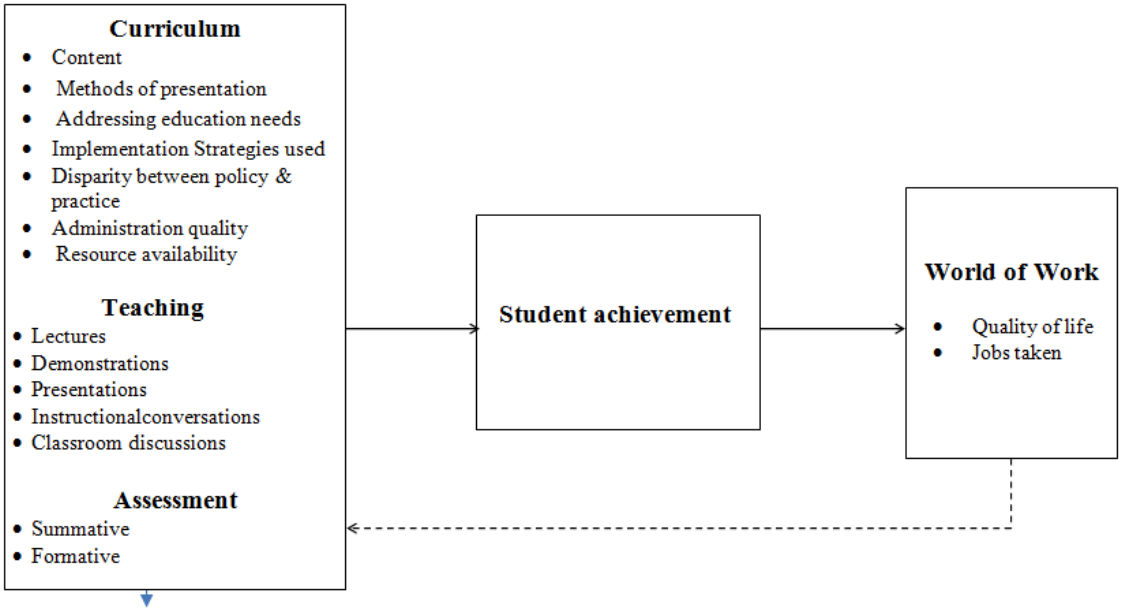
**Research Questions**

The research questions were:

i. How does curriculum influence the world of work in Uganda?
ii. How does teaching influence the world of work in Uganda?
iii. How do assessment methods influence the world of work in Uganda?

## Conceptual Framework

**Instructional quality**




**Review / Reform**

In developing the curriculum, a needs assessment should be done so that learners can become useful assets in society. In order to find out whether the learner has acquired the expected competencies through the learning process, assessment is conducted:

To help learners form expected skills (Formative assessment) - for survival in the world of work.

For certification / placement (Summative assessment).

If curriculum has not helped to develop the learner to successfully fit into the world of work, then the curriculum has to be revisited, reviewed or reformed to address gaps, which do not develop the expected competencies of the learner which facilitate effective transition to the world of work.

## Literature Review

***Curriculum and World of Work***

Attracting graduates of universities and centers of higher education in the labor market depends on the former having requisite abilities and characteristics, (Binaghi & Rezvani, 2003). It seems that the irrelevance of processes, disciplines and educational materials taught in universities at dissonance with the skills and abilities required by the job market is the most important factor in graduates' failure in job placement and employment. In addition to this, some external factors that are outside the scope and control of higher education have a significant influence on the employment of graduates (Sajara, 2012).

Internal factors are processes and strategies that are used in higher education systems, which are directly or indirectly connected with employment and employability of graduates (Shariatzade, 2011). These factors include; lack of congruence between current capacity of university admissions and future needs of the labor market, mismatch between the

educational content and occupational skills. Additional factors are the lack of success in creating and sustaining motivation for students to serve the community, lack of appropriate context for training scientific and applied research, and not considering scientific research as a priority at universities (Azizi, 2008).

External factors include all factors that directly or indirectly affect the employment of graduates and prevent their absorption into the labor market (Brown & Lauder, 2012). These factors include; lack of job seeking culture, lack of development of private enterprises for job seeking, inefficiency in job placement and career guidance, large number of applicants and high competition for available jobs, inadequate promotion of the culture of entrepreneurship and small number of entrepreneurs, practical difficulties in implementing employment policies and strategic plans (Azizi, 2004). Curriculum, in other words, provides the bridge between education, development and quality of life (De Clercq, 2007).

***Teaching and the World of Work in Uganda***

Self-directed learning is the most forward thinking and independent of teaching choices available under Student-Directed Teaching, a progressive teaching technology. This is a teaching style, which can be adopted by teachers in rural schools on students who demonstrate a high level of independence, enjoy working on their own, and have the ability to initiate plans for their own learning (Mulyasa, 2006). This teaching style promotes creative problem solving and a deeper engagement with the content to be learned, which greatly helps in achieving the relevant competences needed in the world of work.

Under the lecture teaching method, students simply obtain information from the teacher without building their engagement level with the subject being taught (Boud&Feletti, 2009). The former does not apply activity based learning to encourage students to learn real life problems based on applied knowledge. As a result, both interest and understanding of students may be compromised. To address such shortfalls, Zakaria, Chin & Daud (2010) specify that teaching should not merely focus on dispensing rules, definitions and procedures for students to memorize, but should also actively engage students as primary participants. The classroom pedagogy used by teachers is consistently seen as the crucial variable for improving learning outcomes and is critical in any reform to improve quality (UNESCO, 2005). Over the last two decades, many developing countries have embarked on major curriculum and pedagogical reforms to meet the EFA goal, often with donor involvement.

***Relevance of Assessment Methods to the World of Work***

Formative assessment is part of the instructional process. When incorporated into classroom practice, it provides the information needed to adjust on-going teaching and learning (Black et al, 2013). Teachers use formative assessment during the learning process and use feedback to make necessary adjustments to their instruction in order to better satisfy learner needs (Weerhe, 2010). These adjustments help to ensure students achieve targeted standards-based learning goals within a set period (Sadler, 2008). Traditional assessments that are used for summative purposes contain useful information for teachers and students, but these assessments are usually too infrequent, come too late for action, and are too coarse-grained (Shepard,

2005). Rescheduling summative assessments can contribute to their usefulness to teachers and students for formative purposes.

## Methodology

### *Research Design*

The study used cross-sectional survey design based on quantitative techniques. Cross sectional descriptive survey design is the selection of a small sample of people from a bigger population to act as an inference of the bigger population.

Surveys are designed to provide a snapshot of how things are at a specific time. Quantitative data were collected through a questionnaire to explain phenomena in the form of numerical data.

### *Study Population*

The study population included head teachers and teachers. All teachers were involved in the study since they had knowledge on various aspects related to curriculum implementation, teaching, and world of work in Wakiso District.

### *Sample Size and Selection*

The sample size was 70 as presented in Table 1 and it was determined using Krejcie and Morgan (1987) sample size determination table.

**Table 1: Number of Participants per Category**

| Category | Population(N) | Sample size(S) | Sampling Technique |
|---|---|---|---|
| Head teachers | 4 | 4 | Purposive |
| Teachers | 84 | 66 | Simple random sampling |
| **TOTAL** | **88** | **70** | |

Source: **Head Teachers Offices**

### Sampling Methods

The study used purposive sampling to select head teachers of each school. Purposive sampling is a non-probability sampling method that is used to select respondents known to the researcher for specific reasons. Simple random sampling was used to select teachers. Lottery method was used to select staff members. A list of the latter was sought from the head teachers' offices and their names written on pieces of papers, put in a bucket shaken and then participants were selected to participate in the study. Random sampling was used because it helped to avoid bias in selection of respondents.

### *Data Collection Instruments*

The study used a five-Likert type scale questionnaire, which was administered to teachers and head teachers. The study used one set of questionnaire to capture all the necessary information from the two categories of respondents in respect to the themes of the study. The questionnaire was administered door to door since most of the respondents in this category were known. The Likert type scale was used since they are very flexible and can be constructed more easily than other types of attitude scales (Amin, 2005).

### *Document Review Checklist*

Both primary and secondary data were used in the study. Primary data were obtained from the questionnaire administered on teachers and head teachers. Secondary data was obtained from other documents such as; journals, books and previous research done on the same topic,

and other documentation considered useful for research were used.

***Quantitative Data Analysis***

Data analysis was done through the SPSS software. The latter was used to obtain descriptive data. In establishing the relationships among variables Pearson correlation and regression analysis were used to ascertain the magnitude of the effect which the dependent variable had on the independent variable. The level of significance was P=0.05.

**Presentation and Analysis of Findings**

Findings of the study are presented and analyzed according to the specific objectives of the study.

**Table 2: The Influence of the Curriculum on the World of Work in Uganda**

| Statement of inquiry | Mean | Std. Deviation | N |
|---|---|---|---|
| The content of the curriculum always addresses needs of the world of work | 4.11 | 0.743 | 67 |
| The methods of curriculum presentation are appropriate for the world of work | 2.11 | 0.567 | 67 |
| All needs in the world of work are properly analyzed before reviewing the curriculum | 1.25 | 0.831 | 67 |
| Effective curriculum with appropriate strategies relate to the needs of the world of work | 1.11 | 0.718 | 67 |
| When implementing the curriculum there is always a connection between policy and practice in relation to the world of work | 2.11 | 0.531 | 67 |
| In curriculum implementation, stakeholders ensure that there is administration quality relevant to the world of work | 2.05. | 0.651 | 67 |
| The responsible stakeholders ensure that there is resource availability in curriculum implementation | 2.12 | 0.542 | 67 |
| Valid N (list wise) | | | 67 |

Analysis revealed that the content in the curriculum does not always address needs of the world of work (mean=4.11). In other words, the curriculum does not first assess the needs of the world of work, which leaves a gap in the implementation process that may affect learners' ability to fit into the world of work.

Study findings disagreed that methods of curriculum presentation are appropriate for the world of work (mean=2.11), and that all needs required in the world of work are properly analyzed before reviewing the curriculum (mean=1.25). This implies that most methods of curriculum presentation are not aligned to changing societal demands, and this may greatly affect the fit between competences acquired by graduates from school and exigencies of the world of work in the end.

Effective curriculum with appropriate strategies relate to the needs of the world of work (mean=1.11), and that when implementing the curriculum there is always a connection between policy and practice in relation to the world of work (mean=2.11). This implies that curriculum sometimes does not have appropriate strategies that are effective enough to ensure that gaps are effectively dealt with to pave the way for positive outcomes of education in relation to the world of work.

It was not confirmed that stakeholders ensure there is administration quality relevant to the world of work (mean=2.05), and the responsible stakeholders ensure that there is

resource availability in curriculum implementation (mean=2.12). This implies that usually there is lack of quality in administrative processes and in the implementation process; there are times when resources are inadequate to effectively implement the curriculum.

**Table 3: Correlation between Curriculum and World of Work**

| Correlations | | | |
|---|---|---|---|
| | | Curriculum | World of work |
| Curriculum | Pearson Correlation | 1 | .474** |
| | Sig. (2-tailed) | | .000 |
| | N | 67 | 67 |
| World of work | Pearson Correlation | .474** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 67 | 67 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

The study findings in correlation analysis revealed a positive significant relationship between curriculum and world of work among workers in Uganda especially teachers. The correlation coefficient of .474(**) with a significance value of .474(**) explains the nature of the relationship between the two variables. Since the p.value is .474(**) higher than 0.01 the relationship is significant. This implies that the nature of curriculum determines one's employability in the world of work in Uganda.

**Table 4: A Single Regression Analysis Curriculum and World of Work**

| **Model Summary** | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .474[a] | .225 | .213 | .39158 |
| a. Predictors: (Constant), curriculum | | | | |

| **Coefficients[a]** | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 1.785 | .430 | | 4.156 | .000 |
| | World of work | .478 | .110 | .474 | 4.345 | .000 |
| a. Dependent Variable: World of work | | | | | | |

The results of the regression analysis in the table above indicate the coefficient of determination $R^2$=0.225, which shows that 22.5% variation in curriculum is explained by changes in the world of work. This implies that any changes in curriculum would lead to 22.5% chance change in World of work in Uganda. The results also show that curriculum is significantly related with the world of work in Uganda ($\beta$ =0.474, p<0.01). This means that improvement in curriculum is significantly and positively associated with improved world of work in Uganda.

## Influence of Teaching on World of Work

**Table 5: Descriptive Results Teaching**

| Statement of inquiry | **Mean** | **Std. Deviation** | **N** |
|---|---|---|---|
| Teaching is done using lecture method of teaching | 1.21 | .418 | 67 |
| In teaching, demonstrations are largely used in schools | 4.13 | .426 | 67 |
| In teaching, presentations are used in schools | 3.91 | .453 | 67 |
| Instructional conversations are used in teaching | 2.30 | .418 | 67 |
| classroom discussions are used in teaching | 3.11 | .581 | 67 |
| Valid N (listwise) | | | |

In the study, it was disagreed that teaching is done using lecture method (mean=4.21). This implies that when implementing curriculum, lecture method of teaching is not usually used as most teachers use notes dictation. This is somehow time consuming in terms of preparation and delivery; enhances more teacher centred teaching than learner-centred teaching, and this reduces student-teacher interaction which curtails creativity and this may cause adaptation issues for labor force in the world of work.

In the study, it was agreed that in teaching, demonstrations are largely used in schools (mean=4.13) and was agreed that presentations are used in schools (mean=3.91). This implies that some of the teaching methods used in schools are demonstrations and presentations.

In the study, it was disagreed that instructional conversations are used as a teaching method (mean=2.30) and it was disagreed that classroom discussions are used as a teaching method (mean=2.11). This implies that instructional conversations and discussions are not used in the teaching process and this may influence learners' effectiveness in the world of work in Uganda.

**Table 6: Correlation between Teaching and World of Work**

| **Correlations** | | | |
|---|---|---|---|
| | | Teaching | |
| Teaching | Pearson Correlation | 1 | .568** |
| | Sig. (2-tailed) | | .000 |
| | N | 67 | 67 |
| World of work | Pearson Correlation | .568** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 67 | 67 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

Study findings revealed a positive significant relationship between teaching and world of work. The correlation coefficient of .568 (**) with a significance value of .000 explain the nature of the relationship between the two variables. Since the p.value is 0.000 higher than 0.01 the relationship is significant. This implies that in a situation where there is effective teaching, then there is the likelihood that the

learner's ability to fit into world of work will be more successful.

**Table 7: A Single Regression Analysis between Teaching and World of Work**

| **Model Summary** | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .568[a] | .322 | .312 | .36319 |
| a. Predictors: (Constant), teaching method | | | | |

| **Coefficients[a]** | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 1.651 | .403 | | 4.098 | .000 |
| | Teaching method | .551 | .099 | .568 | 5.562 | .000 |
| a. Dependent Variable: World of work | | | | | | |

From the above table, regression results were obtained with a coefficient of determination $R^2$= .322 which shows that 32.2% variation in world of work is explained by changes in teaching. This implies that any changes in teaching would lead to 32.2% chance change in the world of work.

In the study results confirm that teaching is significantly related to world of work ($\beta$ =0.568, p<0.01). This implies that in the event teaching methods are improved, there is the likelihood that one's ability to fit comfortably into the world of work will significantly improve.

## Influence of Assessment on World of Work

**Table 8: Descriptive Results Assessment**

| Statement of inquiry | **Mean** | **Std. Deviation** | **N** |
|---|---|---|---|
| Teachers administer class room interactive tests to all students in all classes of our school | 1.51 | .611 | 67 |
| Interactive tests contribute to the end of term final results | 1.63 | .732 | 67 |
| The school emphasizes team assessments among all students in this schools | 1.52 | .821 | 67 |
| Most teachers value the contribution of team assessments towards students learning | 2.11 | .478 | 67 |
| Teachers give class periodic tests to all learners in the school | 4.15 | .448 | 67 |
| The periodic tests help students to read hard | 4.23 | .516 | 67 |
| All schools teach to pass standardized tests only like UNEB | 4.21 | .643 | 67 |
| Valid N (listwise) | | | |

In the study, respondents disagreed that teachers administer classroom interactive tests to all students in all classes of our school (mean=1.51). This implies that not all teachers in all schools administer classroom interactive tests. This would mean that some teachers teach for the sake of exams, which render the formative assessment more subjective than

objective thereby affecting learners' fit into the world of work in the end. In the study it was disagreed that interactive tests contribute to the end of term results (mean=1.63) in most schools. This implies that to those who do interactive assessments, they do not do it to contribute to final classroom evaluation exams. Interactive assessment helps to evaluate students on a wider spectrum of skills to develop their future career and therefore has an effect on performance in the world of work. It was disagreed that the school emphasizes team assessments among all students in schools (mean=1.52). This implies that most schools do not actually do team assessments as may be required by formative assessment, but largely emphasize individual assessments. Consequently, most teachers do not value the contribution of team assessments towards students' learning (mean=2.11). In the study, it was revealed that in summative assessment, teachers give periodic tests to all learners (mean=4.15). The latter help students to study diligently (mean=4.23).

Findings reveal that, respondents are mostly trained to pass standardized tests like UNEB (mean=4.21). However, it was disagreed that the standardized tests help students to learn other skills at school (mean=2.30). This implies that most teachers emphasize teaching to pass exams but put less emphasis on learning other skills for competency development.

**Table 9: Correlation between Assessment and World of Work**

| **Correlations** | | | |
|---|---|---|---|
| | | Assessment | World of work |
| Assessment | Pearson Correlation | 1 | .569** |
| | Sig. (2-tailed) | | .000 |
| | N | 6 7 | 67 |
| World of work | Pearson Correlation | .569** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 67 | 67 |
| **Correlation is significant at the 0.01 level (2-tailed). | | | |

Study findings revealed a positive significant relationship between assessment and the world of work. The correlation coefficient of .569 (**) with a significance value of .000 explain the nature of the relationship between the two variables. Since the p.value is 0.000 higher than 0.01 the relationship is significant. This implies that in a situation where there is effective assessment, there is likelihood that results from assessment will determine in the end learner alignment to the employment opportunities in the world of work.

**Table 10: A Single Regression Analysis between Assessment and World of Work**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | | |
|---|---|---|---|---|---|---|
| 1 | .569[a] | .324 | .313 | .41745 | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
| | | B | Std. Error | Beta | T | Sig. |
| 1 | (Constant) | .945 | .121 | | 7.789 | .000 |
| | Assessment | .194 | .036 | .569 | 5.320 | .000 |
| a. Dependent Variable: World of work | | | | | | |

From the Table 10 above, regression results were obtained with a coefficient of determination $R^2$= .324 which shows that 32.4% variation in world of work is explained by changes in assessment. This implies that any changes in assessment would lead to 32.4% chance change in world of work. In the study results confirm that assessment is significantly related to world of work ($\beta$ =0.568, p<0.01). This implies that in the event there is improvement in assessment, there is the likelihood that one's ability to fit into the world of work will also significantly improve.

**Discussion of Findings**

***The Influence of Curriculum on the World of Work***

There is a positive significant relationship between curriculum and world of work in Uganda. This implies that the nature of curriculum implemented determines the nature of world of work in Uganda. This is confirmed by Chisholm (2010), who explains that it is the curriculum that provides the structure for the provision of quality learning and correlation with the world of work, especially where teachers might be under-qualified and inexperienced, their classrooms under-resourced, and their students lacking the prior frameworks within which to situate their learning.

In the regression analysis, it was revealed that 22.5% variation in curriculum implementation is explained by changes in world of work. This implies that any changes in curriculum would lead to 22.5% chance change in world of work. This means that improvement in curriculum is significantly and positively associated with improved world of work in relation to the outcomes of education in Uganda. This is confirmed by De Clercq (2007) who explains that it is the curriculum that articulates both the competencies necessary for lifelong learning and the competencies needed for holistic development, and helps to ensure efficiency and effectiveness in the world of work.

Most methods of presentation are not appropriate in the current implementation process and this may greatly affect learner employment in the world of work. Curriculum implementation sometimes does not have appropriate strategies that may be effective to ensure that implementation gaps are effectively dealt with to pave the way for smooth integration into the world of work especially among the graduates. This finding is confirmed by Jansen (2008) who explains that implementing a quality curriculum maximizes the potential for the effective enhancement of learning. Therefore, educational quality should be understood primarily in terms of the quality

of student learning, which in turn depends to a great extent on the quality of teaching.

### *Influence of Teaching on World of Work*

There is a positive significant relationship between teaching and the world of work. This implies that in a situation where there is effective teaching, there is the likelihood that one's ability to fit into the world of work will effectively improve. This latter idea is echoed by Tadesse et al (2007) who indicate that teachers' adoption of appropriate teaching methods helps in facilitating world of work integration. The regression analysis revealed that 32.2% variation in world of work is explained by changes in teaching, and the latter would lead to 32.2% chance of change in the world of work. Thus, in the event the teaching is improved, there is the likelihood that the world of work will significantly improve. When implementing curriculum, lecture method of teaching is not usually used as most teachers use notes dictation which is somehow time consuming in terms of preparation and delivery, and may cause issues to the learner. This finding is confirmed by Zakaria, Chin & Daud (2010) who explain that since the teacher controls the transmission and sharing of knowledge, the lecturer may attempt to maximize the delivery of information while minimizing time and effort. As a result, both interest and understanding of students may be compromised.

## Conclusion

Curriculum in Uganda faces many challenges including; methods of curriculum presentation in class not being very appropriate, curriculum lacking appropriate strategies in its implementation process, and lack of resources to implement the curriculum. These challenges create gaps, which negatively influence learner transition to the world of work after the education process. Teaching in most schools in Uganda entails more of notes' dictation, which is more tedious in delivery than other forms of classroom instruction. This approach involves lesson planning and thorough preparations before delivery, but might not address the practical challenges of graduates like unemployment and lack of skills. Furthermore, assessment is still exam based and this encourages students to cram material for passing exams. Assessment does not test practical skills and students' knowledge for their effectiveness and efficiency in the world of work. In conclusion, there appears to be a close linkage between curriculum, teaching, assessment, and the world of work.

## Recommendations

All stakeholders in the education system should ensure that curriculum implementation strategies at school level are packaged with the required knowledge, skills and attitudes (soft skills) that help to promote inclusive learning, which skills students will eventually apply in the world of work to promote self-employment, enhance creativity, and build more work related competences. There is need to adopt better teaching methods which are more appropriate in terms of reducing stress in the teaching process, and ensuring that teachers adjust teaching to suit requirements of the world of work. These strategies will ensure that students get lifelong skills which will enable them be more apt at self-employment. Employers should be invited to higher institutions of learning to train learners on dynamics of the job market and also have learners in internships, to expose them to the realities (have exposure to

relate work to knowledge), and to develop the required competencies in the world of work.

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# How practical are the PATs? A South African case study

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***Abstract***

*In South Africa, assessment in the National Curriculum Statement Grades R – 12 comprises final end-of-year examinations, School-Based Assessment, and Practical Assessment Tasks (PATs) subjects offered in the Further Education and Training (FET) Phase. Research conducted by Umalusi in 2014, for the service subjects revealed that the PATs do not always fulfill the aims and purposes as set out in the assessment guidelines published by the Department of Basic Education over the years. According to the Assessment Guidelines, the PATs seek to provide learners with opportunity to engage in authentic activities during which they perform in the context of real-world situations in which the skills are to be applied. The Tourism research team (in terms of their subject) indicated that it is difficult to achieve aspirations of the Assessment Guidelines in the absence of any real practical components in the PATs given to learners. In their view, the PATs in Tourism are far too theoretical and do not give learners sufficient opportunities to demonstrate their practical abilities (Umalusi, 2014). In response to the findings, Umalusi conducted an exploratory investigation into how project-based learning can be used to enhance practical assessment tasks for the National Senior Certificate (NSC) subjects. A case study of an outreach programme which uses the project-based learning approach when teaching grade 4 to 11 learners was conducted. This paper reports on the document analysis of the 2017 PATs guidelines, which was conducted as part of a bigger study. The document analysis revealed the following: PATs are approached differently in different subjects, the issues that were raised in relation to Tourism were also observed in other service subjects. Practical assessment tasks in some of the subjects demonstrated high cognizance of real-life activities. The study recommends that all PATs should be engrained in constructivist paradigm where experiential and authentic learning becomes the center. Thus, learners should focus more on active construction of knowledge rather than reproduction of memorized information.*

***Keywords****: National Senior Certificate, Practical Assessment Task, Umalusi, Projects, Skills.*

## Introduction

Umalusi has the responsibility to quality assure qualifications, curricula and assessments of National Qualification Framework (NQF) levels 1 – 4. This is a legal mandate assigned by the General and Further Education and Training Act (58 of 2001) and the National Qualification Framework Act (67 of 2008). Assessment in the *National Curriculum Statement Grades R – 12* comprises School-Based Assessment and Practical Assessment Tasks for certain subjects offered in the Further Education and Training (FET) Phase and a final end-of-year examination.

School-Based Assessment (SBA), Practical Assessment Tasks (PATs) and end-of-year examinations are designed to address the content competencies, skills, values and attitudes of the subject, and to provide learners, parents and teachers with results that are meaningful indications of what the learners know, understand and can do at the time of the assessment. School-Based Assessment and Practical Assessment Tasks allow learners to be assessed on a regular basis during the school year and allow for the assessment of skills that cannot be assessed in an examination sitting. The focus of this study is on Practical Assessment Tasks.

For the NSC, the Practical Assessment Tasks is a compulsory component of the final promotion mark for all candidates registered for the following National Senior Certificate subjects:

a) Agricultural Management Practices and Agricultural Technology;
b) Dance Studies, Design, Dramatic Arts, Music and Visual Arts;
c) Technology, Civil Technology, Electrical Technology, Mechanical Technology and Engineering Graphics and Design;
d) Life Orientation;
e) Computer Sciences, Computer Applications Technology and Information Technology; and
f) Consumer Studies, Hospitality Studies and Tourism.

The Practical Assessment Tasks mark must contribute 25% of the end-of-year examination mark. They have to be moderated to ensure that the quality and standard as contemplated in *Chapter 4* of the Curriculum and Assessment Policy Statements (CAPS) have been met. In Grade 12, Practical Assessment Tasks must be moderated by experts in each subject and quality assured by Umalusi.

## Purpose of the Study

This paper reports on the document analysis of the 2017 PATs guidelines, which was conducted as part of a bigger study. It specifically focuses on the extent to which practical assessment tasks give learners sufficient opportunities to demonstrate their practical abilities.

## Research Problem

Research conducted by Umalusi, in 2014, for the service subjects revealed that the PATs do not always fulfill the aims and purposes as set out in the Assessment Guidelines. A research team that reviewed Tourism PATs indicated that it is difficult for the tasks set in this subject to achieve aspirations of the Assessment Guidelines in the absence of any real practical components in the document. In their view, the Tourism PATs are far too theoretical and do not give learners sufficient opportunities to demonstrate their practical abilities (Umalusi, 2014).

## Literature Review

According to Dewey (1938) as cited in Benjamin (2013), students learn best by doing

and experiencing which enables them to become aware and determined to solve problems, want to learn and become more responsible for their learning. The approach within the practical assessment tasks seeks to achieve this mode of learning with students. Through PATs, learners are required to put theory into practice. PATs are learner-centred, with teachers merely facilitating the process. This motivates learners to learn, grow and take ownership of their work. This type of assessment can be clustered under what is categorically termed as 'performance assessment'. The practical assessment tasks, therefore, require students to demonstrate that they have mastered specific skills and competencies by performing or producing something (Wisconsin Education Association Council (WEAC, 1996). Practical assessment tasks include multiple methods. Consider the following examples: designing and carrying out experiments; writing out essays which require students to rethink; working with other students to accomplish tasks; building models; writing critiques, poems or short stories; playing musical instruments; oral examinations; developing portfolios (WEAC,1996). The broadness of the definition allows for the incorporation of different tasks that are found across different school subjects.

Miller Legg (1993) as cited in Lam (1995), point to the challenge of assuring the comparability of learner results. They state that student performance is not consistent across different contexts and topics in writing assessment, and across different experiments. Another challenge linked with scoring is that of bias. There is no evidence suggesting that assessment bias vanishes with practical assessment tasks (Linn, Baker, & Dunbar (1991) as cited in Lam (1995). As the ones most familiar with the syllabus being assessed, teacher judgements must stand up to the scrutiny of external assessors (Cumming & Maxwell, 2004). This has proven to be a challenge to teachers.

Generally, practical assessment tasks require more classroom time, place greater administrative burdens on staff, and are more expensive than multiple-choice tests for a similar amount of testing time, or for scores with similar levels of reliability (Stecher, 2010). Teachers are also faced with the burden of having to juggle multiple expectations such as supporting and motivating learners, informing parents of learner progress, meeting externally set targets and satisfying both internal and external accountability expectations (Black, Harrison, Hodgen, Marshall & Serret, 2010). Another challenge is whether set tasks actually measure the skills and knowledge that are intended, and whether they do so consistently and comparably across students, schools, tasks and raters (Darling-Hammond & Adamson, 2010). Stecher (2010) shares a similar sentiment on the validity of performance assessments. He makes reference to the lack of clarity on what these assessments are meant to measure and the relationships that ought to be found with other measures of related concepts (Stecher, 2010).

Masole (2011) refers to the following as further challenges in the implementation of practical tasks: inadequate teacher training to handle performance assessment; lack of resources; lack of motivation due to low weighting (20%) of performance assessment; large class sizes leading to high workload; inadequate supervision and monitoring; and lack of commitment by school administration. The

Tourism Research Team in Umalusi (2014) study alludes that in essence the PAT should develop a broad range of competencies such as:

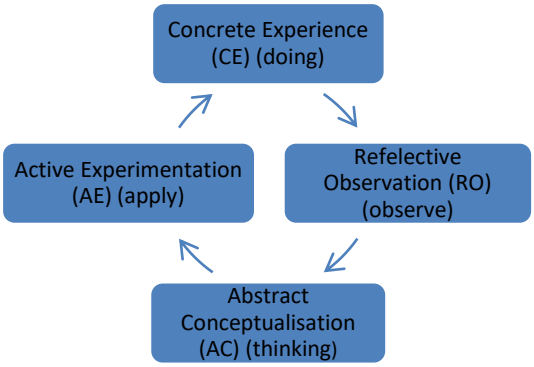
- Demonstration of knowledge, skills and understanding
- Application of knowledge, skills and understanding in aspects such as planning and preparation of a project
- Evidence of analysis and research applied to a practical task
- Evaluation and decision-making to make judgments, draw conclusions and make recommendations
- They further recommend that the PATs must be made compliant with the present Subject Assessment Guidelines (SAGs) requirements and should:
- Enhance knowledge, skills and values
- Establish connections to life outside the classroom
- Address real world challenges
- Develop life skills
- Provide opportunities for learners to engage in their learning
- Defining Practical Assessment Tasks (PATs)

To date there is dearth of literature conducted in South Africa exploring the nature of practical assessment tasks and how they can be strengthened.

**Theoretical framework: Kolb's Experiential Learning Theory**

The theoretical framework that underpins this study is Kolb's Experiential Learning Theory. David Kolb introduced the theory in the early 1980s. It was presented as a learning theory that considers a holistic integrative perspective on learning that brings together experience, perception, cognition and behaviour (Kolb, 1984). Experiential learning shifts the learning design from being teacher-centred, where the teaching is largely authoritarian resulting in students remaining unmotivated and disengaged, to an approach that is flexible and requires students to cooperate and learn from one another through direct experiences tied to real world problems (Bartle, 2015). Kolb (1984) presents four modes of experiential learning:

***Figure 1: Kolb's four modes of experiential learning***




*Concrete Experience:* the student is an active participant

*Reflexive Observation:* the student consciously reflexes on experience

*Abstract Conceptualizing:* the student tries to conceptualize theory or model of what the has observed

*Active Experimenting:* the student tries to plan how to test the model, or the theory, or the plan for the forthcoming experience

**Methodology**

The study followed a qualitative approach. Denzin and Lincoln (2005) assert that qualitative research places the researcher in the world of the study and they maintain that the qualitative researcher should make the world visible. In his definition of qualitative research, Creswell (2007) states that it is a type of educational research in which the researcher collects data consisting largely of words and describes and analyses these words for themes, and conducts the inquiry in a subjective, biased manner. The study is part of an exploratory case study undertaken with the objective of investigating the possibility of undertaking a full research study on the nature of practical assessment tasks. As part of the data collection methods of the main study, document analysis was conducted. According to Merriam (2002), documents can include public records, personal documents and physical material. These can be found in written, oral, visual or cultural artefacts (Merriam, 2002). The benefit of using documents in research is highlighted by Labuschagne (2003) who indicates that such documents produce rich extracts and quotations. We analysed 2017 PAT guidelines for grade 12. The guidelines were sourced from the DBE website. The aim of this exercise was to understand the nature of the tasks and how they are administered.

**Findings**

This section presents findings from document analysis, which mainly focused on Practical Assessment Guidelines for 2017. The subject fields are grouped as follows:

| | | |
|---|---|---|
| **4.1.1** | **ART SUBJECTS** | Dance Studies, Design, Dramatic Arts, Music and Visual Arts |
| **4.1.2** | **SERVICE SUBJECTS** | Consumer Studies, Hospitality Studies and Tourism. |
| **4.1.3** | **TECHNOLOGY SUBJECTS** | Civil Technology, Electrical Technology, Mechanical Technology and Engineering Graphics and Design |
| **4.1.4** | **COMPUTER SCIENCES** | Computer Applications Technology and Information Technology |
| **4.1.5** | **AGRICULTURAL SUBJECTS** | Agricultural Management Practices and Agricultural Technology |

**Arts subjects**

The arts subjects include Dance Studies, Design, Dramatic Arts, Music and Visual Arts. The PATs for these subject look at the transference and application of skills beyond the classroom. They seek to integrate theory and practice in a meaningful manner and deepen and consolidate leaners' understanding. While the development of 21st century skills is not explicitly indicated, the skills sought to be developed through the PATs are indicative of these skills. The PATs recognize 21st century skill development such as planning, reflecting, cognitive development and conceptual development. The PATs allow learners to strengthen higher-order skills such as critical thinking, creative thinking and problem solving. Learners are also afforded the opportunity to collaborate, conduct research, reflect, and analyze. The aim of the PATs is to

guide learners to be effective, independent, critical and reflective thinkers. In the Design subject, the PATs process is linked to the design thinking process, which is in line with the development of 21st century skills. Exhibition of the final product is indicative of the developmental learning undertaken by the learner. The focus of the PATs is also authentic, in that it seeks to apply a real-life context. The PATs promote the production of authentic work. Learners apply their knowledge in an authentic performance context.

**Service Subjects**

A few concerns were raised with the Tourism PAT. While the task is identified as practical, the activities required from learners do not warrant it as such. The 2017 PAT components are primarily desktop research tasks and do not warrant practical assessment. The PAT is not based on a real life situation and can be assessed in a more traditional approach of school based activities. The type of PAT, which is mostly theory/research based, provided for Tourism is similar to that of Geography, Business Studies, Economics and Life Sciences. However, these activities for the subjects are termed as projects and not practical tasks. A similar concern was raised in a 2013 Curriculum Appraisal Study, conducted by Umalusi, where the research team indicated that '*the PATs is far too theoretical and does not give learners sufficient opportunities to demonstrate their practical abilities'.* In 2017, this has still not changed.

The practical assessment tasks for Consumer Studies for Grade 12 consist of two practical examinations for three hours each. Learners perform these practical examinations individually. The words PATs and practical examination are used inter-changeably in the subject, which is an issue for concern. There is a marked difference between a practical examination and task. The PAT for the subject is slotted in the timetable indicating set examination conditions, an occurrence that differs with the other subjects, which take place over the three school terms. The issue of conducting practical assessments over a lengthened period to allow learners the opportunity to review, reason, reflect and allow opportunity for teacher feedback is supported throughout literature (Baker, 1996; Darling-Hammond & Adamson, 2010; Stecher, 2010; Baxter & Glass, 1996; Benjamin, 2013). This then raises concerns about the term usage in the subject and where the examination can be defined as a practical task, based on the criteria provided in said literature.

The practical examination is also not developmental for the learner and no reflection and improvement is allowed; the requirement for the learner is merely performance. For PAT, development of learner skills over a specific period is a key focus. One can argue that similar to Life Sciences, the subject can merely have a practical examination instead of a PAT.

Learners for Hospitality studies complete two practical assessment tasks; however, these are termed as practical examinations. The interchangeable use of the term 'task' and 'examination' applied for this subject raises questions on whether the assessment is a task or an examination. This is further exacerbated by the time factor linked to each assessment. Generally, PATs are undertaken over an extended period throughout the year by learners, where opportunities for critique, reflection and improvement are offered. This is however not the case with the Hospitality Studies PATs. The subject conducts practical examinations and not PATs as formally

understood with other subjects. It follows a similar approach to Life Sciences, where learners conduct a practical examination and not PATs. Stecher (2010) raised a similar concern, about the different meanings attached to performance tasks by educators and policymakers. This then raises the question of whether the PATs conducted in Hospitality Studies for 2017 can be termed as PATs or should rather be called a practical examination.

**Agricultural Subjects**

The Agricultural subjects include Agricultural Management Practices (AMP) and Agricultural Technology. For Agricultural Management Practices, the context in which it is offered is subject to a wide range of approaches; therefore, the PAT has to allow for this wide range of possible approaches and applications. The aim of the task is to assess management, entrepreneurial, research, marketing, operational and technical skills of learners. The design portfolio and final project must be available for monitoring and moderation, and be evaluated, checked and authenticated by the teacher being presented by the learner. The PAT completed under controlled conditions and evidence of each activity is compiled in the learner portfolio. The assessment tool used for this activity could be a checklist, rubric or memorandum. Tasks should be set in real-life settings.

The aim of the Agricultural Technology PAT is to teach learners to solve technological problems in the agricultural environment by using critical, innovative and thinking skills. The PAT comprises a design component, manufacturing component and a final product. It leads the learner to design and develop the product according to technological processes. The learner must design and plan the entire PAT individually with the teacher's guidance. The teacher will provide the learners with the problem statement only. The final model should have functional value and should be suitable for use in real life form and workshop situations.

**Technology Subjects**

The Technology subjects include Civil, Mechanical and Electrical Technology and Engineering Graphics and Design. While the requirements differ across the subjects, Technology practical assessment tasks share a number of commonalities. The PATs are geared at experiential learning. The tasks are based on investigations, simulations and the application of skills, knowledge and principles. The PATs are designed to develop and demonstrate a learners' ability to integrate a variety of skills in order to solve a problem. The PATs for these subjects are externally set and moderated, but internally assessed. Teachers are required to provide frequent developmental feedback to guide the learner. Communication about the task design is a continuous process and the learner is provided with the opportunity to make changes to this part of the PAT continuously – the approach is thus developmental in nature. The PATs are also based on real-life situations and completed under controlled conditions.

**Computer Sciences**

The Computer Sciences include Computer Applications Technology and Information Technology. Both subjects include experiential learning. Learners are provided with the opportunity to choose an area of interest. The PATs are implemented across the first three terms and is broken down into different phases. Learners are required to apply decision-making and problem-solving skills. They are also required to provide evidence of all stages of the

project for assessment. Teachers play a facilitative role where they are required to supervise and monitor learners' work and to provide regular feedback to learners. Learners are required to implement higher order and critical thinking skills, formulate strategies and solve problems on different levels.

**Discussion of Findings**

Having analyzed the different guidelines for practical assessment tasks for the sixteen NSC subjects, we are now asking the question: What is the definition of 'practical assessment task' in the context of South Africa's assessment? The findings of this study also revealed the disparities in the format, structure and administration of the PATs in the different subjects. It was established that 'practical assessment task' and 'practical examination' are used interchangeably. This is confirmed by Lam (1995) in stating that educators in different fields attach different meanings and activities when conducting practical assessment tasks. It can be argued that the practical assessment tasks that are implemented as practical examinations under strict examination conditions fall short of motivating and supporting learners.

The results suggest that most of the practical assessment guidelines as set in the Arts, Technology, Agricultural Sciences and Computer sciences stimulate active and deep learning by engaging students in investigating real-world issues in a collaborative setting. However, this study also reveals that some of the PATs in Music and the Service subjects are theory laden desktop exercises with no elements of practical tasks. This is in contradiction with observation from literature. For instance, French (2017) indicates that practical assessments tasks should be 'multi-step' assignments with clear criteria, expectations and processes.

**Recommendations**

The findings of this study provide the following insight for future research: Further research has to be done to establish whether all the subjects administering PATs warrant the inclusion of a PAT component. This should include re-evaluation of the inclusion of PATs in subjects such as Tourism, or amendment of this to be more practically focused, investigating the possibility of development of the criteria of what constitutes a 'practical assessment task' across the subjects to ensure that the term is not misinterpreted by different role players. The re-evaluation and amendment will facilitate the establishment of a quality assurance model aimed at strengthening the PATs, especially in relation to moderation. This will possibly ensure a significant level of consistency and maintenance of standards.

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# Challenges in Enhancing Science Subject Practicals in Secondary Schools in Tanzania

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***Abstract***

*We are living in a scientifically and technologically advanced world of work where employees who have the ability to cope with technology are in high demand. The science curriculum, teaching and assessment is expected to shape learners to fit effectively into this new world. This study appraises the extent to which Tanzanian Secondary school science teachers have acquired knowledge in practicals, and use it in teaching and assessment. In addition, the study explores challenges faced by teachers in teaching and assessing practicals as well as how they cope. The study used a sample of 345 science teachers who were randomly selected from 27 regions of Tanzania. Open and close-ended questionnaires were used to collect information from the participants. The study revealed that 81% of the participants have good knowledge in teaching and assessing science practicals since they had attended science in-service training. In addition, 72% reported to have had more than three subject meetings per year to share knowledge on how to teach and assess science practicals. The study further revealed that although 93.34% of the teachers do teach science practicals at least once a month, students are never provided with practical tests/examinations due to challenges such as lack of well-furnished laboratories, large class sizes, lack of financial support from school administration, lack of enough time and lack of some specimens. However, teachers overcome some of these challenges by using locally available materials, conducting demonstrations, using after class hours, and classes for practical instead of laboratories. The study, therefore, recommends that there is a need to improve the quality of school laboratories for proper science curriculum implementation, teaching and assessment through practicals, to prepare learners to be able to put classroom activities into practice in real work settings.*

***Keywords:*** *Science practicals, World of work, Curriculum, Teaching and Assessment.*

## Introduction

The rapid changes in science and technology have led practicals, based teaching and assessment of curriculum and specifically the science curriculum to be at the heart of many countries in the world. Many countries are investing in proper implementation of the science curriculum through practicals in order to produce trained persons, who can use their knowledge and skills, and apply competences to cope with changes in today's world of work. However, proper implementation of the science curriculum entails among other factors; good teachers' knowledge, availability of facilities such as well-furnished laboratories for practicals, and a good relationship between teachers and learners.

Millar (2009) argues that practical work is a prominent and distinctive feature of science education. Practical work is an inquiry and hands on activity, which helps to create curiosity and transfer knowledge to higher cognitive levels in learners. Practical work helps learners to develop deep understanding of the concepts and principles in science, develop competence in the skills and procedures of scientific inquiry, which in turn enable learners to gain problem-solving skills, which may translate to good examination performance. When students learn science practically, they enjoy the learning process as it enables them to relate what they have learnt to real life situations. Furthermore, practicals facilitate and improve the learning of science by helping students to develop:

- interest in science
- the right perspective of science and
- basic skills and competencies of science procedures, observation skills, and skills for representing and interpreting data.

In science subjects, practicals support the development of personal learning and thinking skills in relation to how science works. SCORE (2009) summarizes different ways in which science practicals support learning as illustrated in Figure 1.

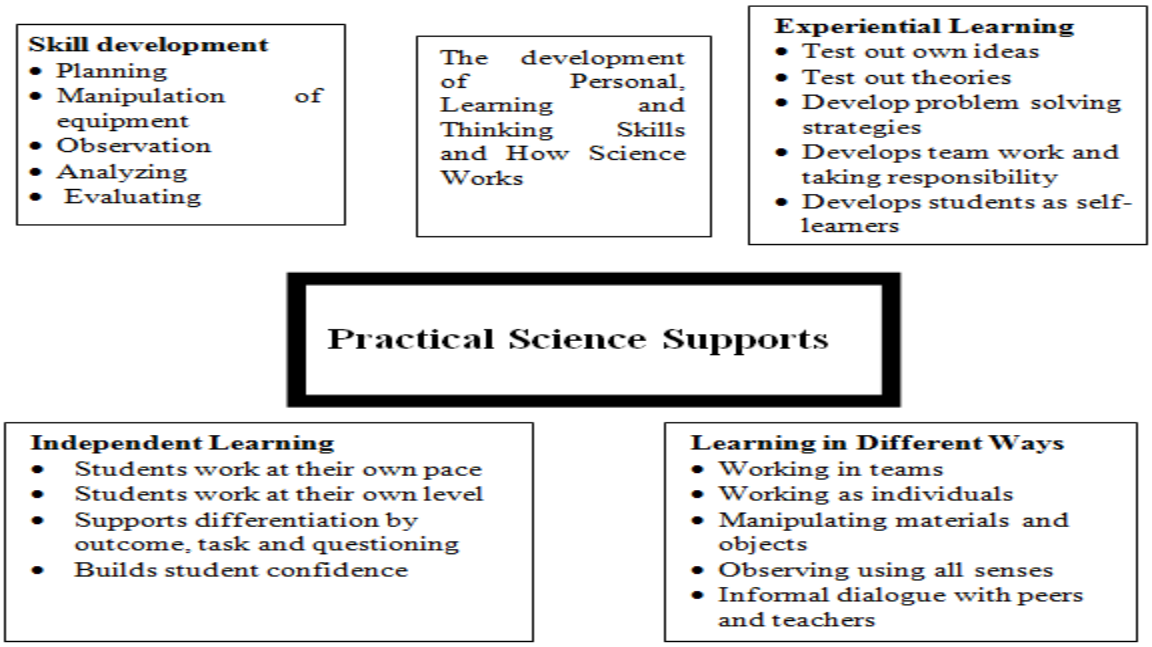


**Figure 1: How practical work supports the learning of science (Adopted from SCORE, 2009)**

In general, practicals support independent learning where students work on their own in different ways to develop critical thinking, which helps to build their self-confidence. Additionally, practicals simplify concepts, which seem difficult in science especially when learnt only theoretically. Consequently, science subjects' practical aspects reassure the development of critical thinking which is useful in the word of work today. Thus, science subjects cannot be effectively taught without practicals.

**Definition of the Term "Practical"**

The term has been defined by several researchers such as Millar (2009) who defines it as an inquiry and hands on activity that helps to create curiosity and transfer knowledge to higher cognitive levels in learners. In 2002, Millar, Tiberghien and Le Maréchal, used the term to refer to a teaching, learning and assessment activity, which involves the student in manipulating the objects or materials and making observation. This study adopts these definitions since they bear the intended meaning.

**Research Problem**

There is a growing concern in Tanzania that Ordinary Level secondary school Biology results are far from impressive according to National Examination Council of Tanzania (NECTA) statistics from 2012 to 2017. In the 2012 Biology Ordinary Level had a 32.71% pass rate, which is its lowest pass rate in the past six years. Reports from NECTA reveal that a majority of the candidates in this level lack understanding of biological concepts, and problem-solving skills. Since Biology is a science subject, and development of problem solving skills is enhanced by practical work, students' poor performance in Biology may be the result of not being engaged in the practicals. Thus, this study seeks to examine the challenges of teaching and assessing Biology practicals in the secondary schools in Tanzania.

**Research Objectives**

1. To assess teachers' knowledge in teaching and assessing Biology practicals
2. To examine teachers' practices in the teaching and assessment of Biology practicals
3. To establish the challenges that teachers encounter in teaching and assessing Biology practicals
4. To determine how the teachers have been coping with the challenges.

**Research Questions**

To fulfill the research objectives, the following research questions were developed:

1. To what extent do teachers teach and assess Biology practicals?
2. What challenges do teachers encounter in teaching and assessment of Biology practicals?
3. How do teachers cope with challenges in teaching-learning and assessment of Biology practicals?

**Literature Review**

Most nations have placed much emphasis on learning and assessment of science practicals. However, a study conducted by Millar (2009) revealed that, despite the aforementioned efforts, practical learning and assessment have continued to be marginalized. This seems to be due to the fact that teaching, learning and assessment of practicals in science entails having teachers equipped with requisite teaching and assessment knowledge, well-

furnished laboratories, text books, and practical manuals.

Ruparanganda, Rwodzi and Mukundu (2013) in their studies conducted in Zimbabwe, found out that the majority of secondary schools especially those in rural areas either had no laboratories or had poorly equipped ones. This made learners struggle to translate what they learn in school into real life skills. The authors asserted that the acquisition of scientific knowledge, skills and attitudes in schools is highly compromised by unavailability of resources and insufficient teacher preparedness.

In the same line, Ekene and Ifeoma (2011) carried out a study on Nigerian students' perception on the factors, which influence acquisition of science process skills in practical Chemistry. They identified; lack of quality science teachers and large population in schools as some of the factors that influence teaching and assessment of Chemistry practicals. Another study that was carried out in Uganda by Wanyama (n.d) established that practicals are given little attention due to poor facilities hence practical skills subjects are theoretically taught. Where some equipment is provided by the Ministry, installation and training are the next issues. In addition, although some equipment could be made locally by the schools, most schools lack income-generating projects to supplement government efforts. Furthermore, the author found out that school administrators give priority to other school items in the budgets instead of focusing on academic materials and text-books. Briefly, studies show that, the teaching and assessment of science subjects in developing countries hardly prepare students for real life challenges.

**Methodology**

The study employed mixed research methodology in a survey research design. The sample came from 347 secondary school teachers in all 27 regions of Tanzania. The teachers had teaching experience of at least 3 years. This implies that by choosing participants purposively, it was possible to get people who had experiences and firsthand information related to the phenomena under study. Data were collected using questionnaires. The questionnaires were developed by the researcher based on information from the literature review. The questionnaires were tested through peer piloting and subjected to further refining before they were administered. The questionnaires consisted of Sections A and B. Section A sought information on personal data of the respondents such as teachers' teaching experience. Section B comprised five questions, in which four were closed-ended questions and one was an open-ended question. In Section B, the first question required teachers to indicate the number of times they had attended capacity-building programs in teaching and assessment of Biology practicals. The second question required teachers to indicate the number of times in a year they meet at departmental level to share ideas on teaching and assessing Biology practicals.

The third question required the teachers to indicate the number of times in which they (a) teach Biology practicals in a month and (b) assess Biology practicals in terminal or annual examinations. The fourth question required teachers to explain the challenges they encounter in teaching and assessing Biology practicals and to state how they cope. Data obtained were analysed using Microsoft excel

where results obtained from quantitative data were presented in figures and percentages. On the other hand, qualitative data were analyzed thematically.

## Findings

This part presents, analyzes and discusses the results.

### *Participants' profile*

*Table 1: Characteristics of the participants*

| Teaching experience | Number of teachers | Percentage |
|---|---|---|
| 3-6 years | 16 | 4.61% |
| 7-10 years | 138 | 39.77% |
| More than 10 years | 193 | 55.62% |

Results in Table 1 reveal that 331 (95.39%) of the participants were teachers with teaching experience of more than six years. This implies that the majority had significant experience in the field of teaching and assessment of Biology practicals.

### Attendance of teachers in capacity building programs for teaching and assessment of Biology practicals

Question 1 required the teachers to indicate the number of times they had attended capacity-building programs in teaching and assessment of Biology practicals from 2010 to 2017. The findings reveal that out of 347 teachers who responded to this question, 186 (53.60%) had attended capacity building programs in teaching and assessment of Biology practicals 1-2 times, while 54 (15.56%) had attended capacity building 3-4 times, and 41 (11.81%) of the teachers had attended such programs more than 4 times. However, (19.03%) had never attended capacity-building programs in teaching and assessment of Biology practicals since 2010.

These findings reveal that, in general majority (80.00%) of the teachers had attended capacity-building programs on teaching and assessment of Biology practicals at least once. This implies that, while the majority of teachers have been equipped with knowledge in teaching and assessment of Biology practicals, there are still some teachers who teach and assess Biology practicals without enough knowledge.

### Sharing knowledge in teaching and assessment of Biology practicals among teachers of the same school

Regarding question 2 which required teachers to report how many times they met annually at departmental level to share ideas in teaching and assessment of practicals, results reveal that, 115 (33.00%) met 1- 2 times per year, 180 (51.00%) met 3 - 4 times a year whereas 52 (14.99%) did not meet to share ideas on how to teach and assess Biology practicals. In general, the results show that while a majority of the teachers do meet and share ideas on how to teach and assess Biology practicals, some do not. This implies that the majority of teachers have acquired enough knowledge in teaching and assessment of Biology practicals either through attending capacity building, or sharing ideas in their departmental meetings.

### Involvement of teachers in teaching and assessing Biology practicals

Concerning question 3(a) which required teachers to indicate how many times per month

they teach Biology practicals in their schools, findings revealed that 73 (21.04%) of the teachers teach Biology practicals 1-2 times per month while 157(45.24%) do teach Biology practical 3-4 times a month, and 93 (26.80%) teach Biology practicals more than 4 times per month. However, 24 (6.92%) of the teachers do not teach Biology practicals at all.

These results revealed that, most of the teachers do teach Biology practicals 1- 4 times a month. The latter implies low involvement of students in practicals. This is because according to the school timetable Form 1 and 2 are supposed to be taught 12 Biology sessions, while Forms 3 and 4 are to be taught 16 Biology monthly sessions. The number of times most teachers teach Biology practicals is not even half the total number of sessions they are supposed to teach in a month. It can be deduced that, most Biology teaching is done theoretically. Thus, learners do not develop critical understanding of concepts and principles in Biology to enable them to gain problem-solving skills needed for good examination performance in Biology and well preparation for the world of work.

For question 3(b) which required teachers to state if they conduct terminal/annual Biology practical examinations in their schools, the results revealed that, out of 347 participants, there is no school, which conducts terminal/annual Biology practical examinations. Biology practical examinations are done only during national examinations. This is an indicator that teaching and assessment of Biology practicals aim at passing the national examinations and not for equipping learners with problem solving skills, which are very important in the world of work.

**Challenges of teaching and assessing Biology practical**

Question 4 required teachers to explain the challenges they face in teaching and assessing Biology practicals and how they cope. The challenges are grouped into major (those identified by more than half of the participants) and minor (those identified by less than half of the participants) as follows:

**Major challenges**

**Lack of laboratory technicians**

Lack of laboratory technicians was the first challenge pointed out by 86.46% of the participants. Some teachers explained that though preparation of chemicals and apparatus, finding of specimens, and all other laboratory preparations are the roles of laboratory technicians, they are obligated to perform these roles by themselves before they start their practical teaching.

**Lack of well-equipped Biology laboratories**

Out of 347 participants, 71.18 % explained that they lack well – equipped laboratories. Some of the teachers explained that present laboratories were too small for the number of students studying Biology. In addition, even if the laboratories are large, there are not enough chemicals and apparatus. All these factors make teaching and assessment of Biology practicals difficult.

**High Teachers' Workload and Time Constraints**

More than half of the participants (60.23%) pointed out that the teacher-student ratio makes teaching and assessment of Biology practicals challenging. For example, one teacher explained that she is the only Biology teacher in a school with 400 Biology students. This problem, when combined with the small

capacity of the laboratories make teachers fail to effectively teach and assess practicals.

**Minor Challenges**

***Lack of specimens***

This challenge was pointed out by 79 (22.77%) of the participants. They explained that some specimens are difficult to find, others are seasonal while others inhabit areas with specific climates. Thus, it is difficult to find the latter especially when they are needed in a fresh state.

***Lack of Biology practical manuals in schools***

There were 60 (17.29%) of the participants who explained that they had no copy of Biology practical manuals. Other participants explained that they had few copies of Biology practical manuals compared to the number of students. This must be a hindrance to proper teaching and assessment of Biology practicals.

***Lack of support/motivation from administrators/school heads***

Thirty-three (33) or 15.85% of the participants explained that school administrators/heads of the schools do not give appropriate support to science teachers during preparation of practicals. Some of the teachers explained that they are not funded to travel in search of seasonal specimens.

***Lack of laboratories***

Some participants (13.54%) explained that they do not have laboratories and therefore, they do not conduct practicals.

***Students' negative attitude to Science***

The challenge of students' negative attitude was pointed out by 7% of the participants. They explained that some students have a negative attitude toward studying science subjects, by claiming that the latter are difficult.

***Language problem***

Two per cent (2%) of the participants explained that some students have problems in understanding the language of instruction. Thus, during teaching of Biology practicals, teachers spend much time explaining, even though the learners still end up with very low marks in examinations.

**Ways in which teachers cope in teaching and assessment of Biology practicals**

Table 2 summarizes ways in which teachers have been trying to cope with the challenges they face in teaching and assessment of Biology practicals.

***Table 2: Ways in which teachers cope with challenges in Biology practicals***

| S/n | Number Challenges | Way of copying |
|---|---|---|
| 1. | Lack of laboratory technicians | - Self-preparation of chemicals and reagents |
| 2. | Lack of well-equipped Biology laboratory | Use of locally available materials<br>Teaching by demonstration |
| 3. | High teachers' work load/lack of time | -Using week-end hours |
| 4. | Lack of Biology practical manuals in schools | - Student buy and make photocopy |
| 5. | Lack of laboratory | -Use of some selected classrooms as temporary laboratory |
| 6. | Lack of specimens | -Use of picture and diagrams instead of live specimen |
| 7 | Students' negative altitude to the science | -Teachers work together with parents in providing counseling to the students |
| 8 | Language problem to students | -Teachers do try to use simple English as much as they can |

## Conclusions and Recommendations

The study has explained the challenges for enhancing science subject practicals in Secondary Schools in Tanzania and put forward the following conclusions and recommendations:

### *Conclusions*

This study has revealed that a majority of teachers, 80.00% have received capacity building in teaching and assessment of Biology practicals, and share this knowledge regularly through their departmental meetings. It is therefore clear that teachers' knowledge in teaching and assessment of Biology practicals is not among the challenges, which affect teaching and assessment of the latter.

Teaching and assessment of Biology practicals is challenged by lack of well-equipped laboratories, high teachers' work load/lack of time, lack of support from administration, lack of laboratory technicians and lack of enough Biology practical manuals. Other factors include students' negative altitude to science subjects and inability of some students to understand the language of instruction. Although teachers are trying to cope with some of the challenges they encounter in teaching and assessment of Biology practicals, it is clear that some challenges are above their coping ability. Therefore, it can be concluded that poor involvement of teachers in teaching and assessment of Biology practicals due to the aforementioned challenges negatively affects students' proper acquisition of problem solving skills, leading to unimpressive performances in national Biology examinations.

### Recommendations

The researcher recommends that for students' proper acquisition of problem solving skills and amelioration of performance in national Biology examinations, the government should make sure that each school has a well-equipped laboratory to enable teachers to equip students with problem solving skills for improving performance in Biology Examinations. Each school should have enough laboratory technicians in order to reduce teachers' load and give the latter enough time for planning, teaching and assessing Biology practicals. Teachers should be encouraged to use locally available materials in the teaching process, to assist government's efforts. There are enough Biology teachers in each secondary school. Monitoring of capacity building programs is properly done in order to ensure that all teachers are involved.

The study also recommends that teachers be frequently provided with seminar/workshops on how to teach and assess Biology practicals. They should also be motivated by being provided with extra duty allowance as they spend much of their free time/weekend time preparing for practicals. Further, it is recommended that school heads be directed to support science teachers in teaching and assessment of practicals.

The study also recommends that there be an increase of teacher-student ratio to 1:20 to reduce the teaching load of science teachers, and to allow teachers time to plan, teach, and assess practicals. Heads of schools and science teachers should also continue to work hand in hand with parents in counseling students to overcome their negative attitude toward science subjects. Finally, teachers should encourage students to read English books and practice using the English language frequently for mastery.

**Suggestions for further Research**

In this study, general factors which affect teaching and assessment of Biology practicals were analyzed. Further research may be done to find out how specific factors such as student home environment (rural/urban) and parent economic status influence students' performance in Biology practicals.

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# An Exploration of the Effects of High-Stakes Examinations on the Teaching and Learning of Computer Studies in Secondary Schools in Kenya

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## Abstract

*The introduction of Computer Studies as an examinable subject at the Kenya Certificate of Secondary Education was done in 1998. Among the objectives of introducing the subject was for the learners to appreciate computers and develop ICT and programming skills. The number of candidates has been slowly rising since then. In the year 2016, about 1,300 schools presented candidates in the subject with a candidature of about 13,000 out of 570,000 candidates. This study sought to explore the effects of high-stakes examinations on teaching and learning of Computer Studies. It explored teachers' views on high-stakes examinations and looked at learners' attitudes and study methods employed. The study categorized the institutions into national, county, sub-county and private secondary schools. A representative sample was acquired for each category and questionnaires administered to the candidates and teachers. One hundred and ninety-two (192) schools offering the subject were considered from all the 47 counties across Kenya. Data was analyzed using SPSS and presented in frequency tables and graphs. The study found out that high-stakes examinations make teachers complete syllabus on time, improve the contact hours with the learners, make schools invest heavily in technologies that can assist in teaching and learning and lead to creation of offices to promote learning, guidance and counseling. The Kenyan education system of 8-4-4 is focused on the authority of the curricular and the tyranny of high-stakes national examinations, implying that learners have less chance to co-create or discover knowledge needed in the job market. Even with a standard syllabus in Computer Studies, some schools have invested heavily in ICT resources while others have very little. Low investment in ICT eventually translate to poor performance in the subject while other schools start employing unprofessional means to score highly in the summative assessment. The study recommends that high-stakes examinations need to be treated with caution for they promote teaching for examinations and malpractices. A move towards formative assessment with a higher percentage to the final grade in summative assessment than the current 25% in Computer Studies may be a solution to the problems created by these examinations.*

***Keywords:*** *High-stakes examinations, summative assessment, school-based assessment, Teaching, Learning*

## Introduction

According to The Great Schools Partnership (2014), a high-stakes examination is any set of questions used to make important decisions concerning learners, educators, schools, or educational policies, most commonly for the purpose of accountability. The high-stakes means that test scores are used determine:

- the punishments such as sanctions, penalties, funding reductions, negative publicity among others;
- accolades which may include awards, public celebration or positive publicity;
- advancement to a higher grade promotion or graduation for learners;
- compensation like in case of salary increment or bonuses for administrators and teachers.

Wasanga and Muiruri (2010) note that high-stakes examinations are "fiercely competitive".The very competitive nature of the public examinations has led to candidates, school head teachers, teachers and other stakeholders to engage in unfair practices to enhance their scores during public national examinations. This often results in lessening of public faith in examination, lowering the credibility and reputation of the examination authority and adding substantial amounts of operational costs to public expenditure in cases where the irregularities become so rampant that the examination has to be nullified and arrangements devised for a re-registration of the affected candidates.

In Kenya, the high-stakes tests exist in the form of the Kenya Certificate of Primary Education (KCPE) sat at the Grade 8 or Class eight and the Kenya Certificate of Secondary Education (KCSE) examination sat at Form 4 or Grade 12. The Kenya's education system follows the 8-4-4 cycle, which means a minimum of 8 years in primary school, four in secondary school and four at the university level.

The KCPE examination results determine the category of school a learner is to be admitted for the secondary education. There are four categories of public schools in the Kenya's education system. These include national, county, extra-county and sub-county schools in the order of preferences and the resources available in them. The KCSE examination results determine the career path the candidate takes for his/her future. This is determined by the subject combination and the overall grade attained. This explains the seriousness of these examinations which to many is a matter of life and death. Computer Studies as a subject in the KCSE examination comprises of three papers. Paper 1 is theory marked out of 100%, but eventually converted to 50%, paper 2 is a practical one marked out of 100% but later converted to 25% and paper 3 is a project marked out of 100% but converted to 25%. It has been observed by KNEC that majority of the schools take paper 1 and 2 more seriously than paper 3. Many schools have been reported by teachers to be purchasing the projects instead of the candidates undertaking them. Others are said to be sending marks to KNEC without even carrying out the projects as required. The majority of the schools and learners seem to focus on summative assessments administered during the months of October and November at the expense of skills and competences acquisition that come with formative assessment. Summative assessment has a direct impact on what happens on the life of the learner based on the examination performance.

**Research Problem**

The KCPE and the KCSE examinations which are the high-stakes examinations in the Kenya's education system, largely determine the future of any learner in the country. This suggests that all the stakeholders in the education sector focus on these examinations when they are being administered. Of greater importance in this process is the learner, the subject teacher and school administration as well as the parents/guardians to the candidates. According to Awiti (2012), standardized national examinations have a tyrannical hold on students, teachers and parents hence creating a lot of tension to all the education stakeholders during their administration, marking, scoring and eventually release.

The overall good results boost a school, while personal performance directly has a positive or negative impact on the learner. For the subject teacher, there is always the internal motivation that comes with a subject that is well performed and many rewards that may come with it. A teacher who is internally and externally motivated tends to do his/her best to produce excellent performance. Such a teacher can use any means at his/her disposal to ensure that the learners perform well. Poor results have resulted in the some of the following happening; parents demanding the sacking of teachers and administrators, teachers forcing learners to repeat classes, schools losing learners, demotions, learners committing suicide among others.

This study sought to explore the effects of high-stakes examinations on the teaching and learning of computer studies in Kenya.

**Objectives of the study**

The study was guided by the following objectives:

i. determine the perceptions of the teachers on high-stakes examinations;
ii. establish the impact of high-stakes examinations on teaching and learning of computer studies in Kenya;
iii. determine how to handle high-stakes examinations in the future with special reference to computer studies.

**Research Questions**

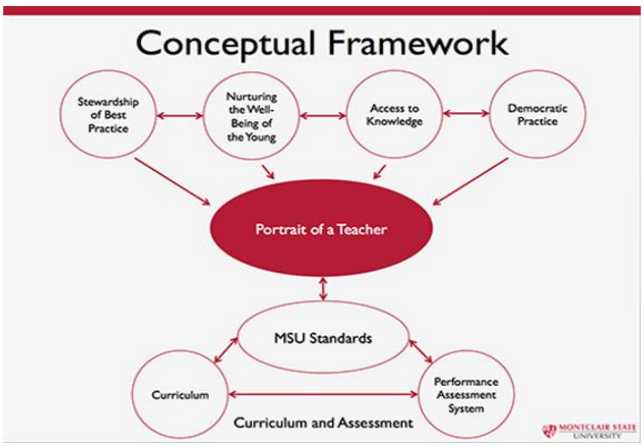
i. What are the perceptions of the teachers on high-stakes examinations?
ii. What are the impacts of the high-stakes examinations on teaching and learning of computer studies in Kenya?
iii. What needs to be done during the administration of high-stakes examinations in Kenya?

**Literature Review and Conceptual Framework**

This study used Montclair State University (MSU) conceptual framework of teaching and learning. The framework is guided by four principles which are: providing access to knowledge for all learners; forging caring and effective connections with all learners; fostering in the young the skills, dispositions, and knowledge necessary for effective participation in a social and political democracy; and ensuring responsible stewardship and change agency in schools.

The model envisages a learning environment that is democratic and geared towards the acquisition of skills and competencies with total participation by all the learners. Such learning and assessment demands a commitment to civic responsibility and critical examination of nature, causes, and means for eradicating social and institutional inequalities as well as fostering the development of best practices for supporting productive learning for

all learners. This is illustrated in the diagram below:




**Source:** https://www.montclair.edu/cehs/academics/ncate-accreditation/conceptual-framework/

**What are High-stakes examinations?**

The Great Schools Partnership (2014) defines a high-stakes test or examination as any test used to make important decisions concerning learners, educators, schools, or educational policies and is used for the purpose of accountability. Heubert (2000) notes that high-stakes assessments are those used to make significant educational decisions about students, teachers, schools or school districts.

**Uses of high-stakes examinations**

High-stakes tests come in many forms and may be used for a wide variety of purposes. The following provide an overview of applications of high-stakes testing according to The Great Schools Partnership (2014):

Students: the results may be used to determine whether students advance to the next grade level or what career path they may pursue.

Educators: the results may be used in the job-performance evaluations of teachers or to determine professional compensation. Promotion to the next job group or grade may be pegged on the classroom performance of the teacher. This has been criticized in Kenya for it has led to many schools abandoning extra curricula activities to concentrate on academic work only. In some situations, the candidate classes do not take part in these activities to maximize on academic performance.

Schools: the tests results may be used to trigger penalties for schools, including negative public ratings, replacement of staff members, or even closure. This is quite evident in Kenya after the release of KCSE and KCPE examination results. Many headteachers are sometimes forced to get security after the release of these examinations especially if the results are poor. In some situations, headteachers especially of the public schools even commit suicide (Rono and Kiage, 2017) and Oduor (2016).

Policy formulation: The Ministry of Education adopts some policies based on the performance of candidates in examinations (MOE, 2012). Bishop et al. (2000) explore the effects of policies associated with school reforms, including exit exams that measure basic skills, on students' "schooling, learning, and earning." High-stakes examinations present a wealth of data on differences in various outcomes for students who had been exposed to certain

competencies. This can help a country adopt certain policies in the education sector.

The National Academy of Sciences (2018) gives the following as the principles of educational testing

Accountability: This is providing evidence of the performance of teachers, administrators, schools, sub counties, or counties, relative to the established standards or benchmarks. This helps in ensuring that learning is taking place uniformly in all parts of a country or state.

Decisions about students: Examinations help in providing data that is used in making important decisions about individual students, such as placement in academic programs, grade promotion, or graduation.

Program evaluation: The success or failure of an educational system is best measured using the end products who are the learners. Examinations help in providing evidence of the outcome of a particular educational program in terms of students' performance.

Tracking of long-term trends: Examinations help in providing evidence of changes in the performance of groups of students (cohorts), such as those enrolled in a particular grade, school, district, or those belonging to population subgroups, tribe among others.

Diagnosis: Examinations help in providing information about students' strengths and weaknesses with regard to specific objectives to be achieved. They also help in determining the skills to be used in improving teaching and learning. Diagnostic assessment is intended to improve the learner's experience and level of achievement. However, diagnostic assessment looks backwards rather than forward.

It assesses what the learner already knows and/or the nature of difficulties that the learner might have, which, if undiagnosed, might limit their engagement in new learning (QAA, 2006).

**Impact of High-stake examinations**

Stecher, Hamilton and Klein (2002) summarized the effects of high-stakes examinations as shown in the table below:

| **Positive Effects** | **Negative Effects** |
|---|---|
| Provide learners with clear information about their own skills | Frustrate learners and discourage them from trying |
| Motivate learners to work harder in school | Make learners more competitive |
| Send clearer messages to learners about what to study | Cause learners to devalue grades and assessments |
| Help learners associate and align personal efforts with rewards | |

According to Awiti (2012); high-stakes examinations in Kenya are killing the education sector despite the government putting a lot of resources in it. She notes that schools and learners are involved in unhealthy competitions where passing in the examination is more crucial than the mastery of the content. This is also noted by Wasanga and Muiruri (2010). Aysel (2012) notes that high-stakes examinations are objective and provide homogeneity, and they focus students on studying. However, they encourage attention to material covered by the examinations and as a result; the aims of the curriculum may not be addressed in teaching and learning making the teachers to adopt certain teaching methods. She observes that drill-and-practice may be used as a teaching method with students using memorization as a learning style and not focusing on conceptual understanding. In her thesis, she concludes that high-stakes examinations can be stressful and can

negatively influence students' confidence and anxiety. This has been observed by Awiti (2012) as well.

The Great Schools Partnership (2014) observes that in school-reform mechanisms, the use of high-stakes testing is generally motivated by the belief that the promise of rewards or the threat of punishment will motivate educators to improve school performance, teaching effectiveness, and learner achievement. This philosophy works quite well in public schools in Kenya. By attaching rewards and punishments to tests score, students, teachers, and school administrators take the tests seriously, make personal or organizational changes, and put in the necessary effort to improve performance. This is what has made many schools to be labeled as high achievers yet what could be going on may be drilling and use of dubious means to make their learners "pass" who eventually have it rough when they join the tertiary institutions. Orfield and Kornehaber (2001) observe that when rewards and sanctions are attached to rigorous tests they motivate the unmotivated to learn. They note that the unmotivated are usually identified as low socioeconomic students in urban schools. When rewards are provided because of excelling in the high-stakes examinations, the poor students tend to perform better since they will act like motivation.

Amrein and Berliner (2002) lament that high-stakes examinations make schools emphasize on drilling other than teaching. This, they note may affect the validity of the examinations and occasionally make the schools to be involved in examination malpractices. Wanyama (2016) observes that "the craze by candidates, parents and teachers for good grades that engenders cheating is now up against the government's (Kenya's) bid to ensure credibility and integrity of the exams". It has been noted that high-stakes testing policies hurt the learners instead of helping them. It has also been observed that they have resulted in no measurable improvement in student learning. This has been discouraged in any modern educational philosophy for little learning has been observed to take place in such situations. Research by Wheelock, Bebell and Haney (2000) noted that students depict themselves as anxious, angry, bored, pessimistic and withdrawn from high-stakes testing while the older students become more disillusioned and hostile towards these tests compared to the younger ones. This suggests that in high-stakes testing, the teachers may need to handle the learners with a lot of care if the learning objectives are to be met.

**Handling the high-stakes examinations**

High-stakes examinations setting, administration, marking and scoring are known to cause significant anxiety among the education stakeholders. In acknowledging the many issues associated with high stakes examinations, the Government of Kenya created in 2012 a Task Force on the Re-alignment of the Education Sector to the Kenya Vision 2030 and Constitution of Kenya 2010, from which a Sessional Paper No. 2 of 2015 on Reforming Education and Training in Kenya was developed.

The Sessional Paper recommended the following: reforming the education and training sector to provide for the development of the individual learners potential in a holistic and integrated manner, while producing intellectually, emotionally and physically balanced citizens; development of a competency based curriculum; establishment of a national learning assessment system; early

identification and nurturing of talents; and the introduction of national values and national cohesion and their integration into the curriculum.

The report calls for more continuous assessment, which serves as a window to curriculum delivery. Consequently, teachers can use continuous assessment not only to actively and continuously assess learner's progress, but also to acquire useful data to inform their own instructional practices (Stiggins, 2004). This helps in gaining insight into a child's thinking hence, better approaches when imparting knowledge and skills. Formative assessment is enhanced when there is a variety of written and practical work, not just a final exam (Edwards et al., 2006). Teachers and lecturers should be encouraged to consider both formal and informal methods of formative assessment. Laying emphasis on continuous assessment or formative assessment in education as a solution to high-stakes examinations helps in: enhancing a culture of assessment for the support of the teaching and learning process; providing for meaningful integration between internal and external assessments, and between formative and summative assessments; reducing of pressure of high-stakes examinations and resultant vices such as cheating; removing the unfair categorization of schools as good performers or non-performers; teaching and learning which is geared towards acquisition of competencies and skills and not necessarily for passing in examinations; provision of supplementary examinations to learners who may not be able to take part in a summative assessment due to various reasons such as illnesses, ill-preparedness, bereavement among other causes. National Academy of Sciences (2018), while giving precautions on the assessment of a curriculum, notes that there is a need to: ensure that necessary changes in teaching and curriculum have been made so that students have adequate opportunity to learn the material on which they are being tested before such tests are used in making promotion or graduation decisions; ensure that students for whom English is a second language or who have disabilities that affect their schooling are tested only in ways that conform with professional standards regarding inclusion and accommodations; and ensure that students are given sufficient opportunities to demonstrate mastery of the required content and skills. It is only through the issues discussed above that the high-stakes testing will be democratic to the learners.

The National Council of Teachers of Mathematics (2007) observes that, "formative assessment produces greater increases in student achievement and is cheaper than other efforts to boost achievement, including reducing class sizes and increasing teachers' content knowledge." Not only is it satisfying to the learners but also to the teachers. It notes that, "in classrooms where medium- and short-cycle formative assessment is used, teachers report greater professional satisfaction and increased student engagement in learning." This should be the basis for any teaching and learning in any academic set-up. Participating in assessment should not be a matter of life and death.

**Methodology**

The research study used quantitative and qualitative paradigm. Survey approach was used to collect data.

***Population***

The target population for the study comprised of teachers and administrators of the sampled schools offering computer studies and had a candidature of over ten candidates. The schools were 487 out of the 1406 schools that had candidates in the subject in 2016.

***Sampling***

The study clustered the examination centres into rural and urban then purposively sampled four schools from each of the 47 counties. Of the four schools chosen, one was a national, a county, a sub county and a private school. This ensured that all the categories of the schools were represented.

***Data Collection instruments***

The study used questionnaires for data collection because of the following reasons:

- large amount of information can be collected from a large number of people who are far from one another in a short period of time and in a relatively cost effective way;
- the results of the questionnaires can quickly be analyzed with a software package;
- when data has been quantified, it can be used to compare and contrast other research and may be used to measure change.

The research to a limited extent used observation in the schools that were physically visited.

**Data analysis**

Data analysis was done using statistical software (SPSS) and a spreadsheet.

**Findings, Analysis and Interpretation**

**Research Question 1: What are the perceptions of the teachers on high-stakes examinations?**

The study established that majority of the teachers i.e. 82% were happy with the high-stakes examinations. They felt that these examinations, despite providing a very competitive teaching and learning environment in schools, help them to:

- complete the syllabus covering basically all the topics provided in the curriculum;
- weigh themselves against other schools nationally when ranking is done;
- compel the school administrators to acquire all the facilities needed to facilitate teaching and learning;
- invest in their education because of the challenging environment created by the examinations;
- get promotion from one job group to another especially amongst the teachers employed by the government;
- get gifts from schools when the candidates perform well.

A minority of 18%, felt that high-stakes examinations result in the following:

- unhealthy competition between schools and learners;
- promotion of malpractices in schools which eventually may lead to loss of jobs and even prosecution of the teachers implicated;
- making teachers to scavenge for any opportunity they may get to engage the candidates, hence making the learners left with no control of their personal academic timetable;
- some teachers discouraging the learners from taking part in extra-curricular activities;
- some administrators coercing learners to start specialization in the optional subjects at form one instead of form three

which eventually make them not explore the many facets of optional subjects offered by the 8-4-4 curriculum.

**Research Question 2: What are the impacts of the high-stakes examinations on teaching and learning of computer studies in Kenya?**

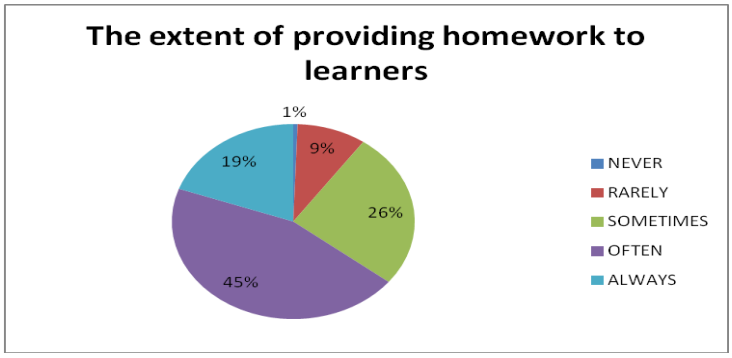
**Use of textbooks by the teachers and learners**

The research established that all the schools use the recommended textbooks by the Kenya Institute and Curriculum Development (KICD) and revision books especially by the renowned publishers. The teachers prefer revision books which have the format of the Kenya Certificate of Secondary Education (KCSE) examination question papers and have answers unlike those with just questions. The schools are quite specific on the books the candidates are to use and it is made clear right from their entry to form one. About 68% of the schools would make the candidates to choose the subject at Form one as a KCSE subject and not in Form three as recommended by the Ministry of Education being an optional group 4 subject.

**Homework presentation to the learners**

The majority of the teachers gave and marked homework. The study established that most of the homework given was based on the past national examinations questions. The marking and revision would be thorough as a way of preparing the candidates for the national examinations. In some instances, the teachers together with the candidates brainstorm on what has not been assessed by KNEC around the topical issues being addressed in the homework. Homework would also be given from the popular revision books by the renowned publishers, which follow the formats of the national examinations.

**The extent of providing homework is shown in graph 1 below:**



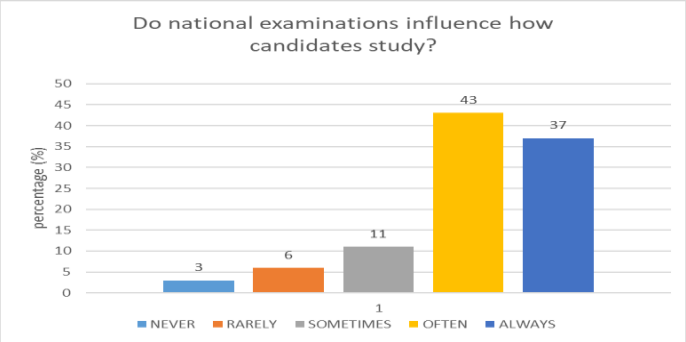

**Graph 1: A pie chart showing the provision of homework to the learners**

This shows that teachers give homework to the learners.

**Teachers' thinking about the examination system**

Teachers refer to the national examination question papers during the teaching and learning process. This influences the way they teach. They spend more time going through what has not been assessed. Majority of the teachers have the statistics of how often a certain topic is assessed and have gone to the extent of grouping those questions based on the year and the weight allocated. At least 80% of the teachers are influenced by the national examinations as they deliver in the classroom. This also has a bearing on the way the learners study. The picture of the national examinations is always with the learners as they study just like their teachers as they teach them.

The influence of the national examinations to studying by the learners is illustrated in **Graph 2** below:




**Graph 2: A graph showing how national examinations influence how candidates study**

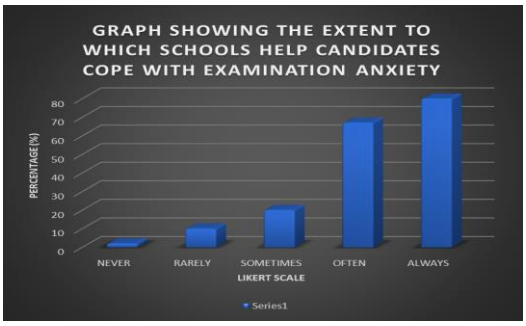
The above graph suggests that as candidates study, they are to a greater extent influenced by the national examinations.

**Coping with anxiety, confidence and study style before the administration of national examinations**

Majority of the schools in the study had programs on helping the learners cope with anxiety and confidence before the administration of the national examinations. About 90% of the schools had guidance and counseling department headed by a qualified counselor whom the students open to but mostly on academic matters. The 10% remaining were upcoming schools who were more concerned with extracurricular activities than academics. The guidance and counseling department was observed to help the learners cope with stress and anxiety in the following ways:

- inviting KNEC examiners to talk to them on how marking is done. This is against KNEC policy;
- inviting motivational speakers to encourage them;
- organizing trips to relaxing areas where the learners would have fun;
- having a learner allocated a teacher to be his/her mentor;
- organizing guidance and counseling sessions;
- promising the learners rewards on excelling in the national examinations;
- having special meals during examinations.

How the schools in the sample assist the learners in coping with anxiety brought about by national examinations is presented in **Graph 3**:



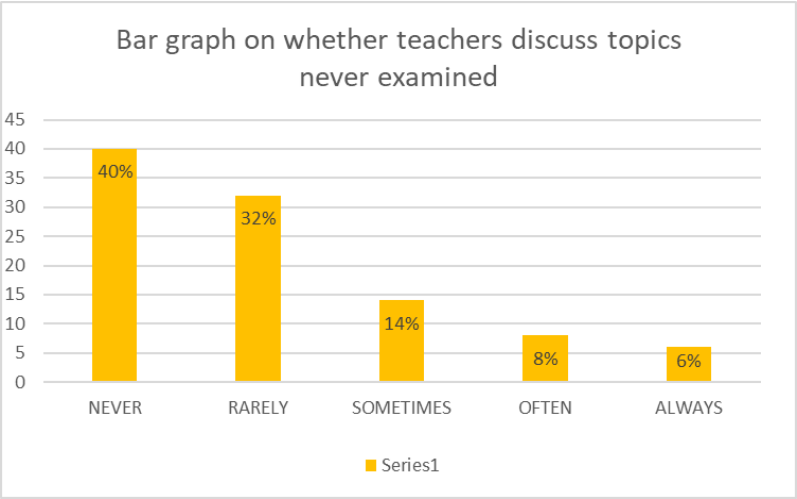

**Graph 3: A graph showing how schools help learners cope with national examinations anxiety**

From the graph above, it is clear that schools are aware of the anxiety examinations bring to the candidates, hence look for different ways of helping them to cope.

**Teaching of topics that are never examined**

The study established that 72% of the teachers hardly or rarely discuss anything that is never assessed by the national examiner. Only four teachers admitted that they have taught presentation package yet this skill is very important for the learners when they join colleges. Robotics and artificial intelligence sub topics are implied in the syllabus but are rarely taught since the national examiner does not assess them. It is only in a few national and international schools where they teach Cambridge Assessment International Education and *International Baccalaureate (*IB) curriculum where topics never examined are taught to help the learners think about their future careers.

The **graph 4** below shows the extent to which teachers teach what is never assessed by the national examiner (KNEC).




**Graph 4: A graph showing how often teachers teach topics that are never examined**

From the above graph, it is evident that majority of the teachers only teach what is assessed by the national examiner.

**Exam driven Teaching**

The study found out that teaching or curriculum delivery is examination driven. This suggests that the teaching and learning that takes place is not so much geared towards the acquisition of skills but rather towards passing the examinations. This as a result leads to unhealthy competition amongst teachers so that the schools can reward their performance. It was observed that some teachers especially in the boarding schools are ever on the school compounds even at night and over the weekends to look for any available opportunity to impart knowledge amongst the candidates so that eventually their subjects may perform better than for the other teachers. It also leads tounhealthy competition amongst schools: As teachers set their targets for a certain candidate class, the study found out that it is done based on the performance of the rival schools within the sub county or county. This creates enmity amongst the schools and it becomes evident during interschool games competitions and in the science congresses. Some schools start implicating others to the Ministry of Education officials that their rivals are using dubious means to pass in the national examinations.

Examination malpractices; Some of the schools in the sample had been involved in examination malpractices most likely perpetrated by the candidates, parents, teachers and the school administration all in the name of making the

candidates perform better in the national examinations.

Schools and teachers investing heavily in resources such as:

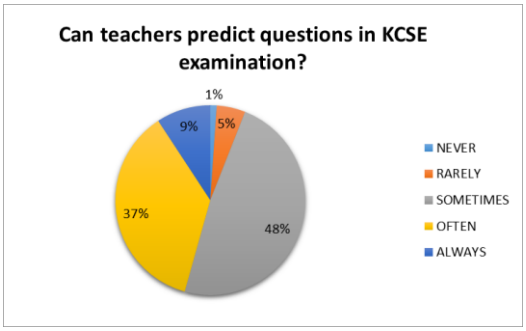
- ICT equipment;
- Board of Management teachers to beef up the teaching personnel in the schools;
- Revision resources; and
- Motivational speakers.

**Ability to predict what will be assessed in the KCSE examination**

Majority of the teachers are able to predict what will be assessed in the KCSE examination. The prediction is through the students they teach and the teachers teaching the same subject. This is done through:

- looking at the untested topics;
- checking the areas where students failed as indicated in the KNEC backwash reports;
- commonly tested areas;
- sub county and county mocks.

The ability of the teachers to predict what will be tested in the national examinations is represented in the **graph 5** below:




**Graph 5: A graph showing the ability of the teachers to predict questions in Computer Studies**

The above graph shows that majority of the teachers are able to predict the possible questions that may appear in the KCSE examination.

**Research Question 3: What needs to be done during the administration of high-stakes examinations in Kenya?**

The research came up with the following suggestions from the respondents as ways of administering the high-stakes examinations:

- creation of an examination period by the Ministry of Education. This has already been done;
- provision of adequate security in all examination centres during the administration of national examinations to avert any indiscipline by the candidates which may lead to malpractices ;
- provision of more supervision personnel to ensure that examinations are administered as per the policy of the national examiner;
- the supervision personnel to be paid well and on time as a motivation;
- ensure that no school has access to any live national examination questions prior to the stipulated day and time on the timetable;
- the government to ensure that all schools undertake their projects and within the time provided;
- create same conducive environment for the conduct of examinations in all

centres. There was a feeling that the national schools and some private schools create a better environment for the management of examinations as compared to other schools.

## Conclusion

The education sector needs to come up with a system that will motivate the learner and the teacher for the individual, national and international benefit. This is through the creation of effective classroom discussions and development of assessment tasks with the right type of evidence of how learners are progressing through feedbacks and encouraging them to take ownership of their own learning processes where peer learning is one of the components.

## Recommendations

The study recommends that Education should be implemented in such a way that it endeavors to provide the learners with skills and attitudes as opposed to making them shine in the national examinations. The education system should strive to demystify the notion that success in national examinations amounts to success in life. Further, the examination system should look for other ways of assessing the learners than relying on the sit-in examinations, projects and practicals as is the case for now. The system should strive to introduce ways of assessing soft skills. In addition, it is recommended that the School Based Assessment in Computer Studies increase the percentage from 25% to at least 40% of the final score a candidate is awarded at KCSE examination. There is also need to introduce formative assessment in all subjects to reduce the anxiety and pressure that the high-stakes summative assessment brings to the learners, which may eventually lead to sickness, poor performance, school dropout and occasionally candidates committing suicide.

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# Integrating Employability Skills in Teaching and Assessment; the Missing Link in Bridging the Gap between Classroom and Workplace

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***Abstract***

*There are growing concerns that the curriculum offered by educational institutions is inadequate for equipping learners with employability skills for the workplace. It is axiomatic that employers consider it the responsibility of institutions of higher learning to develop such skills. However, the titanic gap that exists between curricula, teaching methodologies, assessment approaches and the realities and demands of the workplace represents a complex set of challenges facing graduates, hence the need for practical strategies to bridge this gap. Although there is abundant literature on interfacing curricula and the workplace, much of the research is preoccupied with patterns and outcomes in Western economies. Scholarly works that target African settings from an African student's perspective in particular, are scarce. This paper interrogates the connection between curriculum, teaching, assessment and the workplace from a students' perspective particularly, the multicultural and multilingual South African workplace. The study used third year Social Sciences students' perceptions on the relationship between their current education and employment prospects in a practical Workplace Skills component of an English course at the University of Fort Hare. Data was gathered from the purposively sampled third year class through participatory observation of presentations, peer assessment and questionnaires. In line with previous studies, the findings suggest that students are ill equipped in practical workplace skills. They only become aware of their limitations within class practice situations. Through practical workplace simulation, students become conscious of the key workplace skills such as communication, critical thinking, problem solving, Ubuntu, use of information and communication technologies, teamwork and creativity. The missing link in bridging the earlier stated gap is consistent integration of workplace realities in content delivery and assessment. The paper recommends that practical employability skills be integrated as a teaching and assessment element in academic courses to equip students with a complete repertoire of employment-relevant skills. We posit that workplace skills can be embedded in academic subjects without compromising the fundamental academic curriculum. Given that learners learn in order to earn; this paper provides a useful concept on developing employability skills within the classroom.*

***Key words**: Curriculum; workplace; Employability skills; Teaching methodologies; Assessment*

## Introduction

There are growing concerns that the curriculum offered by educational institutions is inadequate for equipping learners with employability skills for the workplace. It is axiomatic that employers consider it the responsibility of institutions of higher learning to develop such skills. However, the titanic gap that exists between curricula, teaching methodologies, assessment approaches and the realities and demands of the workplace represents a complex set of challenges facing graduates, hence, the endeavour of this paper to explore practical strategies that can bridge this gap.

## Background

The mandate of educational institutions has experienced a monumental transformation in the 21st century. It is no longer enough for colleges and universities to graduate students in their thousands. This is because the 21st century workplace is dynamic and in a state of flux. The rapid changes in the workplace are a consequence of the alarming speed of technology (Tran, 2016). Therefore, schools in general, and higher education institutions (HEIs) in particular, should be engaged in the execution of curricula that can meet the demands of the workplace (Yorke and Knight, 2003). Fundamentally, students need to possess the right blend of skills in order for them to find a job and to perform well enough to be able to keep the job. Existing research indicates that flexibility, critical thinking, problem solving, and communication are some of the transdisciplinary attributes that an employable graduate is expected to possess (Shivoro, Shalyefu & Kadhila, 2018). The challenge of how to produce a graduate who possesses such a skill-set has hardly received enough attention in terms of research.

Educators at every level encounter pressure to improve student performance and student outcomes. School officials and university management also demand excellence in the form of employable graduates. Likewise, employers seek critical thinking, communication, innovation, and problem-solving skills from university graduates. Nevertheless, post-secondary institutions often neglect to teach these important workplace/employability skills (Dixon, 2017; Oviawe, Uwameiye & Uddin, 2017). This paper explores the strategies that can be employed to bridge this gap from a student perspective.

## Research Problem

Standard workplace activity for graduates is mostly related to interpersonal, social and intellectual pursuit. Workplace demands occasionally require employees to push boundaries and apply firefighting ability. It is this creativity and going beyond the call of duty; attributes that cannot be aligned with a theoretical field in a strict sense; that employees are consistently looking for in a graduate. It is, therefore, evident that for the expression and execution of field specific expertise/knowledge, one needs what currently remains as untaught skills. Schools and institutions of higher learning alike seem to be executing an urgent agenda to complete syllabi and course outlines before the close of term. Consequently, the outcome is of educated but clueless graduates who can hardly fit into a real-life workplace with real people, real tasks and service and product deadlines to be met. There seems to be an unspoken consensus that employability skills should come naturally to

individuals. Such an assumption is detrimental when reality sets in after graduation. Taking workplace skills for granted has resulted in unemployed graduates in the least and employed but unsatisfied and stagnant workers at worst. The prevailing situation of stagnancy in the workplace indicates that a traditional lecture-based curriculum that expects students to participate mostly through answering questions in lectures and that is assessed only through exams and essays will not necessarily foster employability attributes. Workplace skills can only be built through repeated exposure and deliberate experience; either real world or simulated.

**Research Questions**

The intention of the study was to answer the following research questions;

1. What is the relationship between current classroom practices in teaching and assessment and workplace skills?
2. How do current classroom practices hinder the development of workplace skills?
3. What strategies can be employed to bridge the gap between the classroom and the workplace from students' perspectives?

**Research Objectives**

The study was guided by the following objectives;

1. To demonstrate the relationship between current classroom practices in teaching and assessment and workplace skills.
2. To assess how the current classroom practices hinder the development of workplace skills.
3. To establish the strategies that can be employed to bridge the gap between the classroom and the workplace from students' perspectives.

**Significance of the Study**

The 21st century classroom and workplace are highly contested spaces. There is growing acknowledgement of the challenge of unemployable graduates locally and globally. This paper grapples with current classroom practice and its impact on the development of workplace skills with the intention of establishing how the ever-growing gap between these two institutions can be bridged in South Africa. The significance of the study lies in its practical approach in crafting strategies that can be utilised in bridging the gap between the classroom and the workplace. The methodology employed in the study allowed for authentic responses that can be used to transform classroom practice. Taking into consideration students' experiences and perceptions introduced an important element as data was gathered from students affected by current practice. Future pathways were also proposed by the same group of students in an attempt to transform both their current classrooms and their future workplaces. Findings from this study can be used to revolutionize teaching methodologies with a view to bridging the gap between the classroom and the workplace. Once implemented, this could significantly improve the employability of graduates in the sample.

**Defining Employment and Employability**

This section distinguishes between employment and employability. The section also outlines the inevitable nexus between the two constructs. Although there is abundant

literature on interfacing curricula and the workplace, much of the research is preoccupied with patterns and outcomes in Western economies. Scholarly works that target African settings from an African student's perspective in particular, are scarce.

Employability is a problematic concept to define succinctly and comprehensively. However, Hillage and Pollard (1998) propose that employability is a term that has been traditionally used in varied contexts with a range of meanings; hence, it can lack clarity and precision as an operational concept. Yorke and Knight (2003), define employability as a set of skills and personal attributes that can place graduates in a better position to acquire employment and be successful in their chosen occupations for personal, communal and national benefit.

Employment and employability refer to two concepts that can be differentiated. According to Lee (2002), being employed refers to having a job while being employable means having the qualities needed to maintain employment and advance within one's career in the workplace. Fundamentally, employability is not a product, but a process of learning. We adopt Harvey's (2001) definition of looking at employability as a two-pronged concept relating to two broad sets of abilities. First, employability is conceptualised as relating to the ability of the student to acquire, retain and develop in a job after graduation. Secondly, employability is concerned with enhancing the students' attributes so that the student can fulfil their role in the workplace through display and execution of skills, knowledge, attitudes and abilities (Hillage and Pollard, 1998; Harvey, 2001; Knight & Yorke, 2000, 2001; World Bank, 2017; Rider International, 2017).

In a study on employability and expectations of university students, Vidanapathirana (2000) used a sample of 68 undergraduates to ascertain the extent to which employability and personal expectations affected job opportunities of educated youth. The findings confirmed that the more educated an individual, the greater the likelihood that they could be unemployed. This situation arose out of the high rate of graduate entry into the labour-force on one hand and the relatively lethargic expansion of the economy as currently applicable in the South African context and elsewhere (Mmesi, 2015; Van Aardt, 2012). The above-referenced studies have an important bearing on this study given that the sample of the present study comprised third year students at near-exit point for the labour market. This paper addresses the gap of how to give students a competitive advantage to make them stand out from the vantage point of the classroom owing to the alarming competition they have to contend with in the workplace. We conceptualise the classroom as a vantage point since the mould is yet to be set beyond possible remedy, therefore, the need to capitalise on pedagogy that will develop employability skills.

Employers' concerns about the challenges of graduate employability have become more pronounced in South Africa as they are globally (Links 2010; National Council for Higher Education 2011; Schade and Amunkete 2011; Shivoro, Shalyefu & Kadhila 2018). Following submissions by Wagner (2008) and the Blackboard Institute (2011), the traditional school curriculum has focused on a persistent reliance on traditional learning structures that do not promote critical thinking or 21st century

skills. We postulate that this is generalizable to a significant range of tertiary education programmes of study.

Employability goes beyond issues of competency in the field. As Lowden et al. (2011) report, there is a broad understanding of what qualities, characteristics, skills and knowledge constitute employability both in general, and specifically for graduates. Employers expect graduates to have technical and discipline competences from their degrees but require graduates to demonstrate a range of broader skills and attributes that include specifically communication, team-work, leadership, critical thinking, problem solving and project management abilities. Griesel (2002: 55–6) indicates that there is no grand narrative regarding what universities are able to produce or of the attributes that best fit the demands of the world of work. However, some universal attributes important to employers are critical and analytical ability; flexibility, ability to apply knowledge widely; ability to use ICTs; willingness to learn; initiative; ability to plan and execute tasks independently. The knowledge-based economy of the 21st century demands a pro-active, enterprising, versatile and multi-talented workforce yet the prevailing situation in the workplace is that graduates in search of work do not possess the requisite workplace skills that employers require (Marope, 2006; Links, 2010; Tran, 2016). This paper seeks to explore the process of integrating workplace skills in teaching and assessment in the classroom.

As the gap between the university and the workplace is a global problem that has consequently become a national concern in South Africa, researchers have examined the gaps between the two institutions (Marope, 2006; Links, 2010; Tran, 2016). However, few of them have investigated the perceptions of students from tertiary institutions. Students have first-hand experience of possession and awareness (or lack thereof) of employability competences, consequently, their opinions and observations are crucial in helping stakeholders design effective solutions to narrow the gap. The present study uses students' perceptions as a basis for the creation of a fundamental link between classroom and boardroom; a link that should manifest actively in class activities and assessment to create workplace-ready graduates.

**Reflections on Current Practice and Trends in the Classroom**

The predominant approach in current classrooms is limited to teaching and assessment focused on learning passively within academic disciplines in an undeviating text-based environment. Students and educators alike are consumed by an almost compulsive desire for memorizing fixed information, getting the right answer and performing exceptionally well on individualized tests.

Apparently, the credibility and integrity of the education system depends not on percentage pass rates and graduation statistics but on the number of students whose education has yielded productive results. Unless education can contribute to personal, community and national advancement; then any talk of achievement remains rhetoric. Education has successfully transformed individuals only when individuals begin to transform society. Therefore, skills acquired in education should enable individuals to fit snugly in workplace roles that require them to face and practically solve real problems.

While tertiary education is invaluable for equipping students with specialist knowledge and critical thinking skills, preparing the future workforce requires more than theoretical knowledge (Tomlinson, 2008). Tertiary education has an important role to play in connecting universities to industry. The question that this paper grapples with, therefore, is how tertiary education can bridge the gap between the classroom and the workplace. In practical terms, how can the classroom respond to employability challenges through playing a stronger role in preparing students for the workplace? Tertiary education can be a powerful instrument development through the production of advanced knowledge, skills and competences, basic and applied research and community engagement. Educational institutions, therefore, should interact with industry stay relevant in a world where demand for routine work is systematically disappearing due to advances in technology.

**Employability and the 21st Century Workplace**

A fundamental dynamic of labour force participation and labour productivity is skills. Due to the impact of fast-emerging information and communication related technologies and changes in the workplace, jobs that involve routine tasks are vanishing. The 21st century workplace involves tasks that demand skills that are non-routine such as analytical ability, creativity, interpersonal relations, communication and conflict resolution; tasks that humans are still better at than machines. Programmes of study should not necessarily pigeonhole students. Instead, after graduating, students should be able to fit confidently into a number of careers. Possessing employability skills means that employers who are recruiting graduates for jobs outside their specialisms will not be disappointed.

We posit that the manner in which employability is currently measured is problematic. Emphasizing on universities' ability to get graduates into employment that matches their degree discipline, rather than their readiness for a career detracts from the concept of versatile graduates. A progressive idea would be for universities to think of graduates' long-term careers as dynamic not fixed, and evolving not pre-determined. Consequently, students are also asking to be trained to be employable as reported by the National Centre for Universities and Business (NCUB) survey. The survey reports that 92% of students want placements, work experience and internships to be a part of their university experience.

While institutions of higher learning are laser-focused on graduating students with largely theoretical knowledge in their thousands for the labour market, the same labour market is yearning for graduates that are practically oriented. The 21st century workplace is not ready to assimilate the traditional graduate with distinctive grades on theory and zero practical expression of that knowledge. The workplace is self-defining; it is a place of work, and work presupposes possession of skills.

**Theoretical Framework**

Harvey's (2002) Employability Model underpins this study. Harvey (2002) views employability as a construct that involves the student, learning material and the industry in which the student is likely to get placement. Harvey (2002) further describes employability as the development of employability attributes,

work experience, self-promotional and career management skills and a willingness to learn and reflect on learning. The employability model has three core processes that have an impact on employability namely a) the pedagogic process that encourages development, b) self-reflection by the student and c) the articulation of experiences and abilities. This paper is preoccupied with the first process that is the pedagogic process. The pedagogic process encourages the development of employability skills given that it is only in the classroom that students from a South African background can be exposed to any form of workplace knowledge. A large percentage of the students undertaking studies at the UFH Alice Campus from which the study sample was drawn, come from a rural setting where they do not have exposure to images of a formal workplace.

Furthermore, the interface between education and the workplace can be explained using human capital (HC) and signalling theories. According to research in HC, higher education is an investment for productivity in the workplace as it increases individuals' productivity and enhances job performance (Fincher, 2007; Jonck, 2014; Cai, 2013). Weber (2014) substantiates that persons with more education are likely to adjust more easily than those with less education as they stand a better chance to get jobs and be successful, than those with lesser knowledge and skills. Equipping individuals with more knowledge and skills contributes to performance; rewarding income, employment opportunities, and financial comfort (Kaplan and Norton, 2004). Similarly, signalling theory assumes a relationship between graduates seeking a job and the employers (Stiglitz cited in Cai, 2013). As espoused in signalling theory, job-seeking graduates send signals of their capabilities to prospective employers by displaying portfolios of knowledge and skills acquired at university. The three theories, therefore, converge to reinforce the concept that the classroom is the nucleus and foundation where the fundamental stakeholder of bridging the gap between education and the workplace is located.

## Research Methodology

### Design

The study adopted the qualitative research approach. Given that qualitative research is a situated activity that locates the observer in the world, in this study, we immersed ourselves in the classroom where students who are the future workforce were congregated. The aim was to explore the connections of curriculum and workplace in an attempt to transform current classroom practice.

### Participants

The study used third year Social Sciences students' perceptions of the relationship between their current education and employment prospects in a practical Workplace Skills component of an English course at the University of Fort Hare.

### Data Collection

Data was gathered from the purposively sampled third year class through participatory observation of seminar presentations, perspectives from peer assessment and questionnaires with open-ended questions. The sample comprised of a purposive sample of thirty students doing a Workplace Skills component of a third-year English course.

### Data Analysis

Data was categorized into specific themes for analysis and presentation of the research

findings. Thematic units were placed into categories that could be systematically identified for thematic analysis. Conclusions were drawn from observation of the emerging and recurrent patterns.

**Results**

The results of the study were divided into two sets. The first set of results was drawn from the participatory observations during seminar presentations. Seminar topics included issues regarding the challenges encountered by subordinated groups in the multicultural and multilingual workplace. The subordinated groups included women, racial-ethnic minorities, sexual minorities and the lower working class. Presentations ranged from discussing how co-workers enacted, perpetuated responded and corrected the subordinate status such groups in the workplace. Secondly, simulations of students acting as either the employer or the employee (roles were exchanged in order for all students to get a feel of what it means either to be in power or to be subject to those in power) were enacted for peer assessment. Possible solutions to common workplace problems were also part of the seminars. Asked to list their fears of the workplace environment in a post-seminar evaluation, students listed their fears as:

- Communicating proficiently and professionally
- Speaking to, and interacting with individuals from multicultural backgrounds
- Working in a team
- Being called upon to think critically and solve real problems
- Conflict resolution
- Peer assessments of seminar presentations highlighted the following as major weaknesses of presenters:
- Lack of confidence in self and in content exposition
- Disregard of multicultural audience (racist and gender insensitive language)
- Unethical and unprofessional language
- Informal deportment
- Poor communication

The open-ended question on the questionnaire was focused on what hindered the development of workplace skills in the current classroom. The themes that emerged from the responses to this question are tabulated below.

**Table 1: Frequency of Themes about Gaps between the Classroom and the Workplace**

| Themes | Frequency of theme occurrence | Percentage Frequency |
|---|---|---|
| Rigid execution of approved curriculum | 25 | 83% |
| Prominence of theoretical issues over practical/applied realities | 20 | 67% |
| Inadequate interface of learning material with the real multicultural and multilingual South African workplace | 29 | 97% |
| Insufficient application of knowledge during classwork (absence of simulations) | 25 | 83% |
| Limited opportunity for development of workplace/employability skills in the classroom | 28 | 93% |
| Limited interface opportunities with industry | 29 | 97% |

Table 2 below illustrates the themes that merged on the open-ended question for the possible initiatives to bridge the gap between what happens in the classroom and what is expected in the workplace.

**Table 2: Themes for Possible Strategies/Initiatives to Bridge the Gap**

| Themes for possible strategies/initiatives to bridge the gap | Frequency of theme occurrence | Percentage Frequency |
|---|---|---|
| Curricula should be more applied than theoretical | 30 | 100% |
| Teaching and learning should move away from monologic to dialogic methods | 27 | 90% |
| Relevance of learning material and implications to the real multicultural and multilingual workplace should be a major aspect | 30 | 100% |
| Experiential learning and knowledge embedded on standard workplace approaches | 27 | 90% |
| Seminar presentations and simulations should be major teaching and learning tools | 25 | 83% |
| Scheduled visits to the relevant workplaces throughout the study period | 30 | 100% |
| Development of key employability skills to be learned and assessed frequently | 25 | 83% |

## Discussion of Findings

Findings indicate that students required links between their university and the business world in which they were going to work upon graduation. Although the implications for the higher education sector are clear, they need practical implementation at classroom level, which is the greatest hurdle as educators are still somewhat stuck in traditionally structured pedagogies. Participants in the sample indicated that the 21st century workplace demands that educational institutions create graduates who are more agile, have a solid understanding of how the workplace works and can not only see how their skills fit into it but can mould themselves onto existing opportunities effortlessly; something that they felt ill-equipped to do. Furthermore, universities should prepare graduates for the usually traumatic idea of moving across jobs and sectors given the fluidity of the workplace environment: a space that is particularly different from the theoretical comfort zone of academia.

In line with previous studies, the findings suggest that students are ill equipped in practical workplace skills. They only become aware of their limitations within class practice situations. Through practical workplace simulation, students become conscious of the key workplace skills such as communication, critical thinking, problem solving, *Ubuntu*, use of information and communication technologies, teamwork and creativity. The missing link in bridging the earlier stated gap is consistent integration of workplace realities in content delivery and assessment. We posit that employability is a mindset. Students felt that current methodologies thwart and repress open-endedness, therefore they believe that they cannot thrive in fields that they have not been trained for. They further needed to practice communication, critical thinking, multilingual and multicultural intelligence as well as problem solving in simulated workspaces.

### Student readiness vis-à-vis workplace demands

The existing challenges of employability begin with the problematic belief that a career begins after the attainment of a degree or qualification.

On the contrary, career oriented approaches that could better serve students in later workplace situations can be integrated in the mainstream curriculum. Integrating workplace skills in curricula is ideal for preparing students for the future and providing students with career potential. Courses on preparing effective resumes, project management, and interview skills should ideally be a staple in courses to equip students and configure their mindset for a working future as they begin their career pursuits.

**Conclusion**

Integrating employability skills in teaching and assessment opens up a multiplicity of possibilities for practical student engagement in workplace dynamics and increased access to authentic workplace-related information. Students are also given a valuable opportunity to experience the complexity and diversity of the workplace through simulated encounters thus preparing them adequately for the future workplace.

**Recommendations**

We recommend a classroom-boardroom interface through workplace learning that exposes students to work and brings them face to face with their future every day. If we are to transform the workplace into a diverse and productive space, then educating students with the workplace in mind is a starting point. To better bridge the gap between curriculum, teaching, assessment and the world of work, we propose a shift to teaching for diverse careers. Students should learn how to apply information to ubiquitous and multicultural environments. The paper recommends that practical employability skills be integrated as a teaching and assessment element in academic courses to equip students with a complete repertoire of employment-relevant skills. This is in line with Knight and Yorke (2000; 2001), World Bank (2017) and Rider International (2017) who suggest that principles of good teaching and assessment that are consistent with the development of employability skills and attributes should be integrated in the mainstream curriculum. We posit that workplace skills can be embedded in academic subjects without compromising the fundamental academic curriculum. Given that learners learn in order to earn; this paper provides a useful concept on developing employability skills within the classroom.

While university officials can collaborate with businesses, we recommend bringing the classroom and the workplace into dialogue through dialogic class activities such as simulations and engaging in assessment that recognizes the multicultural and multilingual workspaces to help close student skill gaps. While employability from the perspective of HEIs is predominantly about delivery of academic programmes and producing graduates, this paper encourages academic practice to think beyond graduation in the execution of its grand mandate. Integrating employability skills in classroom learning is a model solution for supporting, accelerating and sustaining the education and workplace interface.

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# Exploring the manifestations of teacher interpretations of the policy prescriptions on instructional and assessment practices

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## Abstract

*This paper establishes the impact of teacher's understandings of the Curriculum and Assessment Policy (CAP) prescriptions on classroom practices during the implementation of the New Integrated Curriculum in Lesotho (NIC). It has been a trend for most countries to reform curricula depending on the individual country's needs and context. Countries adopt or adapt different curriculum models that would address their specific needs. In the case of Lesotho, the CAP suggests the use of an integrated curriculum model to improve the quality of education. As suggested by literature, this model is good because it is life-oriented and learner-centred. What remains unknown is how primary school teachers, who have no or very little background of integration, understand the CAP prescriptions for implementation of the NIC. The paper is derived from a study that explored four primary school teachers' classroom instructional and assessment practices. The study followed a case study design, which facilitated investigations on how the teachers interpret the CAP prescriptions, perceive their roles and the learners' roles in classroom contexts. This paper specifically presents one case of a primary school teacher (Thandy) out of the four cases of the study. Data were gathered through document analysis, lesson observations and interviews. The descriptive content analysis technique was employed to analyse the data from Thandy's planning books, interview transcripts; from the observation notes, audio records and pictures. Sense Making and Social Cognitive theories were combined to explain her understandings of the policy prescriptions and their impact thereof. The findings show that Thandy's interpretations of the CAP's prescriptions are incongruent with the policymakers' due to the conflicting demands on her. Her interpretations influence her decisions on instructional and assessment methods and activities. Therefore, her efforts in addressing the CAP's demands and expectations on how to instruct and assess learners were stifled, prompting her to revert to her old ways of instructing and assessing. She treated instruction an assessment as distinct entities dominated by teacher-centred approach. This paper fosters awareness to the relevant stakeholders about the impact of teachers' interpretations of the CAP prescriptions which directly influence their practices including the implementation of continuous assessment.*

***Key words:*** *Curriculum reform, Quality education, Teachers' understandings, Integration, Instruction, Assessment*

## Introduction

The risk of eroding quality in education, due to the focus on increasing enrolments in schools has generated a wide interest in curriculum reform and learner centeredness in education (Ramberg, 2014; UNESCO, 2017). As a signatory member of the United Nations (UN), the government of Lesotho seeks to comply with the international goals of the UN such as ensuring "inclusive and equitable quality education and promote lifelong learning opportunities for all" through its educational policies and curriculum. Lesotho reformed its curricula and introduced the implementation of New Integrated Curriculum (NIC) from 2013.

Recent trends in curriculum reform have led to the realisation that this model provides an opportunity for sustainable development and the practical application of problem solving where teaching and learning are linked with the environment (Dambudzo, 2015; UNESCO, 2015). In this way, Lesotho used curriculum reform as a strategy towards the achievement of quality education. The development of NIC has led to the hope that Lesotho education would be learner-centred and of quality (MoET, 2009). Although the implementation of curriculum reform is often contentious, it is necessary for the attainment of educational targets.

When such reform brings radical changes (including integration, changed pedagogy and changed roles of learners and teachers) to teachers who were trained via distinct subjects and previously taught compartmentalized subjects, success cannot be guaranteed. More so because previous studies have reported that the several attempts made since 1966 to improve the quality of education in Lesotho, including the process of changing the curriculum, occurred with little success (Sebatane, et. al., 2000; Muzvidziwa & Seotsanyana, 2002; Raselimo & Mahao, 2015). The Curriculum and Assessment Policy suggests the integrated curriculum model (MoET, 2009). This modelis learner-centred and enhances quality education by equipping learners with 21st century skills and enabling learners to be face real life independently (Dambudzo, 2015; Kahveci & Atalay, 2015). Being cognisant of the qualities of this model and that the teachers are core implementers, it becomes essential to establish teachers' interpretations of CAP prescriptions and the impact of those interpretations on the enactment of the current curriculum reform. Since little is known on how teachers understand the CAP prescriptions and how their interpretations influence the curriculum implementation, this paper aims to establish the impact of teacher (Thandy) interpretations of curriculum prescriptions on her instructional and assessment practices.

Integration is at the heart of the curriculum reform in Lesotho. According to MoET (2009:15), integration is multi-dimensional: a) linking learning with real life problems and everyday experiences of the learner; b) 'holistic view and treatment of issues related to intelligence, maturity, personal and social development of the learner for survival purposes and economic development of the nation'; c) and establishing a close link between instruction and assessment in order to improve the learning process and to facilitate the achievement of curriculum goals.

Previous research on integration shows that integrated approach to learning is a quest to a major concern for both the developing and developed countries (Jones, 2010; (Dambudzo, 2015; Kahveci & Atalay, 2015; UNESCO,

2017). So the CAP advocates for interlinking instruction and assessment [assessment for learning; assessment as learning; assessment of learning] (MoET, 2009; ECoL & Burdett, 2012; ECoL, 2012).

Research further indicates that success of curriculum reform depends on a number of factors. For instance, in the case of Lesotho, it hinges on the aptitude of the stakeholders in curriculum development to interpret this policy in their contexts (Raselimo and Mahao, 2015). In his critical analysis of curriculum reforms in South Africa, Jansen (1998) argues that educational policy reforms do not only require teachers to apply knowledge and skills but also demands that they comprehend the theoretical underpinnings of that particular policy and to show the ability to transfer such understanding across different classroom contexts.

Teachers' interpretations influence the character and teachers' decision making and the outcome of their work regarding instruction and assessment (Nordholm, 2015). This paper reveals Thandy's interpretations of the CAP prescriptions and how those affect her classroom instruction and assessment practices during this time of transition. Exploring the understanding of the curriculum reform agents determines the prospective limitations and curriculum coverage caused by this paradigm shift in education (Gass, 2012). In essence teachers' interpretations of curriculum policy determine how teachers implement it (Berglund & Lister, 2010).

The paper determines how a teacher who was professionally trained during the implementation of the old curriculum suddenly negotiates the implementation of the new curriculum, which requires her to adopt integration during instruction and assessment. The nature of this particular study calls for the combination of Social Cognitive Theory (SCT) and Sense Making Theory (SMT) which are closely linked. These theories complement each other because they both show what policy means to the implementing agents. They are embedded in the interaction between cognitive structures (cognitive factors), the situation (social factors) and policy signals (behavioural factors) (Bandura, 1989; Spillane et al., 2002).

**Purpose**

Effective implementation of curriculum reform demands teachers to understand the curriculum and assessment policy requirements. However, it still remains unclear, up to this far, as to what understandings, and the impact thereof do the primary teachers have pertaining to the policy prescription for classroom instruction and assessment. This paper therefore aims to uncover the impact of Thandy's interpretations of CAP prescription by providing answers to the following questions:

What are Thandy's interpretations of CAP prescriptions pertaining to instruction and assessment as prescribed CAP?

How do Thandy's interpretations of CAP prescriptions impact on her instructional and assessment practices?

**Methodology**

Based on the framework above, Thandy was one of the purposively selected participants who provided rich data for an in-depth analysis of her understandings (Flick, 2007). This paper, following a case study design, was derived from a qualitative study that was done to answer broad questions, one of which is split into the research questions above. This design provided detailed narrative descriptions of how Thandy interprets the policy prescriptions as a policy

prescription. I used data collected through document analysis, classroom observations and interviews to examine her interpretations based on her instructional and assessment practices at the context where she enacts the curriculum (Spillane, Reiser & Reimer, 2002; Bandura, 1989).

Thandy's scheme book, lesson plan book were analysed using the document analysis protocol with reference to the curriculum materials including the guide to continuous assessment, syllabi and teacher's guide books. The observations were conducted using the observation protocol to determine her actual practices within the classroom context. The observations were captured using digital cameras and voice recorder. I also noted the outstanding experiences. She was further interviewed, with reference to interview protocol, to give her a platform to air their views. The interviews were recorded with a voice recorder and then transcribed. Data analysis principles were used to guide the content analysis because the collected data was presented in the form of text (Bowen, 2009).

I then followed a direct content analysis approach that allowed for the relevant explorations. I exploited multiple data collection methods, data sources and theoretical perspectives to search for conversions in the findings of the study and used triangulation as a validation approach (Johnson & Christensen, 2014). Thandy's understandings regarding her instructional and assessments practices were corroborated through the use of multiple data sources. I examined the similarities and differences in descriptions and conclusions across the findings. This triangulation of the findings from various sources increased the trustworthiness of the results obtained.

The analysis of her schemes and lesson plan books, observation notes as well as her interview transcripts, determined the consistency of the data obtained. This enabled for reflection on whether her utterances matched her practices. The protocols assisted in bringing objectivity therefore the possible problems and bias that could stem from the subjectivity of data collection methods were minimised.

Although there is very little data regarding the implementation of NIC within the Lesotho context, the data collection techniques used were based on the international and local studies with in the curriculum reform and implementation disciplines to ensure rigour. Permission was obtained from all the relevant authorities before data collection which included the University of the Free State, Lesotho Ministry of Education and Training, principals and teachers. Participation was voluntary. As a result, Thandy was allowed to withdraw from the study whenever she wished to.

**Discussion of the Findings**

Thandy is a female, qualified teacher. She taught the old curriculum for over 14 years and was initially observed during her second (2015) and third year (2016) of teaching the integrated curriculum in Grade 4. The majority of the learners that she taught in 2015 came from Grade 3 with her, but in 2016 she taught a new group of learners coming from Grade 3. She reported that she only attended a short workshop on the integrated curriculum aimed to prepare, train and equip teachers with the necessary skills and knowledge about the New Integrated Curriculum.

In order to help solve the problem of little information on the implementation of the

integrated curriculum to bridge the existing gap between teaching, assessment and the world of work this paper reveals that Thandy's interprets curriculum prescriptions and outlines the inherent manifestations on her classroom instruction and assessment. Thandy seemed to have an idea of what is expected to happen, that is a curriculum implementation should involve integration, pedagogy has to change and that teachers' and learners roles ought to change. Her challenge was to put her knowledge into practice. The classroom context was also a problem to her in the following ways;

Integration

Integration as grouping concepts and learning outcomes

It seemed that she habitually looked for concepts with obvious associations when scheming. She understood integration as the process of grouping the easily relatable concepts within the Integrated Part content in the syllabus and within each of the windows and linking the concepts across the windows based on those of the Integrated Part. This was evident from her scheme of work as shown below:

> *In this new syllabus, we really integrate, you don't go straight to the concept; you integrate it to linking concepts to make a whole thing…that is, you can't say you are teaching nouns. Nouns will be related to something else…maybe… household items… their names are nouns, so household items relate to nouns.*

Thandy was aware of integration as a prescription; concepts should not be taught in isolation. She regards integration as linking the easily relatable concepts and putting those with no obvious relationship together with in the Integrated Part, the windows and across all these;

> *…you will find that we normally relate concepts that are easily relatable…we don't think outside the box. We want those that are related to relate them, we don't want to relate those that do not have very visible relationship. So that is how we do it.*

**Assessment**

The findings suggest that Thandy is not cognisant of the idea of "assessment for learning" and "assessment as learning" hence she relies mainly rely on "assessment of learning". She seems to regard assessment only as a process to determine whether learning has occurred or not after teaching, using it as assessment of learning (Norton, 2009).

Thandy tended to leave out the other two important purposes of assessment. These are useful for determining learners' achievements and challenges during learning and form basis for providing descriptive feedback that would enhance learning. Carl (2009) and Harlen (2007) indicate that this feedback is of crucial importance for enhancing learning. As a result, learners were not given immediate and constructive feedback that would improve their learning. However, McMillan (2004) advocates that immediate and constructive feedback is necessary in learning.

The policy and its supplementary documents, such as "Guide to continuous assessment" advocate for the use of "assessment for learning", "assessment as learning" and

"assessment of learning" (ECoL, 2012: pp.10; ECoL & Burdett, 2012). These three types (are the building blocks for CASS) promote the attainment of the continuous assessment which enhances learning through feedback, remediation and by enriching learners' targets (Muskin, 2017).

**Pedagogy and roles**

Turning learning outcomes into lesson objectives

As shown on the table below, Thandy used learning outcomes in making her lesson objectives, without unpacking, which resulted into complex and immeasurable objectives.

**Table 1 Segment of IP and NM unit 4 learning outcomes with the corresponding 2015 lesson objective**

| **Segment of IP and NM unit 4 learning outcomes with the corresponding 2015 lesson objective** | |
|---|---|
| **Learning outcomes- At the end of this unit, learners should be able to:** | Lesson objective - By the end of the lesson learners will be able to: |
| **7. practice sack racing [IP unit 4-2015]** | ***** practice sack racing and apply bar chart in different contexts. |
| **6. apply bar chart to different contexts [NM unit 4-2015]** | ***** practice sack racing and apply bar chart in different contexts. |

When formulating lesson objectives, Thandy appears to have just changed the stem of the LOs and fitted the lesson objective stem. Her lesson objectives may suggest that she equated the learning outcomes to lesson objectives.

Reliance on textbook activities to engage learners

Thandy seemed to derive activities from the learners' textbooks to engage them kinaesthetically. She involved learners actively by referring them to the textbook activities. She instructed learners to demonstrate different lines with their bodies based on the textbook activity. However, all these activities were done as a class activity (large group) and the teacher could not see the learners from all angles. However, her assessment at the end of the lesson was written work.

**Oral and written assessment**

Thandy predominantly used oral and written assessment. She was also aware of this:

> *…we did oral work mostly. The last exercise I gave was written. I was asking questions orally and they were answering…*

It seemed therefore that the use of authentic assessment was not given attention. This brings the question as to whether she is aware of the advocated methodologies and assessment strategies of CAP. Interestingly, this finding coincided with her interview segment below:

> *Interviewer: Do you use only the oral and the written work to assess learners?*
> *Thandy: Mostly, yes.*
> *Interviewer: Which are the other (assessment) methods that you rarely use?*
> *Thandy: We use oral and written.*

Lesson evaluation section serving as assessment

**The table 2 below comprise of two lesson plans segment of the evaluation section.**

| | Teacher's activities | Learners' activities |
|---|---|---|
| **Segment 1 (sack race)** | Teacher asks the learners to give a record of pupils who participated in the sack race and she helps them to record them in tally marks and bar graphs. | The learners record the data they have in form of bar and tally. |
| **Segment 3 (patterns)** | Teacher asks the learners to draw a pattern showing the vertical line, horizontal line and diagonal line and label them | The learners draw patterns showing different lines and label them |

On the bases of the lesson plan format given to teachers during the dissemination phase, this is the section of a lesson plan where Thandy has to evaluate the lesson in terms of what went wrong or right and the reasons why the lesson occurred the way it did.

**Contextual challenges**

**Overcrowding**

Thandy had a class of 72 learners in 2015 and she taught 82 in 2016, and these large classes seemed to prevent her from taking appropriate measures to help learners. Furthermore, she indicated that overcrowding in classrooms was exhausting and led to unproductive work:

> *In this big school we have two teachers in a very big class… We have 72 children… follow up becomes difficult… I have to check each and every one of them… Sometimes we tire on the way because we are only human…we share the task…but it is not effective.*

It was evident during the lesson observations that overcrowding impacted negatively on her lessons. For instance, while marking she realised that some learners encountered problems. She therefore explained to these learners and had discussions with them. However, this only occurred with learners near the aisles. She struggled to collect the exercise books and to return them to the other learners, let alone discussing the feedback after marking. She was unable to reach all learners in an equitable manner.

**Lack of resources**

Lack of resources seemed to be one of Thandy's concerns. She indicated that insufficient materials such as pens, pencils, and rulers affected her work:

> *It makes the periods longer. The time planned for, if we have one hour lesson, it will extend to two hours because… it also promotes copying…it provides not a clear picture of the understanding of learners.*

This seems to be a serious problem regarding time (prolonged lessons), assessment of learners and further brings out the behavioural problems in class.

**Conclusions**

This paper confirms that enactment of curriculum reform results from a complex process that may change the original intension (Yu, 2015; Ramberg, 2014). In Thandy's case, this process encompasses how she interprets the policy prescriptions which ought to stimulate both her instructional and assessment practices. The findings indicate that Thandy's understanding of 'integration' is limited to relating concepts. Furthermore, she imposed content to learners and this denied the learners'

opportunity to play their envisaged roles. On the other hand, her instructional and assessment practices are incongruent to CAP prescriptions. For instance, she used subject teaching approach which is discouraged by the policy. Several factors come to play in this matter: scheme and lesson plan format, curriculum content organisation and contextual challenges. The scheme and lesson plan formats encourage her to conceptualize planning as a process to be done based on the individual 'windows' which undermines the notion of integration. The curricula content organisation and the scheme and lesson plan formats seem to be the possible explanations for this incongruous state. She gives much attention to assessment of learning more that she does to assessment as learning and assessment as learning. The content organisation is underpinned by the broad field approach which is heavily influenced by the positivism (Hearne & Cowles, 2001) rather that the constructivism as per the policy. Linking instruction and assessment also entail ensuring that learners are assessed in accordance to how they are taught.

Her interpretations of the policy prescriptions coupled with her contextual challenges affect her decision making on her instructional and assessment practices. Based on her practice, she is mainly at delivery category and slightly at the modification category of curriculum implementation.

This paper does not make a conclusive claim but makes several suggestions that I believe could help teachers, as the main decision-makers, to be at a higher level of curriculum implementation. Firstly, I suggest the development of teacher professional development programmes to enhance teachers' understanding of the rationale for the current curriculum reform, the expected pedagogy and roles (teachers and learners). Secondly, I recommend a critical review of scheme and lesson plan formats to ensure integration and to meet the teachers half-way. Another suggestion is that content be organised in themes as per the curriculum organisation matrix (MoET, 2009: pp.26). Lastly, I recommend assessment of school ecology to determine the actual school contexts.

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# Assessment for authentic learning or authentic learning for assessment? Sharing experiences

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## Abstract

*Authentic learning and authentic assessment have become very important in the modern era where stakeholders in education are demanding that students should be equipped with 21st Century skills. Authentic education engages learners in activities that make them interact with their natural and social environments with the intention that they create their own understanding of the reality of these environments, the challenges that exist in them and the knowledge and skills that are needed to address such challenges. It is general knowledge that despite these observations, there has been minimal change in the classrooms. Classroom learning activities for learners are neither authentic nor relevant to the social world of the learners. This paper shares the experiences of using a teaching style that promoted authentic learning and authentic assessment in the Instructional Design and Development course in the B.Ed. Honours Program at the National University of Lesotho. This is a descriptive qualitative study in which 29 teachers used the ASSURE Model to develop and implement learning programs that address knowledge and skill needs they identified for their classrooms or their communities. For assessment, teachers were required to submit a detailed report that included a proposal for training, a training program, a description of the program implementation, and self-reflection on the success of the program, and the lessons learnt. Emerging issues were represented in thematic categories. Findings highlight the insights of the journey students took from identifying knowledge and skill needs in their classrooms or communities, to designing and developing authentic learning and assessment, as well as gaining the insights for authentic teaching for learning and assessment.*

***Keywords:*** *Authentic learning, Authentic assessment, Teaching strategies, World of learning, World of work.*

## Introduction

Education is important for the maintenance and development of human life. Therefore, the world of learning could be viewed as an institutionalized arrangement that aims at equipping learners with skills and knowledge that enable them to contribute positively before and after graduation, in their personal lives and at a workplace and in a society at large (Akarowhe 2018:1). Therefore, education and employment should go hand in hand and thus, school graduation should mark a transition of a learner from the world of learning to the world of work that employs and provides such a graduate with monetary capacity to improve his or her standard of living *(Ibid)*.

Despite these observations, there is a general concern that in many educational systems of the world, teaching and assessment have shifted away from the needs in the world of learners. There is a large gap between what learners are engaged in while at school and their needs for real life contexts, in the present or in the future world (Anamuah-Mensah & Towse, 1995; Stevenson, 1995; Muskin, 1997; Tabron & Yang, 1997). For example, in one study, Anamuah-Mensah, Asabere-Ameyaw and Dennis (2007) established that the view among pupils, teachers and parents was that schools put emphasis on the preparation of learners for further education, with the focus on academic knowledge and the pursuit of success in national examinations, and that there was, little emphasis on citizenship and the development of a responsible attitude to life in the community at the local, regional or national level, employment opportunities in the informal sector including self-employment but emphasized on employment in the formal sector with its implied emphasis on white collar jobs (p.147).

According to Anamuah-Mensah, Asabere-Ameyaw and Dennis (*ibid*), the mismatch between what learners do at school and their knowledge needs for their real world is particularly observed in the educational systems in the less-developed countries. Akarowhe (2018:1), who also holds the same view, indicates that in the less developed countries, particularly in Africa, there is a gap between the world of learning and the world of work. As a result, many graduates are unable to apply what they have acquired from the world of learning to perform effectively and efficiently at the workplace. Accordingly, this situation has left many employers in doubt of the capabilities of the world of learning to produce graduates that contribute positively to institutionalized setups (private and public/government organization, establishment, and parastatals) and the African society.

## Background

There is a general belief that teachers in the less developed countries are to blame for the mismatch between the world of learning and the world of work (for example, see Anamuah-Mensah, Asabere-Ameyaw and Dennis, 2007). The argument is that teachers themselves have limited experience of 'life outside the classroom'. However, Anamuah-Mensah, Asabere-Ameyaw and Dennis (2007) are also quick to point out that the blame should not be placed entirely on the teachers; that, such factors as: limited instructional materials that hinder teachers to emphasize relevance in their teaching; and the curricula that are examination-driven are other factors to

consider. It is these factors that often force teachers to adopt a highly didactic, 'chalk and talk' approach to cover the curriculum and meet the expectations of students, headteachers, parents and politicians who judge educational success merely in terms of results (*ibid*).

**Renewed efforts to redefine and position school education**

It has become more critical than ever that today's school education moves from being didactic to being authentic: first because of the global efforts towards education; and secondly because of the reviewed Basotho's view towards education.

*Global Efforts*

There are global efforts to refocus school education so that its fundamental purpose is to maintain and promote human life. For example, Goal 4 of Education for Sustainable Development (*UNESCO, Unpacking Sustainable Development Goal 4 Education 2030*) emphasises the following:

Broad scope that ensure lifelong learning opportunities for all;

Focus on equity, inclusion and gender equality;

Renewed focus on effective learning: effective learning and the acquisition of relevant knowledge, skills and competencies;

Refocus on relevance of learning: both in terms of vocational and technical skills for decent work (Target 4.4), as well as for 'global citizenship' in a plural, interdependent, and interconnected world (Target 4.7)

Thus, the global view towards education is that it should be inclusive, equitable and promote lifelong learning opportunities for all. It is also believed that all these could be achieved through teaching and assessment strategies that equip learners with knowledge and skills that enable them to be functional, productive and responsible members of their communities, who work towards:

Eradicating poverty and hunger;

Protecting planet Earth from degradation;

Prosperity for all human beings;

Fostering peaceful, just and inclusive societies;

Understanding global partnership for sustainable development;

*Basotho's reviewed view towards education*

In the *Curriculum and Assessment Policy Framework* document (2009: 5) Basotho have declared their renewed view on education, that the provision of contemporary education should be directed towards individual and social development. Their view is that;

Education should help individuals to lead a full life as an individual and as a full member of a community and, should cherish the principles of justice, peace, equality, equity, integrity and human rights as prescribed by the laws of the land.

The renewed Basotho's view on education is that education should not focus only on the future life of a learner but should provide a leaner with knowledge and skills that enable them to participate fully in their present lives. For example, in the same document, *Curriculum and Assessment Policy Framework* (2009:5) they indicate that,

As a member of the community, the child should learn the norms and values of his/her

society. Education is not only preparation for life but life itself. The child is already a full member of the community and education must help him/her to live such life fully by equipping him/her with necessary skills and competencies to meet the challenges of life such as the need for food, clothing, shelter and security, intellectual, emotional, physiological and psychological stability.

In both the global and Basotho efforts to reposition education, authentic learning and assessment emerges as a strategy that defines contemporary education.

**Research Problem**

The situation (the mismatch between the world of learning and the world of work) just described in the previous section calls for teaching methods and strategies that bridge the gap between the world of learning (curriculum, teaching and assessment) and the world of a learner. In Lesotho, this debate has resulted in the introduction of a new curriculum and assessment policy framework. The policy has brought about changes of how learners should be taught and assessed:

- schools should use integrated curriculum;
- teaching and assessment should be integrated in such a way that assessment is used to inform teaching and to improve learners' performance;
- teachers should use authentic methods for learning and assessment activities;
- high-stake examinations should be replaced by continuous assessment which uses such strategies as portfolios and project-based tasks;

The view is that with these changes, learners should be able to transfer and apply the skills and knowledge that that they acquire in the classroom to solve problems in the real world.

As already indicated, many teachers in the less-developed countries, Lesotho included, have been exposed to teaching strategies that are didactic in nature. Therefore, it is anticipated that the proposed new ways of teaching and assessment are likely to pose many challenges to these teachers to leave instructional practices that emphasised "chalk and talk" and adopt strategies that engage learners in activities that are meaningful and authentic. With this view, it is imperative that teaching or training strategies that are used in the teacher education programs are aligned with changes that have been introduced in the education system in Lesotho. Teachers in training should be exposed to teaching and assessment strategies that engage learners in activities that are socially and economically relevant in the world of a learner. This could be achieved by carefully selecting and emphasising teaching and learning strategies that would influence teachers to view learning as it is currently viewed by the world.

Learning design (also referred to as instructional design) is core to teacher education. What distinguishes a teacher (or an educator) from other professionals in any field (e.g. natural sciences, social sciences) is the knowledge and skill of designing and implementing events that promote learning. In the field of learning design, teachers in training learn procedural ways of identifying knowledge and skill need of a learner and designing, developing and implementing learning events that address those needs. It is during this process that teachers select teaching strategies from which they design learner activities that match their knowledge and skill need. Therefore, instructional design courses in teacher education programs should play an important role in changing how the

contemporary teachers practice in the education systems.

There is anecdotal evidence that the mismatch between learners' knowledge and skill need and their classroom engagement originates during learning design. It is believed that during planning, teachers focus more on the content than the real knowledge and skill a learner needs to acquire. Thus, such planning often results in learning events that focus on learners' acquisition of theoretical knowledge which they are unable to transfer to their social world or world of work.

**Purpose**

Usually, teachers, and others such as Anamuah-Mensah, Asabere-Ameyaw and Dennis (2007), blame lack of resources for the use of teaching and learning strategies that do not promote authentic learning in the classrooms. This is true even in Lesotho, teachers always blame lack of resources for using teaching strategies that are teacher centred and that do not promote authentic learning (see Chere-Masopha, 2011). Therefore, in this study, authentic learning and assessment strategies were trialled in order to establish whether they could be successfully adopted and used in the classrooms in Lesotho.

**Conceptual Framework: Authentic Learning and Authentic Assessment**

Authentic learning and authentic assessment have become very important in the modern era where stakeholders in education are demanding that learning institutions provide learners with education that equips learners with knowledge and skills relevant to their contemporary worlds. Authentic education engages learners in activities that facilitate their interaction with their natural and social environments in order to create their own understanding of the reality of these environments, the challenges that exist, and the knowledge and skills that are needed to address such challenges.

**Defining Authentic**

The word authentic, which basically means genuine or real, originates from Latin '*authenticus*' and Greek 'authentikos'. The synonyms of authentic include real, true, genuine, original and Bona Fide. In Lesotho, such words and phrases, as '*Makoy', 'legit', 'ea nete',* and *'eona-eona'* refer to authentic. The antonyms of authentic are fake, phony, bogus, and false.

**Defining Authentic Learning and Assessment**

With reference to teaching, learning and assessment, authentic learning and assessment mean the learning and assessment activities designed to connect what students are taught in school to real-world issues, problems, and applications. The reasoning behind authentic learning and assessment is that learning and assessment experiences should mirror the complexities and ambiguities of the learners' real life. Accordingly, learners are engaged in activities that result in production of discourse, products, and performances that have value or meaning beyond success in school; this is learning by doing approach (*e-Teaching: Management Strategies for* Classroom, 2016).

**The Benefits of Using Authentic Strategies for Learning and Assessment**

Earlier in this paper, it has been demonstrated through discussion, that the approaches which are used in education have created a mismatch between school education hence learners spend most of their school time engaged in activities that are irrelevant to their real world. It has also been reasoned that teachers often interpret learners' knowledge and skill needs as about acquiring content knowledge of the field.

Hence, this interpretation often results in teachers using strategies that require learners to spend classroom time sitting at a desk, taking notes, and regurgitating curriculum content (Revington, 2017). It has also been established in this discussion that global efforts to re-orientate education to align it with learners' needs, place emphasis on education that prepare learners for real world. Therefore, through authentic learning and assessment, learners are made to do "real" things while in school.

According to Newmann and Wehlage (1993); authentic achievement can be assessed using three criteria which are:

i. whether the learning tasks allow and require learners to construct meaning and produce knowledge,
ii. whether students use disciplined inquiry to construct meaning, and
iii. whether tasks aim at learners to work toward production of discourse, products, and performances that have value or meaning beyond success in school.

Newmann and Wehlage (1993) provide the following framework to guide the design and implementation of authentic learning and assessment. They achieve this by comparing the characteristics of non-authentic learning with authentic learning

***Table 1:*** **Authentic Learning and Assessment versus Non-authentic Learning and Assessment**

| | **Non-authentic learning and Assessment** | **Authentic Learning and Assessment** |
|---|---|---|
| **Learner mental engagement** | **Low order thinking:** learners are information-receivers and are given pre-specified knowledge ranging from simple facts and information to more complex concepts. They are asked to receive or recite factual information or to employ rules and algorithms through repetitive routines. | **High order thinking:** students are asked to manipulate information and ideas in ways that transform their meaning and implications. They combine facts and ideas to synthesize, generalize, explain, hypothesize, or arrive at some conclusion or interpretation. |
| **Depth of Knowledge** | **Shallow Knowledge: this knowledge** is thin or superficial does not deal with significant concepts of a topic or discipline. Learners always have a trivial understanding of important concepts and they acquire only a surface acquaintance with their meaning. Instructional strategies emphasize coverage of large quantities of fragmented information. | Learners are involved in deep knowledge acquirement when they make clear distinctions, develop arguments, solve problems, construct explanations, and otherwise work with relatively complex understandings. Depth is produced, in part, by covering fewer topics in systematic and connected ways. |
| **Connectedness to the World** | Learners are engaged in the classroom activities that are deemed important for success only in school (now or later). Learners' work has no impact on others and serves only to certify their level of compliance with the norms of formal schooling. | Learners are engaged in the classroom activities which make a connection to the larger social context within which learners live and require these learners to:<br>(1) address real-world public<br>(2) use personal experiences as a context for applying knowledge to influence audiences beyond their classroom; for example, by communicating knowledge to others, advocating solutions to social problems, providing assistance to people, or creating performances or products with utilitarian or aesthetic value. |

| | | |
|---|---|---|
| **Substantive Conversation** | **Low levels of substantive conversation:**<br><br>Class activities engage learners in little or no substantive conversation;<br><br>interaction typically consists of a lecture with recitation in which the teacher deviates very little from delivering a pre-planned body of information and set of questions;<br><br>Learners' routinely give very short answers. Teachers' list of questions, facts, and concepts tend to make the discourse choppy, rather than coherent; there is often little or no follow-up of learner responses. Such discourse is the oral equivalent of fill-in-the-blank or short-answer study questions | **High levels of substantive conversation**: There is considerable interaction between a teacher and learners about the ideas of a topic (the talk is about disciplined subject matter and includes indicators of higher-order thinking such as making distinctions, applying ideas, forming generalizations, raising questions, and not just reporting experiences, facts, definitions, or procedures).<br>A teacher and learners share ideas and the exchanges are not completely scripted or controlled (as in a teacher-led recitation). This sharing is characterised by the willingness of those participating to explain themselves or ask questions in complete sentences and when they respond directly to comments of previous speakers.<br>The dialogue between a teacher and students, and among students, builds coherently on the participants' ideas to promote improved collective understanding of a theme or topic. |
| **Social Support for Learner Achievement** | A teacher provides a **low social support for learner achievement** is with comments, and actions that tend to discourage effort, participation, or willingness to express one's views | A teacher provides **high social support for learner achievement** by conveying high expectations for all learners, including that it is necessary to take risks and try hard to master challenging academic work, that all members of the class can learn important knowledge and skills, and that a climate of mutual respect among all members of the class contributes to achievement by all. |

**Source:** adopted from Newmann and Wehlage (1993). Five Standards of Authentic Instruction in Authentic Learning. Vol 50 (7): 8-12

**Characteristics of authentic tasks for learning and assessment**

The following are identified as the characteristics of authentic tasks by *for e-Teaching: Management Strategies for Classroom* (2016) and Lombardi (2007):

Identification of authentic learning needs: learning needs that are identified were real and relevant to the learners' world.

Learner involvement: They in Involved learners in experiences which were real and that solved their life problems;

Well-defined problem: learners are involved in challenging tasks that have layers that need to be completed in order to solve the problem;

Sustained investigation: learners are given project tasks that that require time and that cannot be solved in a matter of minutes or hours;

Multiple sources and perspectives: leaners use resources that are theoretical or practical, and that require them to judge information for relevance;

Collaboration: learners build social connections and networks in the process of task completion and these were sustained beyond the study project.

Reflection: the participants reflect on their own learning and challenges they encountered in problem-solving process and make choices of

strategies and tools for solving future challenges.

An interdisciplinary perspective: learners are engaged in tasks that were not limited to a single subject or topic, but that made use of knowledge and skills from across disciplines.

Integrated assessment: Formative assessment is woven seamlessly into tasks and activities and was used purposefully by learners and teachers alike.

Polished products: learners' activities and tasks lead to the creation and completion of a product.

Multiple interpretations and outcomes: learners discover that there are many possible solutions and answers to the problem.

**Design and Methodology**

This paper shares the classroom experiences of using authentic learning and assessment activities in the instructional design course.

**Participants**

The participants in this study were 29 teachers who were enrolled in an instructional design in a Part-time Bachelor of Education Honours postgraduate Program. All the participants were serving qualified teachers in the schools in Lesotho. The benefit of engaging serving teachers in this study was that demonstrating to teachers how authentic learning and assessment is done, through practice, would change their understanding of the purpose of teaching.

**Project-based learning and assessment**

The following are the task instructions that were given to the participants.

Identify learner's knowledge need from your curriculum document (subject Syllabus) or identify a knowledge need and skill need in your community that links to target 4.4 of SDG 4 (UNESCO, 2016).

Develop a proposal for a training programme that is intended to address the identified knowledge or skill need;

Implement the proposed program;

Write a report that include the evidence of the program learning activities (Scrapbook format can be used) and your self-reflection;

Submit both the proposal and the report.

**Participants completed task**

Participants submitted their completed projects that included a proposal for training/teaching, a training/teaching program, a description of the program implementation, and a report on self-reflection on the success of the program, and the lessons learnt.

**Criteria for assessment of the authenticity of students' projects**

The following criteria were adapted from authentic teaching framework proposed by Newmann and Wehlage (1993) which is built on five standards; learner mental engagement, depth of knowledge, connectedness to the world, substantive conversation and social support for learner achievement. the highest number (5) is the highest score and the scores indicate how close the aspect of the project was close to the criterion evaluated. These aspects are listed in the Table 2.

***Table 2: Assessment Criteria for participant's projects***

| ASSESSMENT CRITERIA | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|
| The program has defined **community audience** | | | | | |
| The program had a well-defined blended **scheduling** (for program activities, consulting with the lecturer for progress and trouble-shooting) | | | | | |
| **Person expert:** where needed, the candidate identified and recruited members from his or her community who has **local or indigenous knowledge**) | | | | | |
| **Training:** where necessary, the candidate ensured that he/she has necessary skills that enabled him/or her to implement the program) | | | | | |
| **Expert Consultation:** (where necessary the learner consult an expert to assist with parts of the program that required specialised skills | | | | | |
| **Portfolios:** The learner(s) has submitted a portfolio that included (a proposal, report, evidence in the form of photos, video clips and artefacts) | | | | | |
| **Design back planning:** where necessary the learner was able to identify program that needed redesigning to fit the context or emerging issues. | | | | | |
| **Integrated Subject Learning:** the is evidence that the candidate drew learning material from and across various disciplines; | | | | | |
| Where necessary **role playing** was involved; | | | | | |
| There was evidence that the **candidate collaborated** with members in their communities (school or village) in the implementation of the program; | | | | | |
| The Results of the program are **tangible products** or observable change of behaviour and or attitude, indicated in the program objective(s) | | | | | |

## Data Analysis and Findings

All the work submitted by the students were analysed using the framework of authentic learning and assessment criteria as proposed by Newmann and Wehlage (1993). Issues that emerged from these reports were constructed using thematic categories using the following five standards; learner mental engagement, depth of knowledge, connectedness to the world, substantive conversation and social support for learner achievement and the following emerged as the findings:

*Learner mental engagement*

The participants we engaged in a task (the project) that required them to use theoretical tools they acquired in the instructional design course and use them to identify authentic knowledge and skill needs that required authentic solutions.

*Identification of authentic learning needs*

Learning needs that were identified were real and relevant to the learners' world. Learning needs identified and used to develop the programs by the participants were of two types. The first type was identified from school-based curriculum while the second type was identified from target 4.4 of SDG 4. Example of these are:

The learning needs identified from the end of level objectives outline of the school-based curriculum were as follows:

At the end of Grade 4 learners should be able to reuse locally available items to promote sustainable use of resources to generate income;

End of Grade 3 learners should be able to identify, reduce, recycle and reuse land pollutants;

At the end of Grade 7, learners should be able to do manicure and pedicure.

Identified community-based needs based on the target 4.4 of SDG 4:

At the end of the program the participants, who are vulnerable people leaving with HIV/AIDS and or living in abject poverty, should be able to engage in income generating activities.

At the end of the program, the participants (school parents) living in abject poverty should be able to grow and preserve vegetables that will improve their nutrition.

*Learner involvement*

Learners were involved in experiences which were real and that solved their life problems. The participants were involved in the activities which were relevant and connected to their professional life. The project required them to identify learners' knowledge and skill needs, plan and implement a program.

*Well-defined problem*

Learners were involved in challenging tasks that have layers that need to be completed in order to address knowledge and skill through planning, implementation, assessment and self-reflection. There were times when the participants had to rethink and adjust their instructional implementation problems such as limited time, lack of resources, and the willingness of community members to participate.

*Sustained investigation*

Learners were given project tasks that required time and that could not be solved in a matter of minutes or hours. The participants took a minimum of two months to complete their tasks because of the complexity of the tasks.

*Multiple sources and perspectives*

Leaners used resources that were theoretical or practical, and that required them to judge information for relevance. In their investigative activities, the participants used resources such as community members, internet, libraries and consultation with individuals whom they considered knowledgeable in matters relating to their projects.

*Collaboration*

Learners built social connections and networks in the process of task completion and these were sustained beyond the study project. The participants, particularly those whose projects community based.

*Reflection*

The participants reflected on their own learning and challenges they encountered in the problem-solving processes and when making choices of strategies and tools to solve problems.

*An interdisciplinary perspective*

Learners were engaged in tasks that were not limited to a single subject or topic, but that made use of knowledge and skills from other disciplines.

*Integrated assessment*

Formative assessment was woven seamlessly into the project tasks and activities and was used purposefully to support the participants.

*Polished products*

Learners' activities and tasks lead to the creation and completion of projects. The finished training programs produced the by-products of, for:

Paper and ash made fuel blocks (school-based)

Plastic made Door mats made (school-based)

Preserved vegetables and fruits (community based)

Poultry project (community based)

Pig projects (community based)

Vegetable key hole gardens (community based)

Students participating in the district debate on issues concerning the youth such as teenage pregnancy (school-based);

Teddy bears made by school children (school-based)

*Multiple interpretations and outcomes*

Learners discover that there are many possible solutions and answers to the problem. This is displayed in the variety and number of the projects of the participants. Many of these projects were intended to assist learners to solve income generating needs, poverty and unhealthy eating.

## Conclusion

This paper shared the experiences of using authentic strategies for teaching and assessment. Teachers who were enrolled in the instructional design course in the Bachelor of Education (Honours) Program were given a task to identify from the school-based curricula or community-based knowledge and skill needs, develop and implement programs that addressed these needs. The results demonstrate that authentic strategies respond directly to the knowledge and skill needs of the learners. They assist them to identify and solve problems of the real world. Such strategies engage learners in such a way that they use theory as a tool-kit from which they choose tools to solve problems at hand.

## Recommendations

Teacher education programs should use authentic strategies to train teachers. It is only when these teachers see and experience how it is done that they can begin to change the way they teach. Using authentic strategies in teacher training programs can also enable teachers tooffer teaching that assists the universal efforts towards education for sustainable development as well as

offer teaching that realises the Basotho philosophy of education. Further, teachers will be able to implement the new curriculum reform that has just been introduced in the schools in Lesotho education system.

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# Assessment of the Relevance of Technical and Vocational Education and Training (TVET) Curriculum to the 21st Century Certified Craftsmen in Nigeria

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## ABSTRACT

*In every nation, skills transform lives and drive economies. Technical and Vocational Education and Training (TVET) is a veritable tool to build functional and relevant skills where curriculum is at the heart of TVET delivery. In this era of globalization where skills and labour market demands are constantly changing, one of the key questions for policy makers is which skills are needed in the TVET curriculum (such as the Craft-level curriculum) to make it more relevant to the 21st century needs in Nigeria? This study, therefore, assessed the relevance of the TVET Curriculum of Certified Craftsmen in Fabrication and Welding, and Electrical Installation and Maintenance Practice to 21st Century needs. Four research questions were answered and one hypothesis was tested. The study adopted a mixed method survey research design employing the qualitative and quantitative approaches. The population comprised all teachers of Fabrication and Welding and Electrical Installation and Maintenance Practice in Technical Colleges and employers of labour in the two Trades in Nigeria. One hundred (100) teachers and 30 employers of each trade were purposively selected. Four validated instruments were used: Questionnaire for Teachers of Fabrication and Welding (Cronbach Alpha = 0.87); Questionnaire for Teachers of Electrical Installation and Maintenance Practice (Cronbach Alpha = 0.82) and two Interview Guides for employers of each trade. Quantitative data were analysed using frequency, percentage, mean and t-test while qualitative data were analysed thematically using direct quotations. Findings revealed that the graduate Craftsmen were, to a great extent, exposed to relevant skills in both trades. Moreover, the curricula for the two trades were relevant to the 21st century craftsmen and industry needs. Non-technical skills such as communication skills and discipline are necessary for employment. However, the study further revealed that Technical Colleges lack, among other things, adequate facilities to teach all necessary practical skills to students. It is, therefore, recommended that skills, such as automation and handling of modern tools, be included in the curriculum. Also, the challenges facing TVET delivery should be addressed.*

***KEYWORDS**: Fabrication and Welding, Electrical Installation and Maintenance Practice, TVET, 21st Century Certified Craftsmen, Curriculum Assessment.*

## Introduction

Nigeria, with a population of over 180 million is the most populous black nation in the world. The country is endowed with a wide variety of natural resources, ranging from petroleum to precious metals. The abundant presence of natural resources in the country has attracted lots of investors, thereby serving as a strong source of economic strength to the country. The country is blessed with enormous oil and gas reserves, making her a formidable member of the Organization of Petroleum Exporting Countries (OPEC). In the last few decades, Nigeria has witnessed an appreciable level of industrial development, starting with the oil sector in the 1970s and the mobile telephone industry since 2010. However, despite the country's emergent industrial growth, unemployment has remained a major problem as a large percentage of young people, irrespective of their educational qualifications, are unemployed. According to the National Bureau of Statistics (2017), the total unemployment rate rose from 37.2% in the Second Quarter of 2017 to 40.00% in the Third Quarter of the same year. The pervasive nature of the unemployment problem has been a source of concern; and, questions have been asked whether the causes of unemployment have been due to lack of employable skills needed by the industry on the part of the graduates, or other reasons (Nduka, 2006).

Possession of appropriate skills has remained an important factor for employment, productivity, inclusiveness of economic growth and international competitiveness (ILO, 2011). With increasing interest on skills acquisition in view of its vital role in the global knowledge-based economy, comes the need to renew the focus on Technical and Vocational Education and Training (TVET) in order to equip graduates with abilities that will improve their work opportunities and impact upon global poverty and social stability (African Union, 2007; King and Palmer, 2010; UNESCO, 2012).

TVET generally is an aspect of the education process, which includes General Education, and deals with the study of technologies and related sciences as well as acquisition of practical skills, attitudes and knowledge related to different professions. It has been described as an aspect of lifelong learning and preparation for responsible citizenship; an instrument for promoting environmentally sound sustainable development as well as method of alleviating poverty (Alhasan and Abdullahi, 2013). The implications is that TVET prepares individuals for the ever changing world of works. One of the objectives of TVET is to prepare people for employment and upward mobility in the world of work, through which individuals can aspire to achieve a better life and then develop the necessary skills needed to attain such aspirations. Consequently, TVET is seen as an effective tool that can be used to achieve a globally accepted workforce. It is a known fact that acquisition of such practical skills could make youth to be self-sustaining and self-reliant. As a result, they will no longer be seekers of white collar jobs but employers of labour.

The National Policy on Education (2004) stipulates that TVET in Nigeria, leading to assessment and certification of craftsmen, is offered in educational institutions at the post-basic educational level. TVET is offered in Technical Colleges, Vocational and Business

Schools. It is important to note that training in the colleges and schools for the award of certificates on craftsmanship is carried out using the curriculum designed and developed by the National Board for Technical Education (NBTE),while the National Business and Technical Examinations Board (NABTEB), which is mandated to assess and certify craftsmen, develops examination syllabi from the curriculum.

NABTEB, which was established in 1993, is one of the examination/assessment bodies in Nigeria. Its establishment domesticated the technical and business certificate examinations conducted by City and Guilds of London Institute, the Royal Society of Arts as well as the Technical and Business examinations conducted by the West African Examination Council (WAEC) leading to the award of National Business Certificate (NBC) and National Technical Certificate (NTC) among others. While the Board has made considerable progress in the award of craftsmanship certificates to qualified candidates, it has gone further to strengthen both the Technical and General Education subjects of its examinations to meet the requirements for admissions to tertiary education and for professional advancement. It means that certified craftsmen in Nigeria undertook their training in schools and other formal training institutions using government designed curriculum. At present, NABTEB certifies craftsmen in numerous trades, which include Fabrication and Welding and Electrical Installation and Maintenance Practice drawn from NBTE curriculum.

The TVET curriculum for craftsmanship programmes in Fabrication and Welding and Electrical Installation and Maintenance Practice is designed to prepare learners with the understanding, knowledge and skills of the trade through the integration of practical and theoretical activities as well as General Education subjects considered important to enhance the study of the trades. Fabrication and Welding is an occupational process that joins materials, usually metals or thermoplastics, by causing coalescence. The goal is to produce competent craftsmen with sound practical and theoretical knowledge, who should be able to carry out various types of welding processes and fabrication design (NBTE, 2001). Technologies on welding have created opportunities to add value to welded structures and products. Typical examples are the automobiles, air-crafts, ships, trains, space shuttles, offshore platforms and others. As these structures are dominated by metals, the search for the use of metals in manufacturing innovative products by utilizing welding as the main joining process is highly indispensable. The operations performed by Fabrication and Welding craftsmen at various levels have contributed enormously towards both national and global development, such as in the provision of energy for lighting and cooking, creation of efficient and effective transportation, provision of clean water, safe sanitation, accommodation both for living and working, and the creation of machinery for diverse industrial application, especially in the developed countries (Cary and Helzer, 2005; Ericsson, 2012).

Similarly, Electrical Installation and Maintenance Practice trade is a programme introduced by way of practical exercise, the maintenance of electrical system and circuits, electrical installation, inspection and test

procedure. Their craftsmen are expected to test, diagnose, service, install and completely repair any fault on electrical machines and equipment. In the report of NBTE (2004), the aim of Electrical Installation and Maintenance Practice is to give training and impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant. Electrical craftsmen maintain and repair the electronic components and equipment or device that involves electricity.

Fabrication and Welding and Electrical Installation and Maintenance Practice at the technical colleges are offered at two levels, leading to the awards of the National Technical Certificate (NTC) and Advanced National Technical Certificate (ANTC) for craftsmen and master craftsmen respectively. The curriculum is prepared in modules at both levels. The trainees on completion of the programmes like any other vocational courses in the technical colleges according to FRN (2004) shall have three options: secure employment either at the end of the whole course or after completing one or more modules of employable skills; set up their own business and become self-employed and be able to employ others; and pursue further education in craft/technical institutions such as colleges of education (technical), polytechnics, or universities.

Employers of labour depend on educators to train students who are prospective employees turned out from the institutions. They desire craftsmen who can stand on their feet and determine ways to accomplish tasks. Schmidt (2002) opines that graduates entering the workplace should be able to solve complex, multidisciplinary problems, work successfully in teams, exhibit effective oral and written communication skills and practice good interpersonal skills. Billing (2003) states that the skills needed in the industry by most employers are those that are transferable to a variety of situations; specifically the skills on problem solving, communication, self-management and critical thinking. Robinson (2000) also adds that these transferable work skills are considered very basic and generic in nature and should assist every person entering the workforce.

Mismatch between education and employment is a global challenge. Employers all over the world complain that despite high youth unemployment rates, availability of school leavers and graduates with the skills demanded by modern workplaces is increasingly difficult. The specific nature of skills mismatch varies by country, but in each case there is a need for balancing. In Nigeria, the demand for skilled workforce such as bricklayers, carpenters, plumbers, painters, welders, electricians among others, is far above supply (Akindoyeni, 2005; Obiegu, 2005). Nigeria, like many other countries, has an oversupply of tertiary graduates who may not possess the 21$^{st}$ Century skills and competencies employers often require. Production of graduates in all disciplines with 21$^{st}$ Century skills needs to become a priority for policy makers and educators alike. Embedding these skills into the curricula will help create a workforce that has the attributes necessary to meet the demands of a global and increasingly connected labour market. Employees, who have learnt how to adapt to new and challenging situations, and

how to direct their knowledge in practical ways, will flourish in a future workforce.

Nigerian Employers Consultative Association (2009) reported a general lack of requisite skills by applicants and expressed dissatisfaction over the skills possessed by employees. Fifty-four percent of metal work employers stated that applicants do not have the right skills, although they possess the experience and certificates. The Employer Skills Survey (2002) reported that over three quarters of companies have difficulties in meeting customer service standards as a result of recruitment problems. Successful teaching and learning require the application of the best pedagogy, practice and an appreciation of the work skills needs of craftsmen as perceived by industries related to the trade. This will enable graduates to be employable because their skills will match those demanded by the industry.

The World Bank (2012) suggests that many TVET graduates, even those with university degrees, are unemployable because of lack of relevant 21st century TVET skills. The incidence of employers of labour reporting difficulties in filling vacancies due to skills mismatch had climbed from 28% in 2013 to 48% in 2015 in South Asia (World Bank, 2012 and 2013). The concern of this study, therefore, was whether the current TVET curriculum in Nigeria is relevant to the 21st century skills, which expect employees to participate in intercultural communication, critical thinking, technological integration and much more. Curriculum, which is the road map for learning, must be functional and relevant to the needs of the society. It should focus on knowledge and skills that are judged important to learn. Functional curriculum is designed to enable students acquire relevant skills that will allow them function as competent and responsible citizens as well as cope with the demands of the 21st century world of work (Mbachu and Dorgu, 2013).

Fabrication and Welding requires technical skills from students for good performance in welding work trades, such as safety precautions, soldering, sheet and metal work, drawing and welding symbol interpretation, cutting metals, oxy-fuel cutting, metal arc welding, and the skills in the use of tools and equipment to effectively conduct metal work practical project. In Electrical Installation and Maintenance Practice, the core skills taught include: workshop safety rules and their application, physical properties, manufacturing process and application of ferrous and non-ferrous metals, use of common measuring, marking out, cutting and striking tools; basic workshop principles of drilling machines and the ability to use them; the ISO system of tolerances, fits and their applications, production of simple engineering components on the bench, essential features and working principles of the centre, and others (NBTE, 2001). As detailed and technical as the requirement of these trades sound, it is important to validate how far students in these trades areas are seen to be acquiring appropriate skills needed for employability in their work-related establishments.

**Statement of the Problem**

Technology is advancing every day and, as a result, industries demand highly competent employees in technical fields. This requires improvement in the skills imparted to students,

and which have implications on the curriculum. Graduates of TVET in Nigeria are trained based on content drawn from the curriculum developed by the government, which often lack up-to-date input contributions of employers. Hence, employers complain that availability of school leavers and graduates with the skills demanded by modern workplaces is increasingly difficult. Nigeria, like many other countries, has an oversupply of graduates who may not possess the 21st century skills and competencies employers often require, and this implies that there is a mismatch between education and employment. This study, therefore, assessed the relevance of TVET curriculum to the 21st century certified craftsmen in Fabrication and Welding and Electrical Installation and Maintenance Practice.

**Objective of the Study**

The objectives of the study were to:

1. ascertain the extent to which Fabrication and Welding and Electrical Installation and Maintenance Practice curricula are able to produce 21st century craftsmen
2. establish if the skills of graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice meet the industry expectations
3. ascertain the skills the employers perceived necessary for the employability of graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice
4. determine the challenges confronting the delivery of Fabrication and Welding and Electrical Installation and Maintenance Practice curricula.

**Research Questions**

To execute the study, the following research questions are posed:

1. To what extent are the Fabrication and Welding and Electrical Installation and Maintenance Practice Curricula in Technical Colleges able to produce 21st Century Craftsmen?
2. Do the skills of graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice from Technical Colleges meet the industry expectations?
3. What are the skills the employers perceive necessary for the employability of graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice?
4. What are the challenges confronting the delivery of Fabrication and Welding and Electrical Installation and Maintenance Practice curricula?

**Hypothesis**

1. There is no significant difference in the skills exposure between graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice

**Significance of the Study**

Findings of this study are of immense benefit to the graduates and employers of labour to become aware of the employability skills required to gain and retain employment. If the required skills are included in the curriculum, it will help the graduates to meet the demands of the industry and face the challenges of the 21st century world of work occasioned by technological advancement. In addition, the results of this study will further be beneficial to the curriculum planners and the government by providing them with necessary information about the existing skills gap between the

curriculum content and those skills required by employers of Fabrication and Welding/Electrical Installation and Maintenance Practice craftsmen.

## Methodology

### Research Design

The study adopted a mixed method survey research design employing the qualitative and quantitative approaches. This was considered appropriate because only a part of the population was studied by collecting and analyzing relevant data obtained from a few stakeholders deemed to show the representation of the total group, and findings were generalized to the entire population.

### Population

The population of the study comprised all teachers of Fabrication and Welding and Electrical Installation and Maintenance Practice in technical colleges and the employers of the two trades in Nigeria.

### Sampling Technique and Sample

Multi-stage sampling was employed in selecting the sample. Firstly, the simple random sampling technique was used to select 19 states out of the 36 states and Federal Capital Territory (FCT) across the 6 Geo-Political zones in Nigeria. Secondly, simple random sampling was also used to select 57 out of 177 technical colleges. Thirdly, 100 teachers of Fabrication and Welding and Electrical Installation and Maintenance Practice were purposively selected. Finally 30 employers of the two trades were also purposively selected.

### Instrumentation

Four instruments were used for the study, namely:

1. Questionnaire for Teachers of Fabrication and Welding (QTFW)
2. Questionnaire for Teachers of Electrical Installation and Maintenance Practice (QTEIMP)
3. Interview Guide for Employers of Fabrication and Welding (IGEFW)
4. Interview Guide for Employers of Electrical Installation and Maintenance Practice (IGEEIMP)

### Questionnaire for Teachers of Fabrication and Welding (QTFW)

The QTFW was developed by the researchers. It was used for data collection from the teachers. This consisted of three sections (A, B and C). Section A contained information on teachers' Bio-Data consisting of nine items, while Section B had twenty items that addressed some skills related to the curriculum in Fabrication and Welding in Technical Colleges that prepare students for the work force. Teachers were required to tick the extent to which they agreed with each statement on a four-point scale of Very Low Extent (VLE), Low Extent (LE), Great Extent (GE) and Very Great Extent (VGE). Section C contained five semi-structured items on the challenges confronting the delivery of the curriculum on Fabrication and Welding.

### Questionnaire for Teachers of Electrical Installation and Maintenance Practice (QTEIMP)

The QTEIMP was developed by the researchers. It was used for data collection from the teachers. This consisted of two sections (A and B). Section A contained information on teachers' Bio-Data consisting of nine items, while Section B had twenty items that addressed some skills related to the curriculum in Electrical Installation and Maintenance Practice in Technical Colleges that prepare students for the work force. Teachers were required to tick the extent to which they agreed

with each statement on a four-point scale of Very Low Extent (VLE), Low Extent (LE), Great Extent (GE) and Very Great Extent (VGE). Section C contained five semi-structured items on the challenges confronting the delivery of the curriculum on Electrical Installation and Maintenance Practice.

**Interview Guide for Employers of Fabrication and Welding (IGEFW)**

The IGEFW was developed by the researchers. It was used to gather data from the employers of Fabrication and Welding craftsmen. The instrument consisted eight items in section A (Employers' Bio-Data) while section B consisted six semi-structured questions to be responded to by the employers.

**Interview Guide for Employers of Electrical Installation and Maintenance Practice (IGEEIMP)**

The IGEEIMP was developed by the researchers. It was used to gather data from the employers of Electrical Installation and Maintenance Practice. The instrument consisted eight items in section A (Employers' Bio-Data) while section B consisted of six semi-structured questionnaire to be responded to by the employers.

**Validation of Instruments**

Experts in Educational Evaluation validated the instruments. In addition, Fabrication and Welding and Electrical Installation and Maintenance Practice subject officers in NABTEB and two subject teachers from a technical college carried out the content validity and curriculum coverage. The reliability coefficients were obtained using Cronbach Alpha and the reliability coefficients of 087 and 082 were obtained for Fabrication and Welding and Electrical Installation and Maintenance Practice respectively.

**Data Collection**

Questionnaires were administered and collected by the researchers and research assistants. The oral interview was conducted by the researchers and research assistants.

**Data Analysis**

Quantitative data was analysed using frequency, percentages, mean and t-test while data generated through semi-structured questionnaire was analysed qualitatively through the use of themes. The decision rule was that a response with a mean of 2.5 and above was considered as 'Great Extent' while the mean below 2.5 was considered as 'Low Extent'.

**Results**

In this section, the results are discussed

**Research Question 1**

To what extent are the Fabrication and Welding and Electrical Installation and Maintenance Practice Curriculum in technical colleges able to produce 21$^{st}$ century craftsmen?

**Table 1: The extent to which graduates of Fabrication and Welding were exposed to the skills in the curriculum**

| S/N | ACTIVITIES | N | VGE(%) | GE (%) | LE (%) | VLE(%) | $\bar{X}$ | SD | DECISION |
|---|---|---|---|---|---|---|---|---|---|
| **1** | Perform measurement using a of range measuring devices | 96 | 18(18.8) | 56(58.3) | 15(15.6) | 7(7.3) | 2.89 | .793 | Great Extent |
| **2** | Carry out basic calculations | 98 | 15(15.3) | 54(55.1) | 24(24.5) | 5(5.1) | 2.81 | .755 | Great Extent |
| **3** | Use hand tools | 98 | 47(48.0) | 39(39.8) | 12(12.2) | - | 3.36 | .692 | Great Extent |
| **4** | Operate grinding machines | 98 | 37(37.8) | 40(40.8) | 17(17.3) | 4(4.1) | 3.12 | .841 | Great Extent |
| **5** | Prepare material for welding | 99 | 26(26.3) | 57(57.6) | 16(16.2) | - | 3.10 | .647 | Great Extent |
| **6** | Cut materials mechanically | 98 | 25(25.5) | 46(46.9) | 24(24.5) | 3(3.1) | 2.95 | .791 | Great Extent |
| **7** | Bend, fold and roll sheet metal | 99 | 16(16.2) | 43(43.4) | 34(34.3) | 6(6.1) | 2.70 | .814 | Great Extent |
| **8** | Set up manual metal arc welding machine | 97 | 19(19.6) | 51(52.6) | 23(23.7) | 4(4.1) | 2.88 | .767 | Great Extent |
| **9** | Perform soft soldering | 99 | 16(16.2) | 38(38.4) | 33(33.3) | 12(12.1) | 2.59 | .904 | Great Extent |
| **10** | Bolt and screw components | 98 | 19(19.4) | 49(50.0) | 18(18.4) | 12(12.2) | 2.77 | .906 | Great Extent |
| **11** | Service hand and machine tools | 99 | 10(10.1) | 38(38.4) | 37(37.4) | 14(14.1) | 2.44 | .860 | Low Extent |
| **12** | Store tools and equipment | 98 | 24(24.5) | 53(54.1) | 20(20.4) | 1(1.0) | 3.02 | .703 | Great Extent |
| **13** | Assemble simple structural components | 99 | 20(20.2) | 49(49.5) | 21(21.2) | 9(9.1) | 2.81 | .865 | Great Extent |
| **14** | Apply safe welding practices in work environment | 98 | 26(26.5) | 49(50.0) | 19(19.4) | 4(4.1) | 2.99 | .793 | Great Extent |
| **15** | Apply various tools to remove dents from mental surfaces for finishing | 99 | 8(8.1) | 58(58.6) | 25(25.3) | 8(8.1) | 2.67 | .742 | Great Extent |
| **16** | Interpret various welding symbols | 97 | 21(21.6) | 48(49.5) | 24(24.7) | 4(4.1) | 2.89 | .789 | Great Extent |
| **17** | Perform routine oxy acetylene welding | 99 | 9(9.1) | 50(50.5) | 26(26.3) | 14(14.1) | 2.55 | .848 | Great Extent |
| **18** | Perform brazing/silver soldering | 96 | 6(6.3) | 23(24.0) | 48(50.0) | 19(19.8) | 2.17 | .816 | Low Extent |
| **19** | Erecting structures | 97 | 12(12.4) | 38(39.2) | 32(33.0) | 15(15.5) | 2.48 | .903 | Low Extent |
| **20** | Detach machines and equipment | 98 | 6(6.1) | 37(37.8) | 38(38.8) | 17(17.3) | 2.33 | .835 | Low Extent |

Table 1 reveals that while graduates of technical colleges were to a 'Great Extent' exposed to sixteen (16) skills representing 80% using the bench mark mean of 2.5; they were to a 'Low Extent' exposed to four skills representing 20% using a mean below 2.5.

**Table 2: The extent to which graduates of Electrical Installation and Maintenance Practice were exposed to the skills in the curriculum**

| S/N | ACTIVITIES | N | VGE (%) | GE (%) | LE (%) | VLE (%) | $\bar{X}$ | SD | DECISION |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Workshop safety rules. | 100 | 41(41.0) | 44(44.0) | 10(10.0) | 5(5.0) | 3.21 | .820 | Great Extent |
| 2 | Effective use of materials | 100 | 34(34.0) | 52(52.0) | 11(11.0) | 3(3.0) | 3.17 | .739 | Great Extent |
| 3 | Interpretation of wiring drawing | 100 | 31(31.0) | 50(50.0) | 15(15.0) | 4(4.0) | 3.08 | .787 | Great Extent |
| 4 | Interpretation of installation details | 98 | 23(23.5) | 54(54.1) | 19(19.4) | 2(2.0) | 3.00 | .718 | Great Extent |
| 5 | Manufacturing process of ferrous and non-ferrous | 97 | 5(5.2) | 21(21.6) | 45(46.4) | 26(26.8) | 2.05 | .834 | Low Extent |
| 6 | Applying grease to the appropriate parts of the machine | 100 | 20(20.0) | 45(45.0) | 30(30.0) | 5(5.0) | 2.80 | .816 | Great Extent |
| 7 | Carry basic calculations on measurement | 100 | 24(24.0) | 56(56.0) | 19(19.0) | 1(1.0) | 3.03 | .688 | Great Extent |
| 8 | Installation of electric circuit breaker | 100 | 36(36.0) | 46(46.0) | 12(12.0) | 6(6.0) | 3.12 | .844 | Great Extent |
| 9 | Use of surface wiring tools appropriate | 100 | 58(58.0) | 34(34.0) | 6(6.0) | 2(2.0) | 3.48 | .703 | Great Extent |
| 10 | Simple surface wiring for domestic and industrial buildings | 100 | 45(45.0) | 43(43.0) | 11(11.0) | 1(1.0) | 3.32 | .709 | Great Extent |
| 11 | Carry out simple conduit wiring for a domestic/industrial wiring | 100 | 29(29.0) | 53(53.0) | 15(15.0) | 3(3.0) | 3.08 | .748 | Great Extent |
| 12 | Identification of primary and secondary cells | 100 | 39(39.0) | 50(5.0) | 9(9.0) | 2(2.0) | 3.26 | .705 | Great Extent |
| 13 | Carry out earth leakage test of a Condit wiring | 96 | 13(13.5) | 54(56.3) | 24(25.0) | 5(5.2) | 2.78 | .743 | Great Extent |
| 14 | Preparation of electrolyte for battery charging | 100 | 8(8.0) | 41(41.0) | 40(40.0) | 11(11.0) | 2.46 | .797 | Low Extent |
| 15 | Carryout a trunking wiring system of an industry | 100 | 15(15.0) | 48(48.0) | 29(29.0) | 8(8.0) | 2.70 | .823 | Great Extent |
| 16 | Identify duct wiring of an industry | 100 | 18(18.0) | 44(44.0) | 33(33.0) | 5(5.0) | 2.75 | .809 | Great Extent |
| 17 | Use appropriate tools required in duct wiring | 99 | 14(14.1) | 47(47.5) | 33(33.3) | 5(5.1) | 2.71 | .773 | Great Extent |
| 18 | Preparation of winding coil | 100 | 10(10.0) | 43(43.0) | 39(39.0) | 8(8.0) | 2.55 | .783 | Great Extent |
| 19 | Testing of voltage and current with the right measuring meters | 100 | 44(44.0) | 43(43.0) | 11(11.0) | 2(2.0) | 3.29 | .743 | Great Extent |
| 20 | Assembling of electric machine systematically | 100 | 11(11.0) | 47(47.0) | 26(26.0) | 16(16.0) | 2.53 | .893 | Great Extent |

Table 2 above reveals that while graduates of technical colleges were, to a 'Great Extent' exposed to eighteen (18) skills representing 90% using the bench mark mean of 2.5; they

were to a 'Low Extent' exposed to two (2) skills representing 10%using a mean below 2.5.

**Research Question 2**

Do the skills of graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice from technical colleges meet the industry expectations?

Tables 1 and 2 indicate that the graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice from technical colleges were to a 'Great Extent' exposed to the skills in the curriculum. Corroborating this result, the oral interviews conducted with officers of managerial cadre in 23 companies that employ graduates of technical colleges in the two trades show that the skills of the employees in terms of meeting industry expectations were satisfactory.

The Head of Operations in one of the Fabrication and Welding companies asserted that:

> the craftsmen we have in our company, particularly those that passed through technical colleges with NTC/ANTC, are not lacking in skills to perform the assigned duties. They are good technically from the appraisals we normally receive from their supervisors every six (6) months. There has not been any adverse report whatsoever that any of them was found wanting in the assessment and appraisal by their supervisors; we move them to the next level or recommend approval for their promotion. If I should rate them in terms of their skills and productivity, I will give this category of staff 75%. The challenge they were having when they were newly employed was poor communication skills in presentations and writing of reports but some of them have improved considerably as they perform their jobs over time (interview with the Head of Operations).

Similarly, the General Manager of one of the Electricity Distribution Companies (EDC) in Nigeria stated that:

> these craftsmen from technical colleges are technically sound but they lack communication skills. They are not lacking in skills to carry out their jobs. In fact, they are the ones we are using to carry out all the technical jobs. They are preferred to the ones with HND who did not pass through technical colleges. They have the background skills and they are ready to work. They are the ones that we use for climbing the poles to trace where there are faults in the cable lines and joints. They make necessary connections and checkmate the supply of electricity. If I should rate them in terms of their skills and usefulness to the industry, I will give them excellent i.e. 70% (interview with the General Manager of EDC).

**Research Question 3**

What are the skills the employers perceive necessary for the employability of graduates of technical colleges of Fabrication and Welding and Electrical Installation and Maintenance Practice?

The commonly mentioned skills that the employers of graduates of Fabrication and Welding perceived as necessary for employability are technical skills such as identification of different components of machines and their uses, maintenance of tools, aluminium window fabrications, materials and fabrication processes, measurement, handling of sophisticated machines, and non-technical skills such as creativity skills, team work, honesty, self-confidence and communication skills.

In a similar vein, while responding to an oral interview the Operations Manager in an Electrical Company stated that:

> Skills perceived necessary for employability of graduates of technical colleges of Electrical Installation and Maintenance Practice include technical skills such as automation, handling of modern machines, interpretation of electrical diagrams, safety techniques and non-technical skills such as communication, discipline and attitude towards work (interview with the Operation Manager, Electrical Company).

**Research Question 4**

What are the challenges confronting the delivery of Fabrication and Welding/Electrical Installation and Maintenance Practice curriculum?

From the responses of the teachers of the two trades the following were identified as the challenges affecting effective TVET curriculum delivery:

- irregular review of TVET curriculum as and when due; that is every five years;
- most TVET teachers/instructors do not have appropriate qualifications;
- the teachers are not regularly sent for in-service and industrial training;
- the facilities are not adequate in technical colleges for effective delivery of the curriculum;
- there is no provision for student industrial attachment/training in the curriculum;
- there is grossly inadequate funds available for the delivery of the curriculum.

**Hypothesis**

There is no significant difference in the skills' exposure between graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice

**Table 3: Independent t-test indicating difference in the skills exposure between graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice**

| Group Statistics | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Trade** | **N** | **Mean** | **Std. Deviation** | **Std. Error Mean** | **Df** | **T** | **Sig. (p)** | **Decision** |
| **Fabrication and Welding** | 100 | 54.93 | 10.347 | 1.04 | 198 | -2.263 | 0.025 | Sig |
| **Electrical and Maintenance** | 100 | 58.11 | 9.464 | 0.946 | | | | |

Table 3 above reveals that while the mean of skills acquired by graduates of Fabrication and Welding was 54.93, with standard deviation of 10.35, that of graduates of Electrical Installation and Maintenance Practice was 58.11, with standard deviation of 9.46. The calculated t-value was -2.26 and p value of 0.025 at 0.05 alpha level of significance. Since $P<0.05$, it implies that there was a significant difference in the skills' exposure between graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice. Therefore, the null hypothesis which states that there is no significant difference in the skills exposure between graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice was rejected; hence, graduates of Electrical Installation and Maintenance Practice were more exposed to the skills in the curriculum.

**Discussion**

The findings revealed that the graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice were well exposed to the skills in the curriculum. These findings negate submissions by Zulu (2018), who opined that most multinational corporations in the country were not employing TVET graduates because applicants in Nigeria lack the required skills, adding that the school curriculum is no longer meeting the demand of the 21st Century employers.

The responses from the employers indicate that the skills of Fabrication and Welding and Electrical Installation and Maintenance Practice meet the industries' expectations. This result supports the finding of Mbachu and Dorgu (2013), who assert that a functional curriculum is designed to enable students acquire skills that will allow them to function as competent craftsmen that will meet the demands of 21st century world of work.

The commonly identified skills perceived necessary for the employability for the two trades include automation, handling of modern machines, maintenance of tools, communication, teamwork, and discipline among others. This is in consonance with Schmidt (2000) who opines that graduates entering work places should be able to solve complex and multidisciplinary problems, work successfully in teams, exhibit effective oral and written communication skills and practice good interpersonal skills.

The study further highlighted the challenges confronting the delivery of Fabrication and Welding and Electrical Installation and Maintenance Practice curriculum to include irregular review of the curriculum as and when due, inappropriate qualification of TVET

teachers and inadequate funds for TVET curriculum delivery.

Finally, the hypothesis revealed that there is a significant difference in the skills exposure between graduates of Fabrication and Welding and Electrical Installation and Maintenance Practice. This implies that graduates of Electrical Installation and Maintenance Practice were more exposed to the skills in the curriculum.

**Conclusion**

The study showed that graduates of technical colleges in both trades were, to a 'Great Extent', exposed to technical skills contained in the TVET curriculum. It equally indicated that the employers of the graduates of the two trades admonished for the integration of soft skills such as communication skills, creativity skills and discipline in the curriculum. Therefore, the current TVET curriculum for the two trades contains sufficient technical skills but requires the integration of soft skills into it to enhance the employability of the graduates in this era where21st century skills are needed for global competitiveness.

**Recommendations**

To improve the quality of skills of technical college graduates, it is recommended that the contents of curriculum should include automation, handling of modern tools, safety techniques, computer programming, communication, discipline and other soft skills. In addition, there should be regular collection of data on industries' demands, and emphasis should be placed on practicals, including industrial training for students of technical colleges. Furthermore, there should be continuous on-the-job training for teachers. Finally, there should be provision of adequate funds so as to address the challenges facing TVET delivery.

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## SUB-THEME C: REFLECTIONS ON THE IMPLEMENTATION OF SCHOOL BASED ASSESSMENT

# Incorporating School-Based Assessment Results into Final Summative Examination Grades at the Lower Secondary School Level in Uganda: Classroom Teachers' Perceptions on the Benefits and Challenges

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***Abstract***

*In an effort to reform the assessment system in Uganda's Lower Secondary Schools, the incorporation of School-Based assessment results into final summative grades has been recommended to give a more nuanced picture of the learners' academic achievement. This study investigated the benefits and challenges of incorporating School-Based Assessment results into final summative examination grades in Uganda's secondary schools. The study objectives included the following: (a) to identify the methods of School-Based assessment that are frequently used by teachers (b) to establish the benefits of School-Based assessment and (c) to identify the challenges faced when incorporating School-Based assessment results into final summative examination grades in Uganda. The study adopted an ex post facto research design incorporating descriptive survey design. A sample of 100 stratified and randomly selected school teachers and 10 purposively selected head teachers was obtained from 10 randomly selected secondary schools in and around Kampala. Data was collected using teachers' perceptions on School-Based assessment questionnaires and interview guides. Mean scores and standard deviations were used during data analysis. The results of the study indicate that school-based assessment has enabled teachers to assess the effectiveness of their teaching; adjust their pedagogical strategies; monitor the progress of each individual learner; identify weak learners who need remediation and gifted learners who need enrichment and to give useful feedback to the learners, parents and other stakeholders. However, School-Based Assessment is currently riddled with numerous challenges including: subjective and unreliable results; unclear guidelines for classroom teachers from curriculum and assessment agencies; a high rate of student mobility from one school to another; poorly developed teacher assessment skills and delayed delivery of marks to the examination Board. The study made a number of recommendations for the effective implementation of the proposed change.*

***Key words:*** *School-based assessment, Summative examinations, Assessment reform, Lower secondary school.*

## Introduction

Worldwide, education is the mainstay of any country's socio-economic and political transformation. Education is the process by which people acquire knowledge, skills, habits, values or attitudes (Begum and Farooqui, 2008). The level of education attained is measured by assessing the amount of learning that has taken place. There is consensus among researchers that incorporating formative or School-Based Assessment (SBA) into the summative assessment improves student learning. The SBA assessment methods used and the quality of feedback therefore enhance the realization of learning outcomes (Assessment Reform Group, 2002; Ndalichako, 2004; Gonzale & Fuggan, 2012).

Globally, many educational systems tend to use high-stakes summative assessments to induce desirable pedagogical changes, with improved student learning as the ultimate goal (Andrews, 2004; Cheng, 2005; Qi, 2005, 2007). Such summative examinations have been used for selection, placement and certification, without formally incorporating formative or SBA grades into the final examinations. This has merely given a partial picture of the learner's progress across a continuum of subject areas.

SBA as a form of assessment evolved along the philosophy of assessment *for* learning that is inextricably entrenched in the teaching and learning process. The teacher is actively involved in planning the assessment programme, developing suitable assessment tasks and ultimately making judgment based on the assessment results. Unlike public examinations, SBA is conducted in an ordinary classroom setting by the learner's own teacher, thereby enabling the teacher to give an immediate and constructive feedback to the learners on their academic achievement. SBA is formative in nature, directly encouraging the acquisition of the intended learning outcomes rather than merely making the learner to be test-wise (Andrew, Fullilove & Wong, (2002).

Many countries including Hong Kong (Hong Kong Examinations and Assessment Authority, 2012) and Nigeria (Ojo & Gbinigie, 2009; Adediwura, 2012; Yin & Adamson, 2015) have incorporated and do benefit from SBA. In Uganda, the incorporation of school-based continuous assessment was recommended by the 1987 Kajubi Report and was highlighted in the 1992 Uganda White Paper on Education. This recommendation has been adopted and is being actualized by the on-going Curriculum Assessment and Examination (CURASSE) reform agenda in Uganda. SBA is to account for 20% in each of the examinable subject papers at this level, unlike in the past where it was incorporated in a few Language, Fine Art and Technical subjects, accounting for between 20% and 30%. This paper delves into the investigation of teachers' perceptions on the benefits and the attendant challenges regarding the paradigm shift of incorporating SBA results into final summative examination grades at the Lower Secondary school level in Uganda.

## Research Problem

There is an ongoing crusade to integrate assessment *of* learning with assessment *for* learning in an attempt to enhance students' learning worldwide in general and in Uganda in particular. In an effort to reform the curriculum and assessment systems in Uganda's Lower Secondary Schools, SBA results are to be massively incorporated into final summative grades to give a more comprehensive picture of

the learner's academic achievement. This move, however, comes at a time when the teachers' integrity, motivation and assessment skills are at low ebb (Mkpae &Obowu-Adutchay, 2017). This trend adversely affects the quality of teaching and learning at the classroom level and undermines the authenticity of the final grades scored by the candidates. This ultimately erodes the quality of the country's education system. This study therefore, investigated the methods of school-based assessment that are frequently used by teachers and the teachers' perceptions on the benefits and challenges of incorporating SBA results into final summative examination grades at the Lower Secondary school level in Uganda.

**Purpose of the Study**

The purpose of this study was to identify the methods of school-based assessment that are frequently used by Lower Secondary School teachers and to investigate the teachers' perceptions on the benefits and challenges of incorporating school-based assessment results into final summative examination grades at the Lower Secondary school level in Uganda.

**Research Questions**

This study was guided by the following research questions:

What methods of school-based assessment are frequently used by Lower Secondary school teachers?

What are the main uses of the information obtained by teachers from school-based assessment?

What challenges are being faced when incorporating School-based Assessment into final summative examination grades in Uganda?

**Objectives of the Study**

This study aimed at achieving the following objectives:

To identify the methods of school-based assessment that are frequently used by Lower Secondary School teachers.

To establish the extent to which information obtained by teachers from school-based assessment is useful.

To identify the challenges faced when incorporating school-based assessment results into final summative examination grades in Uganda's secondary schools.

**Scope of the Study**

This study endeavoured to identify the methods of school-based assessment that are the frequently used by Lower Secondary school teachers and examined teachers' perceptions on the benefits and challenges of incorporating school-based assessment into final summative examination grades in Uganda. It was conducted in Central Uganda at Lower Secondary school level, within an approximate distance of 25 kilometres radius around Kampala, the Capital City. A cohort of head teachers and classroom teachers involved in the compilation of the 2016 Senior Three and 2017 Senior Four students' SBA marks was studied. This was because the latest SBA data and facts were easily accessible.

**Literature Review**

Public examinations and classroom assessment are long-standing and important features of education systems in Africa (Kellegan & Greaney, 2003). Educational assessment is an

indispensable prerequisite in any meaningful teaching-learning process. It involves the collection of information about the learner to facilitate the making of important decisions about the individual learner's progress after undergoing instruction. Assessment may be formative or summative, but a combination of both gives a broader picture on the learner's academic achievement. It should be holistic, covering the cognitive, affective and psychomotor dimensions of learning.

National education systems based on public examinations tend to drive students towards learning and memorizing facts merely to pass examinations. Consequently, the knowledge, skills and attitudes attained in this manner are transient after the examination. Success in such examinations does not give the true picture of the successful mastery of a curriculum (Adediwura, 2012).

In light of the above revelation, the move towards incorporating SBA grades into the final summative grades has gained more currency. Black & Wiliam (1998) strongly believe that SBA has a high potential of accelerating learning for all students. It tends to reduce the tension among the learners by making examinations more of a classroom feature (Turyatemba, 2017). With SBA, the teacher develops ample skills to make well-informed judgments about the learners' achievements, understands the principles of learner progression and uses their judgement to plan for all categories of learners (Obioma, Junaidu & Ajagun, 2013; Turyatemba, 2017). School Based Assessment is expected to improve teaching and learning because the anticipated learning outcomes are predetermined, a timely feedback to the learner and the teacher is provided; the learners are deeply involved in their own learning through a mixture of interactive activity-based and discursive presentations. Teachers adjust their teaching to take into account their observations in the course of assessment (Turyatemba, 2017). This assessment contributes to a life-long process of learning where the learner is equipped with the basic functional and generic skills that enable them cope with the challenges ahead.

Many researchers concur that traditional assessment methods thrive in the classroom. These include: tests, class exercises, quizzes and examinations (Vandeyar & Killen, 2007; World Bank, 2008; Kanjee, 2009; Ndalichako, 2010). The most unpopular modes of SBA are practicals, portfolios and projects. The use of a variety of assessment methods is recommended if valuable information regarding students' strengths and weaknesses in their learning is to be obtained (Shepard, 2000, McMillan, 2000, Gonzales & Fuggan, 2012).

Some researchers however, contend that the move to incorporate SBA results into final summative examination grades to make assessment a more common classroom feature such that it ceases to be high stakes, has proved futile. The battlefield has merely permeated from summative to formative assessment as well (Kapambwe, 2010). Many countries where SBA scores are integrated into the students' final grade have experienced the challenge of teachers inflating SBA marks to make learners excel (Kapambwe, 2010; Ayodele, 2012; De Lisle, 2013). In Uganda, the urge to excel in final examinations is even greater with the predominance of private schools whose primary motive is to reap supernormal profits through increased enrollment. The paucity of

vacancies in the competitive "First World" Government high schools for continuing students further aggravates the problem.

Some teachers have exhibited deficiencies in setting tests that meet the national standard and they have failed to explicitly bring out the ways in which SBA can be most effectively used to give a comprehensive picture of the actual learning achievement. Researchers including Cheng, Andrews & Yu (2010) argue that the SBA component has significant implications for both teaching and learning, and presents challenges to definitions of key components of assessment such as validity, reliability, and fairness at the philosophical, theoretical, and practical levels. During classroom instruction, teachers tend to promote the drilling of students on a narrow set of skills covered on the SBA tests, which may turn out to be harmful to their educational development and thinking (Crocker, 2005). In Bangladesh, the junior teachers were more enthusiastic in the use of SBA than the senior ones. Classes usually being large, it has become an extra load for them to maintain all the categories of activities (Begum & Farooqui, 2008).

Although a number of research studies have been undertaken on the relevance, use and challenges of incorporating SBA in final summative grades, there is no specific research that has been conducted to address this issue at Lower Secondary school level in Uganda. This study attempted to identify the methods of SBA that are frequently used by Lower Secondary School teachers and investigated the teachers' perceptions on the benefits and challenges of incorporating SBA results into final summative examination grades at the Lower secondary school level in Uganda.

**Research Methodology**

The study adopted an *ex post facto* research design incorporating a descriptive survey research design. This research design was found ideal because it is possible to collect a lot of information in a short time. The entire population of the study (N=125) included practicing Lower Secondary school teachers (n=100) who were teaching Senior Three and Senior Four and the head teachers (n=10) of these sampled schools. The targeted population included all the teachers who had a school-based assessment component being incorporated in Uganda the National Examinations Board (UNEB) final results.

Schools in and around Kampala city were randomly selected because they had the required subjects that have an SBA component. In addition, the schools could be easily accessed at minimum cost. The head teachers were purposively selected because they are knowledgeable in both academic and non-academic aspects of the school. The teachers of two Languages (German and French), Fine Art and Technical subjects were purposively selected because they have a coursework component forming part of the final summative grades. The sample was determined by using Krejcie and Morgan's tables (1970).

**Table 1: Sample Size and Sample Selection Strategies**

| Category | Sex | Population | Sample | Sampling Technique |
|---|---|---|---|---|
| Head teachers | Male | 06 | 06 | Purposive |
| | Female | 04 | 04 | Purposive |
| Senior Four teachers | Male | 32 | 28 | Simple Stratified Random |
| | Female | 33 | 28 | Simple Stratified Random |
| Senior Three teachers | Male | 30 | 22 | Simple Stratified Random |
| | Female | 20 | 12 | Simple Stratified Random |
| **Total** | | **125** | **100** | |

As illustrated in Table 1, the study used a sample of 125 randomly selected respondents from the Lower secondary schools. There were 65 teachers who were teaching Senior Four from which a sample of 56 was selected. From 50 teachers of Senior Three, a sample of 34 teachers was selected. Senior Three and Four teachers were included in the study because of their central role, given that they were directly involved in the compilation and submission of SBA results to Heads of department, Directors of Studies and then to the Head teachers. Purposive and simple stratified random sampling techniques were used during this study. Teachers were categorized into Senior Three and Senior Four strata. Purposive sampling was used to select the ten head teachers because they had relevant information for this study (Kathuri & Pals, 1993). To avoid bias and to give each teacher an equal chance of being selected, simple stratified random sampling was used to select teachers in the ten urban and peri-urban Secondary schools. Amin (2005) contends that randomization creates equivalent representative groups that apply similarly to all relevant variables under investigation by the researcher. Self-administered questionnaires were used to obtain non-directly observable primary data from the teachers. This method was used because the teachers can freely express themselves and a lot of information can be collected in a short time. An interview was arranged to obtain information from the head teachers on academic and non-academic aspects of school that cannot be obtained from classroom teachers. This method was used because it yields quick information from the respondents on non-directly observable information.

**Data Collection Instruments**

Questionnaires were used to obtain data from the Senior Three and Senior Four teachers. The questionnaire was preferred as a research instrument because it is easy to administer (Gay, 1996). Questionnaires have been found to be less expensive to administer to a population that can read and write and they yield a lot of information. In order to obtain accurate data, the questionnaires contained precise close-ended questions, which encouraged respondents to think, and offer considered answers and honest opinions (Sedgley, 2007). Respondents were provided with a set of alternatives based on a five-point and a six-point Likert scale.

An interview guide was used to obtain data from head teachers on academic and non-academic aspects of the school. The interviews yielded information on the quality of teaching and learning as well as the challenges relating to the incorporation of SBA in the final summative grades. Expert colleagues from the Research and Data Department validated the

instruments. Cronbach alpha was used to establish the reliability coefficient and an index of 0.78 was realised. Permission to conduct research in the sampled schools was sought from the head teachers. The purposefully selected head teachers and the randomly selected teachers were subjected to interviews and self-administered questionnaires on the appointed dates. The researcher targeted Senior Three and Senior Four teachers who had participated in incorporating SBA data collection into final UNEB grades for 2017.

During this study, frequencies, means and standard deviations were used as the basic tools of analysis. Quantitative and qualitative methods were triangulated to yield more reliable research results. These methods have been found by many researchers as a good way to enhance the validity of inferences (Mertens, 2005, Teddlie & Tashakkori, 2002).

**Discussion of Findings**

The research findings are arranged according to the research questions. These findings were derived from the review of both primary and secondary data. The Statistical Package for Social Science (SPSS) Version 21 was used for data analysis. Findings are presented and analyzed using a triangulation of both quantitative and qualitative approaches.

**Background Information of Respondents**

Of the total number of respondents, 90.0% were classroom teachers and 10.0% were head teachers. Of these, 54.0% were males and 46.0% females. Most (47.0%) the respondents fell in the 31-40 year age bracket, 24.0% were in the 41-50 year age bracket, 18.0% of them were in the 21-30 year age bracket and 11.0% of them were in the 51-60 year age bracket. The majority of teachers (54.0%) had 1-10 years' experience in teaching, 35.0% had 11-20 years' experience, 8.0% and 3.0% had 21-30 and over 30 years' teaching experience respectively.

**Verification of Research Question One**

The first research question was; *"What methods of school-based assessment are frequently used by Lower Secondary school teachers?"*

**Table 2: Teachers' Perceptions of Lower Secondary School Teachers on Frequently used SBA Methods (N=100).**

| SBA Method | Valid | Once a Year | Once a Term | Monthly | Weekly | Daily | Not at All | Mean | St. Dev. | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Home-work | Frequency | 1.0 | 6.0 | 2.0 | 50.0 | 41.0 | 00 | 4.24 | 0.84 | 100 |
| | Percent | 1.0 | 6.0 | 2.0 | 50.0 | 41.0 | 00 | | | 100 |
| Group-work | Frequency | 14 | 23 | 54 | 8 | 1 | 00 | 3.59 | 0.87 | 100 |
| | Percent | 14.0 | 23.0 | 54.0 | 8.0 | 1.0 | 00 | | | 100 |
| Practicals | Frequency | 4 | 11 | 21 | 38 | 16 | 10 | 3.81 | 1.24 | 100 |
| | Percent | 4.0 | 11.0 | 21.0 | 38.0 | 16.0 | 10 | | | 100 |
| Quizzes | Frequency | 1 | 14 | 16 | 13 | 6 | 00 | 4.59 | 1.60 | 100 |
| | Percent | 1.0 | 14.0 | 16.0 | 13.0 | 6.0 | 00 | | | 100 |
| Projects | Frequency | 9 | 37 | 27 | 9 | 2 | 16 | 3.06 | 1.54 | 100 |
| | Percent | 9.0 | 37.0 | 27.0 | 9.0 | 2.0 | 16.0 | | | 100 |
| Portfolios | Frequency | 4 | 17 | 2 | 4 | 3 | 70 | 1.91 | 1.74 | 100 |
| | Percent | 4.0 | 17.0 | 2.0 | 4.0 | 3.0 | 70.0 | | | 100 |
| Tests | Frequency | 1 | 9 | 53 | 35 | 2 | 00 | 4.27 | 0.74 | 100 |
| | Percent | 1.0 | 9.0 | 53.0 | 35.0 | 2.0 | 00 | | | 100 |

*Source: Primary data*

Findings indicate that the most common method of SBA was quizzes (Mean =4.59 (SD=1.60). Of the respondents, 16.0% and 1.0% administer quizzes once a month, and once a year respectively. Tests constituted the next popular method of assessment (Mean=4.27, SD=0.74) with 53.0% of the respondents testifying that they administer tests once a month and 35.0%, once a week. Homework is the third popular method of SBA (Mean=4.24, SD=0.84). Half (50.0%) of the respondents indicated that they administer homework once a week and only 1.0% stated that they do it once a year. Practicals were the fourth popular method (Mean=3.81, SD=1.24). Only 38.0% of the respondents showed that they administer practicals once a week and only 4.0% stated that they do it once a year. The fifth common method was Group-work (Mean=3.59, SD=0.87). More than half (54.0%) and only 1.0% of the respondents testified that they administer Group-work once a month and daily respectively. Projects (Mean=3.06, SD=1.54) were found to be an unpopular method of SBA with 37.0% testifying that they administer it once a term and 16.0% admitting that they do not use this method at all. The most unpopular method was the use of Portfolios (Mean=1.91, SD=1.74) whereas 17.0% stated that they use it once a term, 70.0% admitted that they don't use it at all.

The research findings indicate that the most common methods of SBA were quizzes, tests, homework, practicals and group-work. Projects and portfolios were the most unpopular SBA methods used in Uganda's Lower Secondary schools. These findings indicate that there are disparities in the frequency and quality of tests set by teachers at the school level. This limitation makes the comparability of such test scores difficult and their incorporation into final summative examination grades a bit cumbersome and contestable. These findings concur with those of Ndalichako (2004); Vandeyar & Killen (2007); World Bank (2008) and Kanjee (2009) who established that SBAs are dominated by the traditional classroom tests, quizzes and examinations.

**Verification of Research Question Two**

The second research question was; *"What are the main uses of the information obtained by teachers from school-based assessment?"*

**Table 3: Teachers' Perceptions the Main uses of SBA Information (N=100).**

| Descriptive Statistics | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Items | | SD | D | NS | A | SA | Mean | Std. Dev. | N |
| SBA information enables the teacher to assess the effectiveness of his/her teaching | Frequency | 3 | 0 | 1 | 30 | 66 | 4.56 | 0.80 | 100 |
| | Per cent | 3.0 | 0.0 | 1.0 | 30.0 | 66 | | | |
| SBA information enables the teacher to monitor the progress of each individual learner in the class. | Frequency | 2 | 0 | 0 | 47 | 51 | 4.51 | 0.84 | 100 |
| | Per cent | 2.0 | 0.0 | 0.0 | 47.0 | 51.0 | | | |
| SBA information helps the teacher to identify gifted learners who need enrichment. | Frequency | 1 | 2 | 2 | 39 | 56 | 4.47 | 0.73 | 100 |
| | Per cent | 1.0 | 2.0 | 2.0 | 39.0 | 56.0 | | | |
| SBA information helps the teacher to identify weak learners who do not meet the required standard so that they are given additional help. | Frequency | 2 | 0 | 1 | 45 | 52 | 4.45 | 0.72 | 100 |
| | Per cent | 2.0 | 0.0 | 1.0 | 45.0 | 52.0 | | | |
| SBA information enables students to identify and improve on their areas of weakness | Frequency | 1 | 1 | 6 | 39 | 53 | 4.42 | 0.74 | 100 |
| | Per cent | 1.0 | 1.0 | 6.0 | 39.0 | 53.0 | | | |
| SBA information helps the teacher to categorize learners according to their competencies for proper remediation. | Frequency | 1 | 3 | 1 | 49 | 46 | 4.36 | 0.75 | 100 |
| | Per cent | 1.0 | 3.0 | 1.0 | 49.0 | 46.0 | | | |
| SBA information enables the teacher to give useful feedback to the learners, parents, guardians and other stakeholders. | Frequency | 1 | 3 | 2 | 48 | 46 | 4.35 | 0.76 | 100 |
| | Per cent | 1.0 | 3.0 | 2.0 | 48.0 | 46.0 | | | |
| SBA information enables the teacher to adjust his/her pedagogical strategies to enhance teaching and learning | Frequency | 2 | 1 | 3 | 53 | 41 | 4.30 | 0.76 | 100 |
| | Per cent | 2.0 | 1.0 | 3.0 | 53.0 | 41.0 | | | |
| Incorporating SBA in the final examination helps to reduce stress on the part of learners | Frequency | 1 | 14 | 15 | 25 | 45 | 3.99 | 1.12 | 100 |
| | Per cent | 1.0 | 14.0 | 15.0 | 25.0 | 45.0 | | | |

*Source: Primary data*

The greatest number of teachers (96.0%) testified that SBA enables the teacher to assess the effectiveness of his/her teaching (Mean=4.56, SD=0.80). There was consensus among teachers (98.0%) that SBA enables them to monitor the progress of each individual learner in the class (Mean=4.51, SD=0.84) and 95.0% agreed that SBA helps them to identify gifted learners who need enrichment (Mean=4.47, SD=0.73). There was an equally high level of agreement (97.0%) among the teachers that SBA helps them to identify weak learners who do not meet the required standard so that they are given additional help

(Mean=4.45, SD=0.72).The means were equally high on the assertions that SBA enables students to identify and improve on their areas of weakness (Mean=4.42, SD=0.74), with 92.0% of the respondents in agreement. Overall, 95.0% of the teachers testified that SBA enables them to categorize learners according to their competencies for proper remediation (Mean=4.36, SD=0.75); others (94.0%) confessed that SBA enables the teacher to give useful feedback to the learners, parents, guardians and other stakeholders (Mean=4.35, SD=0.76). 94.0% of the teachers agreed that SBA enables the teacher to adjust his/her pedagogical strategies to enhance teaching and learning (Mean=4.30, SD=0.76). There was divided opinion among the teachers, however, as to whether incorporating SBA in the final examination helps to reduce stress on the part of learners (Mean=3.99, SD=1.12), with only 45.0% strongly agreeing, and 15.0% indicating that they are not sure.

Findings indicate that the greatest number of teachers testified that SBA data enables them to assess the effectiveness of their teaching. These findings are in agreement with those of Ndalichako (2010) who found that teachers use assessment to evaluate the effectiveness of their teaching (Mean=4.39, SD=0.79). Teachers are able to monitor the progress of individual learners in the classroom, identify gifted learners who need enrichment and to identify weak learners who do not meet the required standard so that they are given additional help. The means were equally high on the usefulness of SBA information in helping students to identify and improve on their areas of weakness, enabling the teachers to categorize learners according to their competencies for proper remediation and enabling the teachers to give useful feedback to the learners, parents, guardians and other stakeholders. This supports McCollow (2006) and Mkpae &Obowu-Adutchay (2017) who aptly observe that school-based assessment fosters contextualized judgements about student achievement and allows diagnostic feedback to be provided to students. There was also high agreement among teachers that SBA enables them to adjust their pedagogical strategies to enhance teaching and learning. There was, however, disagreement among the teachers as to whether incorporating SBA in the final examination reduces stress on the part of learners.

**Verification of Research Question Three**

The third research question was *"What challenges are being faced when incorporating School-based Assessment into final summative examination grades in Uganda?"*

**Table 4: Teachers' Perceptions on the Challenges Faced when Incorporating SBA Results into Summative Grades (N=100).**

| Descriptive Statistics | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Items | | SD | D | NS | A | SA | Mean | Std. Dev. | N |
| SBA is quite demanding in terms of time and effort | Frequency | 19 | 25 | 6 | 37 | 13 | 3.02 | 1.38 | 100 |
| | Per cent | 19.0 | 25.0 | 6.0 | 37.0 | 13.0 | | | |
| I do not receive clear teaching and assessment guidelines from NCDC and UNEB | Frequency | 11 | 18 | 12 | 45 | 14 | 2.67 | 1.24 | 100 |
| | Per cent | 11.0 | 18.0 | 12.0 | 45.0 | 14.0 | | | |
| As a teacher, I am not well remunerated and not motivated to do my work | Frequency | 5 | 23 | 13 | 39 | 20 | 2.59 | 1.27 | 100 |
| | Per cent | 5.0 | 23.0 | 13.0 | 39.0 | 20.0 | | | |
| I experience high rate of student absenteeism in my class | Frequency | 4 | 10 | 20 | 43 | 23 | 2.27 | 1.05 | 100 |
| | Per cent | 4.0 | 10.0 | 20.0 | 43.0 | 23.0 | | | |
| SBA yields unreliable results | Frequency | 2 | 10 | 22 | 42 | 24 | 2.24 | 1.00 | 100 |
| | Per cent | 2.0 | 10.0 | 22.0 | 42.0 | 24.0 | | | |
| SBA is highly subjective | Frequency | 7 | 9 | 13 | 42 | 29 | 2.17 | 1.11 | 100 |
| | Per cent | 7.0 | 9.0 | 13.0 | 42.0 | 29.0 | | | |
| I experience a high rate of student mobility (who leave my class for another school) | Frequency | 19 | 56 | 14 | 10 | 1 | 2.16 | 0.88 | 100 |
| | Per cent | 19.0 | 56.0 | 14.0 | 10.0 | 1.0 | | | |
| I have poorly developed assessment skills | Frequency | 33 | 52 | 6 | 7 | 2 | 1.93 | 0.92 | 100 |
| | Per cent | 33.0 | 52.0 | 6.0 | 7.0 | 2.0 | | | |
| I have a large number of students in my class | Frequency | 2 | 13 | 0 | 44 | 41 | 1.91 | 1.06 | 100 |
| | Per cent | 2.0 | 13.0 | 0.0 | 44.0 | 41.0 | | | |
| I deliver my SBA results to UNEB beyond the required time | Per cent | 32 | 55 | 6 | 3 | 4 | 1.84 | 0.80 | 100 |
| | Frequency | 32.0 | 55.0 | 6.0 | 3.0 | 4.0 | | | |

*Source: Primary data*

Half of the teachers (50.0%) indicated that the greatest challenge faced is that SBA is significantly demanding in terms of time and effort (Mean=3.02, SD=1.38). A number of teachers (59.0%) also testified that they have not received clear teaching and assessment guidelines from National Curriculum Development Centre (NCDC) and UNEB (Mean=2.67, SD=1.24) and complained that they are not well remunerated and not motivated to handle SBA (Mean=2.59, SD=1.27). The fourth challenge reported by 66.0% of teachers is the high rate of student absenteeism (Mean=2.27, SD=1.05). An equal percentage of teachers (66.0%) concurred that SBA yields unreliable results (Mean=2.24, SD=1.00) and 71.0% agreed that it is highly subjective (Mean=2.17, SD=1.11). A small proportion (11.0%) of teachers reported that they experienced a high rate of student mobility (Mean=2.16, SD=0.88) and a few of them (9.0%) expressed that they have poorly developed assessment skills (Mean=1.93, SD=0.92). Interestingly, many teachers

(85.0%) agreed that they have large numbers of students in their classes but they downplayed this challenge (Mean=1.91, SD=1.06) and only 7.0% found it a problem delivering their SBA results to UNEB within the required time (Mean=1.84, SD=0.80).

The findings revealed that the greatest challenge faced is that SBA is quite demanding in terms of time and effort. This supports Mkpae & Obowu-Adutchay (2017) whose findings indicate that SBA involves a lot of time in conducting it (mean = 2.70; SD= 1.13). Teachers demanded to be paid more for this additional work that was misconstrued to be a creation of the national examination body than a policy being introduced by the Ministry of Education and Sports. A number of teachers also testified that they do not receive clear teaching and assessment guidelines from NCDC and UNEB. Consequently, the processes and practices are as myriad as the teachers executing the tasks. Teachers are not well remunerated and not motivated to handle SBA; and they are faced with a high rate of student absenteeism. The absence of a learner during one or more of the tests recorded for submission to the Examinations Board brings about a problem of missing marks. Many teachers testified that SBA is highly subjective and yields unreliable results. Teachers tend to give test scores that are not a true reflection of the learners' observed competencies and this may undermine the reliability and predictive validity of the formative grades to the learner's final performance in public summative examinations (Turyatemba, 2017; Cheng, Andrews & Yu, 2010). A small proportion of teachers indicated that they experienced a high rate of student mobility, which, when it occurs, causes a problem of mark record discontinuity. A few of the teachers interviewed agreed that they have poorly developed assessment skills. They testified that during their training, aspects of educational assessment were lightly treated. This explains why some end up buying commercially set tests from established assessment bureaus. Many teachers had no problem handling large student numbers in class and they did not find it a problem delivering their SBA results to UNEB within the required period.

**Conclusions**

There is consensus among researchers that school-based assessment is a necessary condition to ensure a high level of intellectual challenge, relevance and connectedness between curriculum and classroom practice and assessment. The most common SBA methods include: quizzes, tests homework and group work. There is need for teachers to step up their focus on other SBA methods such as practicals, projects and portfolios to enhance the acquisition of skills-based competences. The study revealed that there is need for more guidance and coordination by the Ministry of Education and its agencies for the successful implementation of SBA. Significant teacher professional development and thorough grounding in assessment is required if teachers are to desist from depending on commercially set tests.

The findings indicated that the incorporation of SBA results into the final summative grades is a welcome policy that will not only enhance teaching and learning at the classroom level, but will address the quality of the entire education system. The challenges that adversely affect the incorporation of SBA results into the final summative grades seem surmountable. Important to note, however, is the issue of

teacher remuneration and motivation given that the teachers' role is central in any envisaged educational reform, least of all, School-Based Assessment.

**Recommendations**

The study revealed that the teachers are more accustomed to some SBA methods than others. There is need for formation of professional teacher networks and continuous teacher professional development to improve their pedagogical classroom practice and increase their understanding of assessment. To discourage dependence on commercial tests, teachers should be assisted to develop their own exemplar assessment materials, which should be changed from time to time to reduce the predictability of such tests. The Ministry of Education and Sports (MoES) needs to motivate teachers who are an important cog in the wheel of assessment reform. Such motivation should address both pecuniary and non-pecuniary incentives to teachers such as promotions, staff development programmes and reduced teacher load. To avert the threats posed by large class sizes, teachers need to be equipped with skills of working with large student populations. Modalities for assessing learners in groups should be put in place, clearly detailing how to maximize the participation of each learner if they are to own scores allocated to each group.

or the full realization of the positive impact of SBA, NCDC, Directorate of Education Standards (DES) and UNEB, should endeavor to enhance the quality of students' academic performance through a systemic, systematic and specific alignment of the curriculum, classroom practice and reporting and assessment systems. These agencies should give corrective feedback to the teachers on the aspects of the curriculum, teaching and SBA that need to be improved. This requires constant monitoring and on-spot supervision of the teaching-learning and assessment processes to establish how the intended curriculum is being implemented and with what results.

To ensure uniformity in teaching-learning, assessment and reporting by schools, there is need by the NCDC, DES and UNEB to clearly stipulate the curriculum, teaching and assessment guidelines and checklists, detailing salient aspects to be stressed by teachers, frequency and type of tests to be administered and the timeframe for submission of SBA results to the examination body. Since there is a need to deliver SBA results to the examining Board in time, there should be extensive use of ICT in data storage, retrieval and transmission. Student SBA identity codes should be used to track learners who change schools. The role of the school administrators is central in the success of SBA. The head teacher is the principal quality controller and should ensure that the SBA activities are supervised. An SBA Academic Committee should be established at each school to coordinate and supervise SBA activities to ensure a uniform implementation of the proposed changes.

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# Implementation of Site-based Assessment in the Adult Education and Training Sector in South Africa-Processes and Challenges

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**Abstract**

*The quality assurance of assessment of the General Education and Training Certificate: Adult Basic Education and Training Level 4 (GETC: ABET L4) qualification in South Africa includes judgement of the standard of the site-based assessment (SBA) and examinations conducted by private providers at the Adult Education and Training (AET) sites and in Community Learning Centres (CLCs) in the public sector. This study is qualitative in nature. It is a secondary data analysis of reports compiled by Umalusi during quality assurance of assessment in the AET sector. The reports include data collected from of all public Community Learning Centres and all private Adult Education and Training centres. Documents that were analysed include Umalusi's Quality Assurance of Assessment Instrument for the Moderation of SBA Portfolios, Quality Assurance of Assessment Reports, Assessment Guideline documents of public and private assessment bodies, as well as observations during monitoring site visits. The purpose of this study is to report on the processes of implementing SBA in the AET sector and challenges thereof. The findings include reference to practice in the public and private assessment bodies. The findings indicated that there are challenges in the implementation of SBA at both public and private assessment bodies. Some challenges are common across assessment bodies while others are unique to a particular assessment body. Suggestions are also made towards the enhancement of SBA implementation in both the public and private sectors.*

***Key words:*** *Adult Education and Training; Adult Learner; Community Learning Centres; National Qualification Framework; Site-Based Assessment; Quality Assurance.*

**Introduction and Background**

The South African education system consists of the mainstream sector, vocational education sector and adult education and training sector. The mainstream (schooling) sector provides compulsory education for all children of school going age up to Grade 9. After this grade, some learners may choose to continue with the academic pathway by doing grade 10 to 12, leading to further education in tertiary institutions such as universities. Others will exit the academic field and pursue vocational education after completing grade 9.

Some learners drop out of the mainstream schooling system before completing grade 9 due to various reasons. Thereasons for youth dropouts include their age, teenage pregnancy, their behaviour, child-headed family situation, etc. These learners cannot be accommodated in the mainstream school system and are left without basic skills required to participate in the economy of the country

There was a need for the qualification that will cater for this part of the population. The development of the General Education and Training Certificate: Adult Basic Education and Training (GETC: ABET) qualification aimed at catering for the adults and out of school youth, to prepare adults and youth with academic and vocational skills to further education or find employment or to develop skills to be self-sustainable. Later in life, adults and youth decide to go back to acquire a qualification so that they can cope in the world of work, as one of the reasons. The qualification aims to give a second chance to such learners.

The qualification is at NQF level 1 and has two phases. The first phase is GETC: ABET level 1-3 and aims to develop basic Literacy and Numeracy skills. Students are assessed formatively using different forms of assessment. Students are required to develop portfolios of evidence (POE). Students' work is marked, moderated and the final judgement (for progression) is made based on the evidence presented.

Table 1A below indicates the General and Further Education and Training Qualifications Sub-Framework of the National Qualification Framework (NQF) that Umalusi oversees. The table further indicates where the GETC: ABET qualification is located in the NQF.

**Table 1A: The General and Further Education and Training Qualifications Sub-Framework**

| NQF level | Qualification types and qualifications | | | | | Certificates for units of learning |
|---|---|---|---|---|---|---|
| **Level 4** | **National Certificate (NC)** | | | | | Subject certi□cates towards oneor more quali□cation designatedvariants |
| *Designated variants* | Senior Certi□cate/ National Senior Certi□cate (Colleges) | National Senior Certi□cate (NSC) | National Certi□cate (Vocational) Level 4 | National Senior Certi□cate for Adults (NASCA) | Senior Certi□cate (SC) (as amended in 2014) | |
| **Level 3** | **Intermediate Certificate (IC)** | | | | | Subject certi□cates towards one or more quali□cation designated variants |
| *Designated variants* | [NSC – Gr 11] | | National Certi□cate (Vocational) Level 3 | Intermediate Certi□cate of Education | | |
| **Level 2** | **Elementary Certificate (EC)** | | | | | Subject certi□cates towards one or more quali□cation variants |
| *Designated variants* | [NSC – Gr 10] | | National Certi□cate (Vocational) Level 2 | Elementary Certi□cate of Education designated | | |
| **Level 1** | **General Certificate (GC)** | | | | | Subject (LA) certi□cates for adult learners |
| *Designated variants* | General Certi□cate of Education (GCE) | | | General Education and Training Certi□cate: ABET | General Education and Training Certi□cate for Adults (GETCA) | |

When and where there is sufficient evidence that those skills are developed, the student progresses to GETC: ABET Level 4. This is an exit point that is equivalent to Grade 9 in the mainstream schooling system.

The GETC: ABET Level 4 qualification requires that adult students are assessed in two different ways. To acquire a qualification, students have to complete internal assessment, commonly known as Site-Based Assessment (SBA) which contributes 50% towards the mark per learning area. The other 50% comes from summative assessment (Examinations). Umalusi conducts quality assurance of assessment processes for the GETC: ABET Level 4 qualification. Assessment bodies are responsible for the setting, internal moderation and implementation of SBA tasks based on their Assessment Guidelines.SBA tasks that are quality assured and approved by Umalusi are distributed to the sites of learning by assessment bodies in various ways. Students' responses to the SBA tasks are used to compile portfolios of evidence (POE) which are presented by assessment bodies to Umalusi for external moderation. These POEs must be accompanied by the portfolios of assessment (POA) of the lecturers per learning

area.Students are guided in compiling POE by completing SBA, which is a form of internal assessment. Lecturers/facilitators also assist students to prepare for external examinations, which is summative assessment.

The quality assurance of assessment in the GETC: ABET Level 4 qualification includes evaluation and judgement of the quality and standard of the SBA and examinations conducted by providers in the Adult Education and Training (AET) sites of private assessment bodies and in Community Learning Centres (CLCs) of the public assessment bodies. The GETC: ABET Level 4 qualification requires SBA to be conducted by all providers offering this qualification.

Learning area specialists together with internal moderators of the PEDs and /or CETC meet to develop assessment plans per learning area. The plan will indicate the order in which SBA tasks will be implemented based on the work schedule. Specific dates for specific SBA tasks will also be decided on per learning area. Lecturers at CLCs will incorporate the implementation of the SBA Tasks into the teaching and learning process, in line with the approved assessment plan.

Umalusi moderates the SBA portfolios of students. According to Umalusi (2006:6), "moderation may also be regarded as one of the measures adopted at various stages of the assessment process to ensure that the assessment has been conducted in line with the agreed practices, so that the results can be declared fair, reliable and valid." Moderation aims at ensuring comparability and promoting consistency of judgements with respect to the levels of student achievement.

The purpose of external moderation of SBA portfolios by Umalusi is to:

- Ensure that the SBA portfolios comply with Assessment Guidelines of the assessment body and applicable policies;
- Verify the quality of internal moderation of completed tasks by assessment body;
- Provide feedback to both students and facilitators; and
- Report on the quality of SBA portfolios within assessment bodies.

**Theoretical Framework**

The study is based on the metacognitive theory. Metacognition is an ability to identify what students know and what they do not know in what they have learnt. Meichenbaum (1985 in TEAL Center: 2010) define as "awareness of one's own knowledge – what one does and doesn't know – and one's ability to understand, control, and manipulate one's cognitive processes". It includes knowing when and where to use particular strategies for learning and problem solving as well as how and why to use specific strategies. Metacognition is the ability to use prior knowledge to plan a strategy for approaching a learning task; take necessary steps to problem solve; reflect on and evaluate results; and modify one's approach as needed.

Cognitive strategies are basic mental abilities we use to think, study, and learn (e.g., recalling information from memory, analyzing sounds and images, making associations between or comparing and contrasting different pieces of information, and making inferences or interpreting text). They help an individual achieve a particular goal, such as comprehending text or solving a mathematics problem, and they can be individually identified and measured. Examples of metacognitive activities include planning how to approach a learning task, using appropriate skills and strategies to solve a problem, monitoring one's

own comprehension of text, self-assessing and self-correcting in response to the self-assessment, evaluating progress toward the completion of a task, and becoming aware of distracting stimuli.

The development of metacognitive skills together with feedback from lecturers and/or facilitators regarding SBA tasks help adult students to understand and to be in control of their learning. Feedback is an important part of the assessment process. It has a significant effect on student learning and has been described as "the most powerful single moderator that enhances achievement" (Hattie, 1999).

To benefit student learning, Nicol (2010) believes that feedback needs to be constructive. As well as highlighting the strengths and weaknesses of a given piece of work, it should set out ways in which the student can improve the work. The value of feedback for students is that it encourages them to think critically about their work and to reflect on what they need to do to improve it; helps them see their learning in new ways and gain increased satisfaction from it; and helps promote dialogue between staff and students.

Effective feedback, according to Nicol (2010):

- *guides students to adapt and adjust their learning strategies;*
- *guides teachers to adapt and adjust teaching to accommodate students' learning needs;*
- *guides students to become independent and self-reflective learners, and better critics of their own work;*
- *stimulates reflection, interaction and dialogue about learning improvement;*
- *is constructive, so that students feel encouraged and motivated to improve;*
- *has consequences, so that it engages students by requiring them to attend to the feedback as part of the assessment; and*
- *is efficient, so that staff can manage it effectively.*

Feedback is valuable when it is received, understood and acted on. How students analyse, discuss and act on feedback is as important as the quality of the feedback itself (Nicol, 2010). Through the interaction students have with feedback, they come to understand how to develop their learning.

Quality SBA implementation promotes self-reflection and encourages further self-evaluation. SBA also deals with affective dispositions like perseverance, intrinsic motivation, initiative, responsibility, self-efficacy, independence, flexibility, coping with frustrating instructions and many other behaviours. These dispositions are assessed informally.

**Research Problem**

The contribution of SBA towards the final pass mark in the GETC: ABET Level 4 qualification is the largest (50%) in all the qualifications in the NQF. The implementation and moderation of SBA should ensure that the credibility and reliability of SBA mark is maintained at a very high level. The research evidence reveals that there is not an acceptable standard of SBA at implementation level (DoE 1999b, 2002c and 2003c, in Singh 2004).Different practices by different assessment bodies and PEDs affect the reliability of SBA mark. The quality of implementation is far from the required standard. In this regard, Singh (2004: 4) states that, "the raw SBA mark of learners do not give a true reflection of the learner's achievements in terms of the national norms and must be statistically adjusted."The ideal situation is to

accept the SBA mark as it is, but with challenges in the implementation and moderation processes, this is currently impossible.

**Research Questions**

The study aims to find answers to the following question/s:

- What processes are involved in the implementation of SBA by assessment bodies?
- Are there challenges experienced during the implementation of SBA by assessment bodies?

**Significance of the Study**

The study is significant in that it aims to report on the processes of implementing SBA in the AET sector and challenges thereof. Suggestions are also made towards the enhancement of SBA implementation in both the public and private sectors.

**Literature Review**

The GETC: ABET Level 4 qualification was introduced in the South African education system in 2001. The main purpose for the introduction of GETC: ABET Level 4is, "to equip learners with knowledge, skills and values that will enable meaningful participation in society as well as continuing learning in further education and training, and provide a firm foundation for the assumption of a productive and responsible role in the workplace" (SAQA, 2001 in Poliah, 2003:3). The GETC: ABET Level 4 serves to ensure that adult learners exiting the system have the minimum competence required for NQF level 1. The kind of learner envisaged is based on the critical and developmental outcomes prescribed by the National Qualifications Framework in terms of the NQF Act. Poliah (2003:3) believes that in order to achieve full personal fulfilment and meaningful participation in society, to continue learning in Further Education and Training, and to gain a firm foundation for a future career, the learner will need to:

- *be equipped with the linguistic skills and the aesthetic and cultural awareness to function effectively and sensitively in a multi-lingual and multi-cultural society;*
- *display a developed spirit of curiosity to enable creative and scientific discovery and display an awareness of health promotion;*
- *adapt to an ever-changing environment, recognizing that human understanding is constantly challenged and hence changes and grows;*
- *use effectively a variety of problem-solving techniques that reflect different ways of thinking, recognizing that problem-solving contexts do not exist in isolation;*
- *use effectively a variety of ways to gather, analyze, organize and evaluate numerical and non-numerical information, and then communicate it effectively to a variety of audiences and models;*
- *make informed decisions and accept accountability as a responsible citizen in an increasingly complex and technological society;*
- *display the skills necessary to work effectively with others and organize and manage oneself, one's own activities and one's leisure time responsibly and effectively;*
- *understand and show respect for the basic principles of human rights, recognizing the inter-dependence of members of society and the environment;*

- *be equipped to deal with spiritual, emotional, material and intellectual demands in society; and*
- *have an understanding of, and be equipped to deal with the social, political and economic demands made of a South African as a member of a democratic society, in the local and global context.*

Grobler, Loocke and Govender (2012:122) define School-Based Assessment as, "the assessment of the whole learner on an ongoing basis over a period of time where cumulative judgements of the learner's abilities in specific areas are made to facilitate further positive learning. This involves a system of continuous learning and improvement that focusses on the development of the learner as a whole, using processes that are embedded within the school itself and not administered from outside". Mainstream schooling sector refers to internal assessment as School-Based Assessment while adult education and training sector refers to it as Site-Based Assessment.

Site-Based Assessment (SBA) evaluates student performance against a set of criteria and takes place during the teaching and learning process in the classroom. SBA may comprise assessment of oral and practical work (depending on learning area content), classroom-based work, class tests, assignments, projects, investigations, simulations, case studies, worksheets, demonstration, role-plays, demonstrations, etc.

SBA should be formative in nature. Black and William (1998, in Kuze and Shumba, 2011) believe that assessment becomes formative when the information is used to adapt teaching and learning to meet student's needs. In the same vein, Qualters (2000, in Kuze and Mashumba, 2011:160) defines formative assessment as, "those activities that are used to improve student learning. These activities may be graded or ungraded, but they provide learners with information that will allow them to learn something about their own knowledge or skills, make a change, and ultimately improve their learning. Although its purpose is to improve the quality of student learning, it provides information on what, how much, and how well students are learning." SAQA (2014:23) defines formative assessment as, "a range of formal, non-formal and informal ongoing assessment procedures used to focus teaching and learning activities to improve student attainment, or which are required for the purpose of a year mark."

School Based Assessment is seen as an alternative way of assessing what learners know and can do other than tests and examinations. SBA aims to test skills that cannot be assessed during examinations. SBA helps learners to develop a variety of skills through multiple opportunities under different conditions and situations. This is expected to influence the culture of teaching and learning, thereby resulting in improved student performance.SBA aims to complement the tests and examinations. To achieve this, SBA must be of major relevance to the outcomes of high stakes assessment.

Gauteng Department of Education (2000:15) stated that the rationale for the introduction of SBA is because:

- *Learners will be assessed using different and appropriate assessment methodologies and this will provide a more valid assessment of learners' performance;*
- *Assessment will now take place in an authentic context i.e. the learner will be*

*assessed in a realistic situation which is integral to the learning process;*

- *Assessment will feed back immediately into the learning process, thus promoting the formative role of assessment;*
- *Provides opportunities that are impossible in a once-off external examination;*
- *A variety of skills are able to be assessed by internal assessment which otherwise could not be considered for assessment purposes; and*
- *Assessment is ongoing and therefore learners are compelled to work consistently and this will contribute to reinstating the culture of teaching and learning.*

Because of the equal weight of the SBA and examinations, and the poor quality of SBA tasks developed by educators, the assessment bodies (Department of Higher Education and Training, Independent Examinations Board and Benchmark Assessment Agency) are required to develop common SBA tasks respectively. According to Singh (2004: 6), "some teachers, from their experience, will be stricter than others, others will be more lenient, others may not have necessary experience to know what an acceptable standard is and others may not even conduct the assessments but still provide some marks." Singh (2004) also states that the development of assessment instruments or assessment criteria for SBA happens mainly at the upper levels of the public system due to the limited expertise among educators.

Umalusi (2009:36) found that, "in 2008, all the Provincial Education Departments (PEDs) used the nationally-set SBA tasks for the first time but these tasks were not externally moderated by Umalusi. The use of nationally set tasks was a small improvement on the quality of some tasks in some learning areas, but some SBA tasks had to be totally reworked before they were given to educators for implementation. No definite directive was given to the provinces in terms of the implementation of these tasks, and the provinces were at liberty to implement the tasks as they were, or to subject them to a pre-moderation process." Some provinces checked the tasks and made necessary changes, but others didn't. Many learners were, therefore, exposed to these tasks including original mistakes. This, according to Umalusi (2009), left the majority of adult learners at the mercy of the provinces, districts, and centres, which had an adverse effect on the learners' ability to prepare for the examination. These challenges led to the decision by Umalusi to quality assure all SBA tasks before they are implemented at learning sites to ensure that they are of an acceptable quality and standard.

**Methodology**

This qualitative study was conducted using documents analysis of Umalusi 2016 and 2017 reports. It is a secondary data analysis of reports compiled by Umalusi during quality assurance of assessment in the AET sector. The following documents were used as source of data:

- Quality Assurance of Assessment Reports of Umalusi;
- Assessment Guideline documents of public and private assessment bodies;
- Regulations on the Assessment Process and Procedures for the Adult Education and Training (AET) National Qualification Framework Level 1;
- Umalusi Quality Assurance of Assessment Instrument for the Moderation of SBA portfolios of the GETC: ABET Level 4 (completed by

external moderators during moderation of SBA portfolios); and

- Notes and observations from the practices of assessment bodies during monitoring visits.

Data from these documents was collected and analyzed. Categories were developed during the analysis of data in the study. These categories are:

- Management, administration and conduct of SBA;
- Adherence to assessment guidelines;
- Monitoring the implementation of SBA;
- The structure and content of SBA portfolios;
- Moderation model
- Training of lecturers in the implementation and moderation of SBA; and
- Quality of marking;
- Reliability of SBA mark; and
- Irregularities.

Conclusions were drawn and findings were reported based on categories developed during data analysis.

**Findings**

The study will report on the findings based on the categories created during the analysis of datafrom documents.

**Management, administration and conduct of SBA**

Concerning the implementation of SBA, the management, administration and conduct of SBA is a grey area as it is not clarified as to who, between Department of Higher Education and Training (DHET) and Provincial Education Departments (PEDs), should be responsible for the administration, monitoring and moderation of SBA. Hence, there are different practices by different PEDs regarding the conduct, monitoring and moderation of SBAs. This poses a risk of compromising the credibility and integrity of GETC examinations as implementation model differs from PED to PED. Although the DHET delegated the responsibility to PEDs to conduct examinations, it remains accountable for the conduct of SBA and external summative examinations. The private assessment bodies believe that the conduct, monitoring and moderation of SBA at site level is not part of their scope. This, they exert, is the responsibility of the private providers who conduct teaching and learning in the Adult Education and Training (AET) sites.

**Adherence to assessment guidelines**

Adherence to assessment guidelines is affected by different practices in the conduct of SBA by different, individually constituted PEDs. There are different models in the delivery of SBA tasks to the centres. Anomalies were found in the delivery of SBA tasks to centres in different provinces. It was discovered during the provincial moderation in November 2017 that one SBA task was not delivered to CLCs of two districts of each of the two PEDs respectively. Students' POE contained incomplete number of SBA tasks in one out of the nine PEDs. Different private assessment bodies develop varying numbers of SBA tasks per learning area. Regulations on the conduct of internal assessment developed by DHET are silent on the prescribed number of tasks.

**Monitoring the implementation of SBA**

Monitoring the implementation of SBA was found to be minimal in all PEDs. Officials were only seen at CLCs when preparing for district moderation of SBA portfolios. Community Education and Training (CET) regional officials only conduct monitoring, although this

is not commonly done. Shortage of curriculum advisors in all CET regions was reported as a reason for not monitoring the conduct of SBA. There is a shortage of curriculum advisors in all CET regions. Migration of Adult Basic Education and Training from the Department of Basic Education to the Department of Higher Education and Training led to qualified people leaving the sector to seek greener pastures and they were not replaced. SBA tasks were not implemented as per assessment plan in 75 out of 156 centres.

**The structure and content of SBA portfolios**

The structure and content of students' POE differ from one PED to another with very little or no similarities at all. It is very rare to find all required documentation. Work schedule (teaching plan) and copies of identity documents are the two documents that are commonly not included in the POEs. Assessment guidelines of different assessment bodies stipulate that these documents must be part of the POE.

**Moderation model**

Different models of conducting moderation of SBA portfolios are adopted by different PEDs and CETs. There are no national guidelines for the conduct and moderation of SBA by DHET to provinces. Maile (2013: 21) also found the same with regard to the conduct and moderation of School-Based Assessment in some secondary schools in one District. In the adult sector, eight PEDs follow a centralized model and one PED decentralized the final provincial moderation to districts. Internal moderators who are lecturers conduct moderation of SBA portfolios in eight PEDs while one PED uses the expertise of district officials who are learning area specialists to conduct moderation of SBA portfolios. Two out of nine PEDs conduct provincial moderation of SBA portfolios over a two-day period, six out of nine PEDs moderate SBA portfolios over five days and one CET conducts moderation in districts in only one day. During the provincial moderation, computerised mark sheets are available in only one PED. This means that Umalusi can verify the transfer of marks in that province only. The number of tasks moderated vary from one to three tasks per SBA portfolio in each province. The availability and quality of moderation reports varied across different PEDs.

In one of the two private assessment bodies, there is only one internal moderator per learning area. This is irrespective of the number of SBA portfolios presented for moderation at assessment body level. This is conducted during the marking of scripts. There is not enough time spent on SBA portfolios, moderation is not robust and justice is not done during the moderation of SBA portfolios. In the other private assessment body, a team of internal moderators conducts moderation of SBA portfoliosper learning area. The number in a team depends of the number of SBA portfolios presented for internal moderation. The moderation reports were not available in one private assessment body. Where they were available, the quality of moderation reports was poor. Portfolios of Assessment (POA) are not submitted for moderation in all 40 centres. This is a common practice by private providers who register with private assessment bodies. All other documents like assessment plans, marking guidelines of SBA tasks, evidence of teaching and learning, etc. that must be in the POA cannot be verified.

Monitoring the moderation of SBA at different levels differs per PED. In six out of nine PEDs,

the PED is responsible for moderation at different levels. In three PEDs, the PED is only responsible for the final provincial moderation and in one PED, the PED only delivers the SBA tasks to CLCs and is then responsible for the capturing of final SBA marks into the system. Moderation of SBA portfolios by both private assessment bodies is conducted at only one level, i.e. the assessment body level. DHET (2013) specifies that moderation of SBA portfolios should be done at four different levels. This is not feasible with private assessment bodies because they do not have clusters, districts and provinces.

**Training of lecturers in the implementation and moderation of SBA**

Umalusi (2009:36) found that, "little or no training was given to educators in terms of the purpose of the assessment tool, which means that the tool was inconsistently applied." Lecturers' capacity to handle SBA is very low. There is no or very little evidence of the training of lecturers in the conduct of SBA in all CET colleges. Where training is conducted, it is inadequate and not effective. There is evidence that lecturers teach SBA tasks, not the prescribed content. The lecturers' main concern is to comply with the number of tasks implemented. This is teaching assessment against teaching the content prescribed in respective unit standards.

**Quality of marking**

There was poor quality of marking of SBA tasks by lecturers at CLCs. This is evident in the unreliable SBA mark, varying greatly from the examination mark. Marking was too generous and marks were reduced in 50% of SBA portfolios that are moderated by Umalusi per PED. The standard of moderation differs across PEDs in terms of rigor and intensity. In 100 portfolios, there was a lack of detail in educators' marking, and an inability of moderators to indicate errors. In 45 SBA portfolios, there was huge variation between SBA marks and examination marks although these two components contribute 50% each towards a pass mark in each learning area. This makes the credibility of the SBA mark doubtful. This challenge was noticeable more in private assessment bodies, where marks were changes in all 40 SBA portfolios during moderation. There was extremely huge difference between marks allocated by assessors at the learning site and that allocated by internal moderator of assessment body and Umalusi moderator.

**Reliability of SBA mark**

Based on the research evidence that there is not an acceptable standard of SBA at implementation level (DoE 1999b, 2002c and 2003c, in Singh 2004), drastic measures are taken by Umalusi to reduce the impact of SBA on the examination mark. In this regard, Singh (2004: 4) states that, "the raw SBA mark of learners do not give a true reflection of the learner's achievements in terms of the national norms and must be statistically adjusted." Umalusi adjustthe SBA marks statisticallyso that the mean of SBA marks is not more than 5% above the mean of the examination marks for every learning area offered at GETC: ABET Level 4.

SBA marks are statistically moderated per learning area, per centre to a mean according to a formula explained below. Adjustments are done to a standard deviation that is the same as that of the adjusted examination mark, provided the SBA mean is not both below 5%, and the standard deviation is not less than three quarters of the standard deviation of the adjusted

examination mark. The SBA means of centres that are:

- Between 5% and 10% above the adjusted examination mean will be accepted as is;
- Less than 5% above the adjusted examination mean must be brought up to 5% above the adjusted examination mean;
- More than 15% above the adjusted examination mean must be brought down to 5% above the adjusted examination mean; and
- Between 11% and 15% above the adjusted mean of the examination mark will be scaled down as follows:
  11% scaled down to 9%
  12% scaled down to 8%
  13% scaled down to 7%
  14% scaled down to 6%
  15% scaled down to 5%.

Once the transformed SBA mark is calculated, it must be combined with the adjusted examination mark in a 50:50 ratio to give the final pass mark. The ideal situation is to accept the SBA mark as it is, but with challenges in the implementation and moderation processes, this is currently impossible.

During statistical moderation of SBA marks, Umalusi found that there was no alignment between the mean of SBA marks and that of examination marks in some centres. This led to the rejection of SBA marks of the centre. The mean of students' scores was more than 15% of the mean of examination scores per centre. This is a huge variation that is far beyond the tolerance range of between 5% -10% prescribed by Umalusi, varying greatly from the examination mark. The table below shows the number and percentage of centres whose SBA marks were approved and those with SBA marks rejected. This data is for Communication in English and Mathematical Literacy. These learning areas are compulsory in the GETC: ABET Level 4 qualification.

**Table 1B: Centres with accepted and rejected SBA marks in November 2016 and 2017**

| | **Learning Areas** | **DHET** | | **IEB** | | **BAA** | |
|---|---|---|---|---|---|---|---|
| | | **2016** | **2017** | **2016** | **2017** | **2016** | **2017** |
| Number and % of centres with SBA marks accepted (with or without adjustments) | Communication in English | 86 (100%) | 86 (100%) | 86 (95%) | 136 (95%) | 14 (88%) | 13 (72%) |
| | Mathematical Literacy | 83 (97%) | 85 (99%) | 60 (97%) | 96 (97%) | 10 (71%) | 9 (69%) |
| Number and % of centres with SBA marks rejected | Communication in English | 0 (0%) | 0 (0%) | 4 (5%) | 7 (7%) | 2 (12%) | 5 (28%) |
| | Mathematical Literacy | 4 (3%) | 1 (1%) | 2 (3%) | 3 (3%) | 4 (29%) | 4 (31%) |

**Irregularities**

Irregularities are always identified, investigated and confirmed during the moderation of SBA portfolios submitted to private assessment bodies. In 12 centres moderated, students copied from each other. This means that the conduct of SBA tasks is not properly controlled and monitored.

**Conclusions and Recommendations**

The DHET developed Regulations on the Assessment Processes and Procedures for Adult Education and Training (AET) National Qualifications Framework (NQF) Level 1. These regulations, according to DHET (2013), aim to regulate the assessment processes of the National Qualifications Framework (NQF) Level 1, conducted by the respective providers and assessment bodies. Shortcomings in these regulations create opportunities for different interpretation and implementation by private assessment bodies. The regulations are silent in terms of the prescribed number and nature of SBA tasks that must be developed and implemented. As a recommendation, the DHET needs to review these regulations so that it is explicit in directing assessment bodies regarding the conduct of SBA.

Since SBA is conducted by nine differently constituted PEDs, there is a need for common guidelines for the conduct, monitoring and moderation of SBA across the nine PEDs in the sector. DHET, as a public assessment body, must ensure that all the nine PEDs that are tasked by DHET to conduct SBA on its behalf, are implementing them in a similar and consistent manner. Common guidelines will minimize different interpretations and ensure common standards.

Training of lecturers and facilitators in quality implementation of SBA is vital. Quality input (training of manpower at operational level) will yield quality output, in this case, implementation of SBA. Training of lecturers and facilitators was highlighted in the directives provided by Umalusi (2016a, 2016b, 2016c, 2017a, 2017b, and 2017c) in the quality assurance reports of the three consecutive previous years. There is a need for the training of lecturers in the following areas:

- Provision of assessment criteria prior to assessment (e.g. rubrics, etc.);
- Incorporation of assessment plans into work schedule for teaching and learning;
- Content of students' and lecturers' portfolios;
- Documents to be included in POA and POE;
- Provision of constructive feedback;
- Assessment planning; and,
- Accuracy and consistency of marking (adherence to marking tool).

Private assessment bodies believe that the implementation, internal moderation at centre level and monitoring of the implementation of SBA is outside their scope of operation. They see their role as providing private providers with SBA tasks and receiving the SBA portfolios from centres for moderation at assessment body level. This does not contribute to the quality implementation of SBA and the outcome of such practice does not ensure credibility of the SBA mark. The applicable legislation stipulate as the role and responsibility of accredited assessment bodies to monitor the conduct of SBA since the SBA contributes 50% of the final mark of each student per learning area. Assessment bodies must ensure that SBA marks are credible and that the quality can be trusted.

The implementation of SBA is critical in the collection and collation of evidence that is contained in the portfolios of assessment presented by lecturers or facilitators and portfolios of evidence presented by students. Improper implementation of SBA has a potential of disadvantaging students unfairly, considering that the SBA mark contributes 50% towards the final mark per student per learning area. It is the responsibility of all assessment bodies to ensure that the implementation process is continuously monitored at all levels. The study was successful in responding to research questions. Processes in the implementation of SBA in the AET sector were discussed. Challenges in both public and private assessment bodies were also highlighted and recommendations were made for the enhancement of the implementation of SBA.

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# Integrating Classroom Based Assessment Into National Examination Assessment Of Primary School Learners In Uganda

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## Abstract

*This paper investigated the necessity of incorporating classroom-based assessment into national examination assessment of primary school leaving examinations in Uganda. Assessment of learners' performance in primary schools of Uganda is done after seven years of schooling and entirely relies on the final national examination conducted in two days. This is detrimental to the learners' assessment because some fall sick before or during the examination, while others miss examinations due to various reasons. The study sought to determine primary school teachers' opinions on integrating continuous assessment into national examinations results and their views on content validity of 2017 national examinations. It further determined the ratio of learners who performed well in classroom assessment but failed the 2017 Primary Leaving Examinations and, indicated ways in which the integration of classroom-based assessment with national assessment would cover gaps in students' assessment. A cross sectional survey design was adopted and a sample of 400 teachers was used. A questionnaire with open and closed ended items was administered to the teachers. Data was analyzed using descriptive statistics. It was established that: At most 70% of respondents indicated that classroom-based assessments should be integrated into PLE results, over 70% of participants responded positively on 7 out of 11 items used to assess content validity of PLE. Most participants (62.5%) revealed that less than 21% of learners who failed PLE in 2017 used to perform well in classroom-based assessment. 80% of teachers indicated that the questions in all subjects are a representative of the best in teaching and learning. It was further established that, a ratio of 3:7 between classroom and national assessments be established. Challenges mentioned in integrating classroom assessment with national assessment include unstandardized classroom based assessments and teachers' attitude towards scoring learners. The few challenges identified in the content validity of national assessments can be reduced by introducing classroom-based assessments. However, there is need to sensitize all primary teachers about the importance of the process and ensure that the classroom based tests are standardized to suite educational goals.*

***Key words**: Assessment, Classroom based assessment, Primary Leaving Examination, Content validity*

## Introduction

Various authors based on their points of emphasis have defined continuous assessment differently. Asabe cited in Abiy (2013) define continuous assessment as a classroom process that is integrated with instruction. On the other hand, Juliet cited in (Abejehu, 2016) express it as the final grading of learners on the cognitive, affective, and psychomotor domains of learning. Another definition is that it is an information-gathering tool used by teachers to select content and method of instruction (Nitko, 2004). This paper focused on school-based continuous assessment.

School-based continuous assessment is an important integral part of a comprehensive and fair assessment of students' performance (Ndalichako, 2015). This is because it plays a crucial role in informing teaching and supporting learning (Harris, 2007; Gronlund, 2006; Stiggins & Chappius, 2005; Rea-Dickins, 2006). Countries such as Ethiopia and Tanzania have integrated continuous assessment into their national examination system (Abejehu, 2016; Ndalichako, 2015). However, Izad 2001) and Singh (2001) mentioned that before implementation of school based assessment, there should be sufficient professional training of teachers.

Uganda's primary education system is examination oriented. Education was introduced during the colonial and students had to sit for an exam after a period of seven years to determine whether they could be promoted to secondary education or not (Ministry of Education and Sports, 2017). This kind of examination system is not ideal for assessing students' performance for a number of reasons. Firstly, a student's progress to secondary school is determined by one national examination after seven years in primary school. Secondly, students perform poorly due to; examinations anxiety or illness, even though they could have good school-based continuous assessment. Thus, there is need to integrate school-based continuous assessment into Uganda' national final examinations to avoid some of the pitfalls students encounter when they are limited to the latter.

## Research Problem

Assessment is an integral aspect of the teaching and learning process, and the means by which learners progress from one level of education to another. However, using only the national examinations to determine students' progression to secondary schools is disadvantageous to some students who would have been performing well in classroom-based continuous assessments. The examination-oriented school assessment may not fairly assess all students. It is, therefore, important to integrate continuous assessment results into national examinations results to ensure fair assessment of all primary learners. Therefore, this study investigated the necessity of combining classroom-based assessment with national examinations results.

## Purpose of the Study

The study investigated the necessity of incorporating classroom-based assessment with national examination results for primary school leavers in Uganda.

## Objectives of Study

The following objectives guided the study:

To establish whether continuous assessment should be introduced in primary schools.

To determine teachers' opinion concerning the integration of classroom based assessment into PLE examinations.

To assess content validity of national examinations in determining students' performance.

To compare learners' classroom-based assessment performance with their PLE performance.

**Methodology**

**Research Design**

The study used a cross sectional survey design. This design enabled the researcher to target a large group of respondents to obtain information without making a follow up of the respondents as supported by Amin (2005) and Sekaran (2003). Therefore, the survey design helped to save time and resources during data collection.

**Population and Sampling Technique**

The population of the study was the head teachers of the 6,122 primary schools in Uganda. Stratified random sampling was adopted for the study. Schools were stratified by regions, of which 100 schools were randomly picked from each region. Head teachers of the selected schools participated in the study.

**Instrument**

A structured questionnaire was developed, piloted and the data collected. Structured questionnaires were used to collect data on the basis that participants could read, write, and ease collection of data from a large size of participants (Amin, 2005). The quantitative approach allowed the researcher to solicit information that was quantified while the qualitative approach allowed the researcher to solicit information that was presented in narrative (Mugenda & Mugenda, 1999).

**Data Collection and Analysis Procedures**

Seminars were organized and the questionnaires were administered to respondents in their respective districts. Quantitative data analysis consisted of descriptive statistics (frequencies and percentages). The frequencies and percentages were used to summarize the respondents' views on issues raised in the questionnaires.

**Results**

The questionnaires covered the followingrubrics; participant background information, continuous assessment, integration of classroom based assessment with national assessment, content validity of 2017 national examinations and ratio of learners' performance in classroom assessment to 2017 PLE performance. Findings are presented in the following subsections.

**Participants' background information**

Participants were asked about their job position, qualification, gender and district. Findings are presented in Table 1.

**Table 2: Participants' background information**

| | | Frequency | Percent |
|---|---|---|---|
| Participants' qualification | Degree | 161 | 40.3 |
| | Diploma | 187 | 46.8 |
| | Certificate | 52 | 13.0 |
| Participants' gender | Male | 335 | 83.8 |
| | Female | 65 | 16.3 |

Results from Table 1 indicate that nearly half of the participants had a degree level of education (40.3%) or a diploma level of education (46.8%) while very few had a certificate level

of education (13%). Education is one of the most important characteristics that might affect a person's attitudes and their way of looking and understanding any particular social henomena (Guest, 1999). Thus, the implication of these findings is that most participants had a higher level of education and were able to respond to the questions about continuous assessment and PLE. Thus, information obtained from them was considerably reliable.

In addition, it is shown that most participants (83.8%) were male while only 16.3% were females. The majority of male participants is attributed to the fact that the proportion of males in primary schools is higher compared to that of females. Thus, the implication of these findings is that information about continuous assessment and PLE using the sample was not gender biased.

**Continuous assessment**

Using the questionnaire participants gave their opinions about introducing continuous assessment in primary schools. Findings are presented in Figure 1.

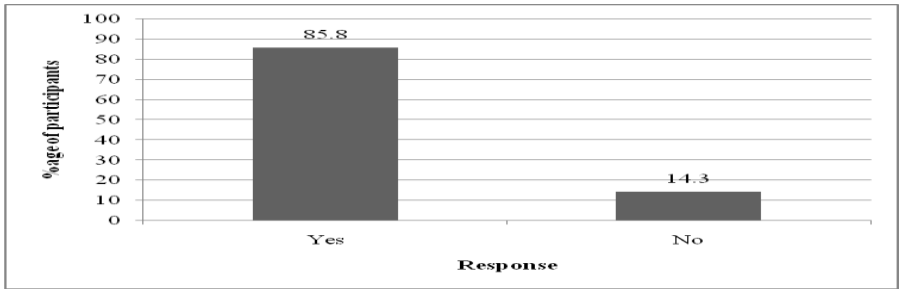


***Figure 2: Participants responses on the introduction of Continuous Assessment in primary schools***

Findings show that most participants (85.8%) responded positively that continuous assessment should be introduced in primary schools while very few participants (14.3%) responded negatively. Participants who responded positively were asked the reasons for continuous assessment being introduced in primary schools. Findings are presented in Table 2.

**Table 3: Reasons for introducing continuous assessment in primary schools**

| Reasons | Frequency (n = 343) | Percent |
|---|---|---|
| Better assessment of learners' abilities | 179 | 52.2 |
| Improves learners' performance | 130 | 37.9 |
| Keeps learners focused on what they supposed to study | 97 | 28.3 |
| Helps teachers keep truck syllabus cover | 74 | 21.6 |
| Helps in making decisions about learners | 73 | 21.3 |
| Builds learners' confidence | 72 | 21.0 |
| Helps keep record of learners' performance | 49 | 14.3 |
| Promotes competition among learners | 34 | 9.9 |
| Students' final examination failure may be due to external factors | 18 | 5.2 |
| Reduces cases of malpractices | 17 | 5.0 |
| Prepares learners for final exam | 9 | 2.6 |
| Encourages learners to become interested | 9 | 2.6 |
| Caters for slow learners | 8 | 2.3 |
| Controls learners' absenteeism | 8 | 2.3 |

Results in Table 2 illustrate the reasons participants gave for introducing continuous assessment introduction in primary schools. The most common reason for introducing continuous assessment in primary schools was for better assessment of learners' abilities (52.2%) followed by improving learners' performance (37.9%), keeping learners focused on what they are supposed to study (28.3%), helping teachers keep track of syllabus (21.6%) and helping in making decisions about learners (21.3%). Other reasons included; building learners' confidence, enabling proper record keeping of learners' performance, and promoting competition among learners. Participants who responded negatively were asked the reasons for continuous assessment not being introduced in primary schools. Findings are presented in Table 3.

**Table 4: Responses on why continuous assessment should not be introduced in primary schools**

| Reasons why continuous assessment should not be introduced primary schools | Frequency (n= 57) | Percent |
|---|---|---|
| May promote injustice (awarding higher results/leakages) | 40 | 70.2 |
| It is expensive in terms of resources (time and finances) | 33 | 57.9 |
| It is tedious/tiresome | 25 | 43.9 |
| May cause work overload | 16 | 28.1 |
| May lack uniformity in marking | 8 | 14.0 |
| Teachers may be incompetent handling assessments | 8 | 14.0 |

Table 3 shows that the most common reason for not introducing continuous assessment in primary schools included; promoting injustice in awarding higher results and leakages (70.2%), followed by the fact that it is expensive in terms of resources such as time and finances (57.9%), it is tedious/tiresome (43.9%), and may cause work overload (28.1%). Other reasons included lack of uniformity in marking and teachers may be incompetent in handling assessments.

Integration of classroom based assessment with national assessment

Participants were asked whether continuous assessment should be part of PLE results. Results are presented in Figure 2.

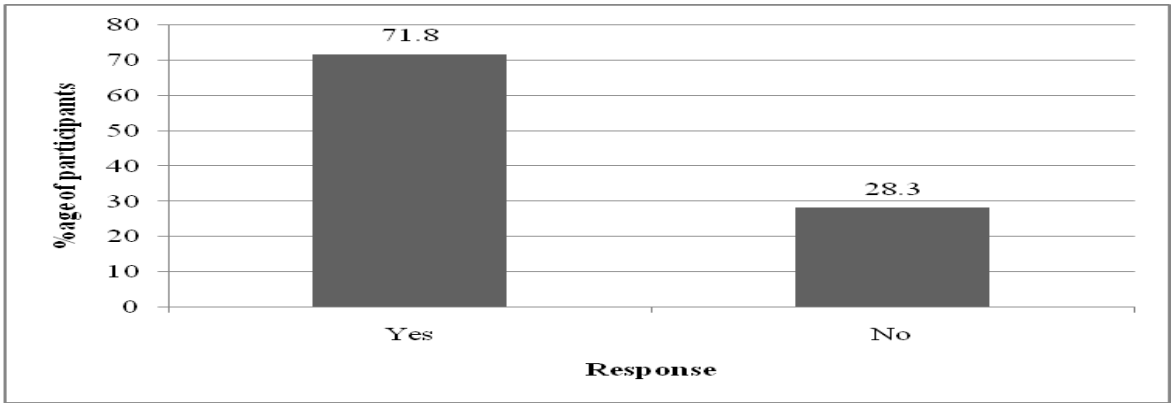


***Figure 3: Continuous assessment should be part of PLE results***

Findings show that most participants (71.8%) responded positively that continuous assessment should be part of PLE results while very few participants (28.3%) responded negatively. Participants who responded positively that continuous assessment should be part of PLE results were requested to indicate the percentage the former would represent in relation to the latter.

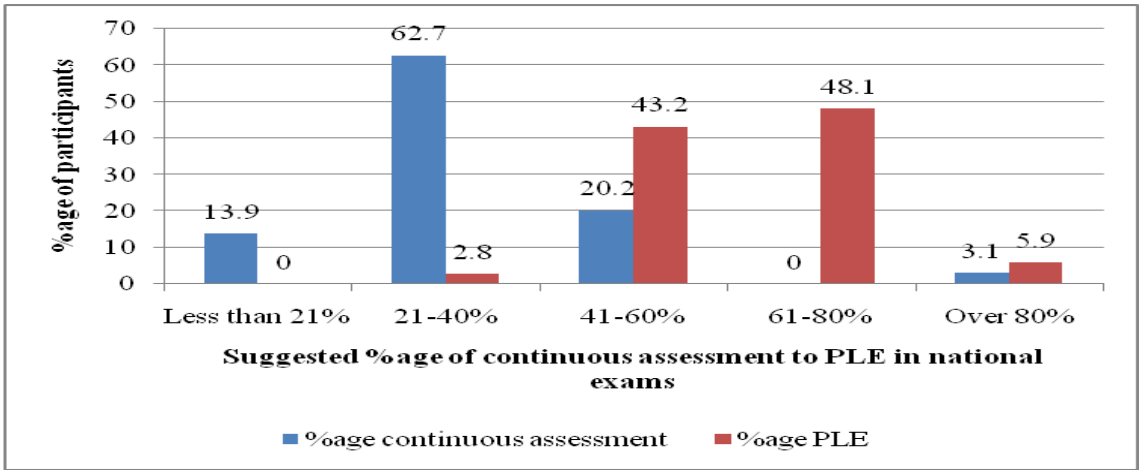


***Figure 4: Ratio of continuous assessment and PLE in final assessment results***

Figure 3 shows that most participants (62.7%) were of the view that continuous assessment should constitute 21-40% of the final assessment results while 48.1% of the participants indicated that PLE should constitute 61-80% of the final assessment results. Generally, these results show that PLE should take the larger proportion of the final assessment results.

**Content validity of national examinations**

Eleven items were presented to the participants about the content validity of national examination papers. Participants gave their opinions on each of the items based on a Linkert scale (agree, Don't Know, disagree). The analysis involved combining participants who strongly agreed and those who agreed into one category who "responded positively" to the items and in addition, combining participants who strongly disagreed and those who disagreed into another category who "responded negatively" to the items. Findings are presented in Table 4.

**Table 5: Content validity of national examinations**

| Items about content of national examination papers | Agree | Don't Know | Disagree | Total |
|---|---|---|---|---|
| Questions could be spotted or predicted by teachers | 187 (47%) | 26 (7%) | 187 (47%) | 400 (100%) |
| Some questions items were repeated from past three years question papers | 204 (51%) | 42 (11%) | 154 (38%) | 400 (100%) |
| Some questions favored some schools | 222 (55.5%) | 17 (4%) | 161 (40.5%) | 400 (100%) |
| The grammar used in the question paper was clear and easily understood | 335 (84%) | 16 (4%) | 49 (12%) | 400 (100%) |
| The question paper covered all important areas of the syllabus | 350 (87.5%) | 8 (2%) | 42 (10.5%) | 400 (100%) |
| Question paper provided for appropriate number of items for the different levels of ability | 343 (86%) | 0 (0%) | 57 (14%) | 400 (100%) |
| The subject terminology was used correctly | 299 (74.7%) | 27 (7%) | 74 (19%) | 400 (100%) |
| The question paper was challenging enough to arouse creative response from candidates | 294 (73.5%) | 16 (4%) | 90 (22.5%) | 400 (100%) |
| Examples and illustrations used were suitable and appropriate | 309 (77.2%) | 42 (11%) | 49 (12.2%) | 400 (100%) |
| Question papers had no errors | 261 (65.2%) | 24 (6%) | 115 (29%) | 400 (100%) |
| Question items are a representative of the best developments in the teaching-learning process | 358 (89.5%) | 16 (4%) | 26 (7%) | 400 (100%) |

More participants responded positively to all items about content validity of national examination papers (that is items 1 to 11) compared to those who responded negatively and did not know. The percentages that responded positively ranged from 47% to 89% while those that did not know ranged from 0% to 11% and those that responded negatively ranged from 7% to 46%.

Over 80% of the participants were of the view that, the grammar used in the question paper was clear and easily understood; the question paper covered all-important areas of the syllabus, the question paper provided the appropriate number of items for the different levels of ability, and the question items were representative of the best developments in the teaching-learning process. In addition, at least 70% of the participants were of the view that subject terminologies were correctly used, the question paper was challenging enough to foster creative responses from candidates, and examples and illustrations used were suitable and appropriate. Therefore, national examinations content is well balanced and easily understood, implying that assessment under such a situation is not biased.

Ratio of learners' classroom-based assessment performance to PLE performance

Participants were asked to compare students' performance during classroom-based assessment to their performance in PLE. Results are presented in figure 4.

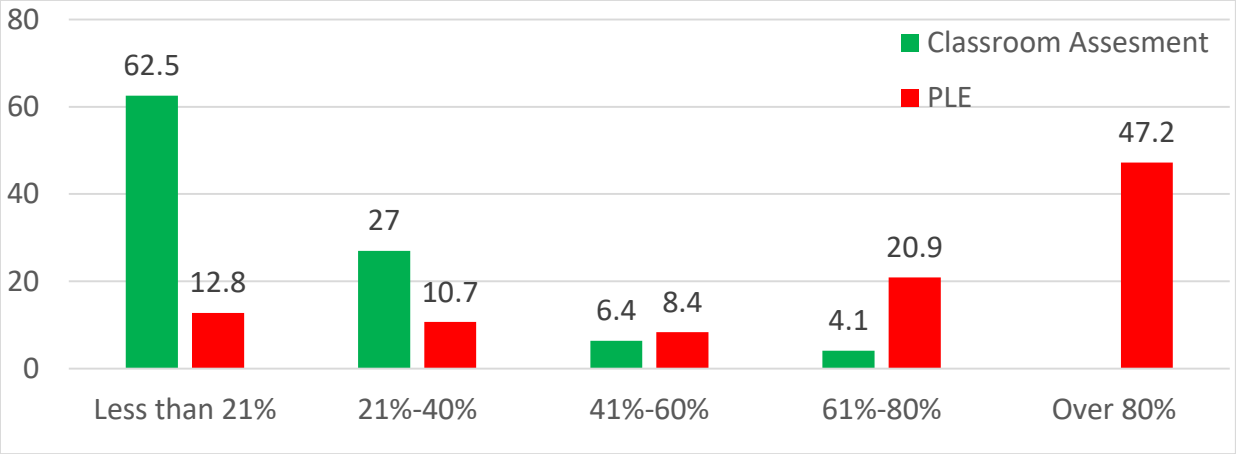


***Figure 5: Ratio of classroom-based assessment performance to PLE performance***

Results in Figure 4 show that most participants (62.5%) revealed that less than 21% of the students who failed PLE used to perform well in classroom assessments, while nearly half of the respondents (47.2%) reported that over 80% of the students who passed PLE performed well in classroom assessments. In addition, the overall results show that participants who indicated a percentage of less than 21% and 21-40% of the students who failed PLE but used to perform well in classroom assessments were more than those who said that some students passed PLE and used to perform well in classroom assessments.

**Discussion**

A significant number of participants in this study were of the view that continuous assessment should be introduced in Uganda's primary schools, because it would lead to better assessment of learners' abilities, improve learners' performance, keep learners focused on what they are supposed to study, among others. Findings of this study concur with Ndalichanko (2015) who was of the view that continuous assessment helps the teacher to identify students' difficulties and to help students master those things they are yet to master. Likewise, research findings by Birhanu (2013) and Desalegn (2014) documented the facts that continuous assessment is a good practice for improving students' performance, monitoring students' learning progress, improving methods of teaching, and motivating and grading students' achievement.

The findings of this study are consistent with those of other studies such as the National Assessment of Progress in Education (NAPE, 2003) in Uganda that established that monthly testing had the greatest positive effect on pupils' achievement. The NAPE study (2003) also revealed that continuous assessment allows teachers time to plan, test, mark and use feedback to redirect teaching, and motivates pupils to internalize what they have learnt (NAPE, 2003). Arega (2014) indicates that continuous assessment is a powerful instrument for enhancing the attainment of learning outcomes to ensure quality education and academic excellence in the educational institutions. Similarly, the Ministry of Education (MoE, 2006) has emphasized the importance of using continuous assessment for monitoring learning progress of students, providing students with constructive feedback, and identifying learning difficulties.

However, it was established in this study that there was public apprehension among a few participants that some teachers may lack the competence to carry out objective assessment if continuous assessment was integrated into the final national examinations. In addition, the latter would lead to teacher classroom work overload, wastage of time and financial resources. These findings are consistent with other findings such as in Tanzania where it was established that the requirement for teachers to provide classroom exercises, quizzes, tests and other assignments on a continuous basis was considered by teachers as too ambitious and as a detractor from regular teaching (NECTA, 2003). Lack of integrity of some teachers resulted in a tendency to submit inflated continuous assessment scores (Ndalichako, 2015). Other countries implementing integration of continuous assessment scores into the final grade of students have experienced similar challenges (Ayodele, 2012; Kapambwe, 2010; De Lisle, 2013).

Participants in this study were largely of the view that continuous assessment should be part of PLE results. In addition, they were of the view that it should constitute 21-40% or 41-60% of the final assessment results. These are similar to practices in other countries. For example, in Tanzania, continuous assessment was assigned a weight of 50% of the Final Examinations marks (Ndalichako, 2015).

Findings of this study also revealed that the national examinations content is well balanced and easily understood, implying that Primary Leaving assessment is not biased. Lastly, it was established in this study that some students fail the national primary examinations yet they perform well in the school-based continuous assessments.

**Conclusions**

In conclusion, there is a consensus from the findings that continuous assessment should be introduced in primary schools given its importance. Regarding integration of school-based continuous assessment into national examinations, findings show a need to introduce school-based continuous assessments into Uganda's primary schools and also as part of national primary examination results to promote fairness. In other words, school CA should be part of PLE. As for content validity, findings indicate that the content validity of national examinations was regarded to be high, hence the need for a higher suggested ratio of CA to PLE. Comparing the performance in school based CA and national exams, the study found that there are some learners who fail national exams yet have been performing well in school based assessments.

**Recommendations**

Uganda's education policymakers need to acknowledge the inherent benefits of continuous assessment in improving educational quality. Therefore, continuous assessment should be introduced as an integral aspect of the national primary examinations results. The need for a more comprehensive and fair assessment system that impacts positively on learning achievement calls for the introduction of school based continuous assessment in national primary examinations results. In view of the challenges that might be experienced in the implementation of continuous assessment in Uganda's national primary examination, guidelines for conducting continuous assessment in primary schools should be developed at the outset. The focus should be in determining the number of classroom-based assessments.

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# Comparability of Content Validity of Teacher Made Tests in Malawi: The Case of Mathematics in Zomba Urban Secondary Schools

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***Abstract***

*The new secondary school curriculum in Malawi has indicated that final assessment at national level should incorporate 40% continuous assessment (CA) from Teacher Made Tests (TMTs). However, little has been researched on the validity of teacher made tests. This study, therefore, assessed comparability of content validity of TMTs for Mathematics in secondary schools in terms of item-syllabus alignment, content representativeness and cognitive functioning levels. To generate data, the study used 30 TMTs for Mathematics for terms one, two and three for the academic year 2016/2017 for Form 3 students from Zomba secondary schools in South Eastern Education Division (SEED) of Malawi. The study used both qualitative and quantitative methodologies. Subject Matter Experts (SMEs) were used to generate the qualitative data by analysing each test item to a content area and cognitive level, while the quantitative data were analysed using descriptive statistics. Reporting of the results is in the form of tables and graphs. The study found that the test items from all the schools were developed from the syllabus. However, content coverage and item cognitive functioning levels varied from one school to another. The study concluded that although the items for TMTs aligned with the syllabus, they were not comparable in terms of content representation and item cognitive functioning level. The study, therefore, recommends that secondary school teachers in Zomba should be trained on the development of standard tests to ensure that the secondary school TMTs are comparable in terms of content representativeness and cognitive functioning levels.*

***Key words*:** *Teacher made tests, content validity, content representation, item cognitive Functioning level*

## Introduction

Malawi National Examinations Board (MANEB) was established in 1987 under an act of parliament to administer national examinations such as Malawi School Certificate Examination (MSCE) in Malawi. The results are used to make important decisions such as certification, selection and placement, among others. In addition, the results are meant to assist education system to determine the extent to which students achieve the objectives of the syllabus for quality education as stipulated by national education sector plan (MoEST, 2008). Therefore, it is imperative that MANEB should produce valid and reliable examination results.

## Background of the study

The Malawi secondary curriculum underwent a revision in 2014. The policy for the assessment of contents of the revised curriculum indicates that national examinations results should incorporate 40% Continuous Assessment (CA). This has prompted MANEB as an examining body in Malawi to change its mode of assessment of secondary education to include CA. Previously, MANEB's mode of assessment of students' work was mainly based on final examination. CA refers to an on-going process which takes place through the whole learning process (Le Grange & Reddy, 1998). The purpose of CA is to assess trichotomy of learning of a learner's development: cognitive, affective and psychomotor domains. It can be formal or informal. Formal assessment deals with learner cognitive domain. Written test is the best method that can be used for assessing cognitive domain (Nxumalo, 2007). In case of CA, it is the class teacher himself/herself who prepares the test items (Marso & Pigge, 1988; Boothroyd *et al.*, 1992). This study, therefore, investigated the validity of teacher made tests (TMTs) in terms of item-syllabus alignment, content representativeness and cognitive functioning levels.

## Research Problem

As part of curriculum reform, Malawi government has introduced a national policy on assessment of secondary education. The policy requires candidates that are assessed at MSCE level to have two components of assessment score: 60% for final examination and 40% for CA. The actual assessment instruments of CA will mainly include TMTs. TMTs need to be valid to gauge students' mastery of learning at the end of a course, term or semester (Gronlund, 1998; Nitko, 1996). In order to achieve this, TMTs must meet the key attributes of test quality such as validity (Kinyua & Okunya, 2014). However, little has been researched on the validity of teacher made tests. This study therefore, assessed comparability of content validity of TMTs for Mathematics in secondary schools in terms of item-syllabus alignment, content representativeness and cognitive functioning levels.

## Purpose of the study

The purpose of this study was to assess the comparability of content validity of tests made by secondary school teachers in Malawi regarding item-syllabus alignment, content representativeness and cognitive functioning level. Specifically, the study sought to answer the following three questions:

- To what extent do TMTs for Mathematics align with the syllabus?
- How do TMTs for Mathematics compare in terms of content representation?

- How do TMTs for Mathematics compare in terms of item cognitive functioning levels?

**Significance of the study**

The study has the potential to inform Ministry of Education Science and Technology (MoEST) and MANEB on areas where teachers need in-service training regarding test construction in order to integrate CA with final examination to promote excellence in assessment to achieve quality education.

**Literature Review**

***Content validity of a test***

The traditional concept of validity views validity as being divided into three types, one of which is content validity (Messick, 1994). Content validity is defined as the degree to which the items in the test adequately sample the areas of subject and abilities that a course of instruction has aimed to teach (Ebel, 1979). Content validity of a test addresses the match between test items and the content area they are intended to assess. This concept of match is sometimes referred to as alignment, while the content area of the test may be referred to as performance domain.

Subject Matter Experts (SMEs) in a given performance domain generally judge the content validity (Sireci & Faulkner-Bond, 2014). Thus, content validity is how well the behaviours demonstrated in a testing situation constituted a representative sample of behaviours to be exhibited in the domain (content). According to Bachman (1990), content validity involves two major concepts: content relevance and content representation. However, Sireci (1998) extended the definition of content validity to include aspects of test development. He argues that content validity pertains to four elements of test quality: domain definition, domain representation, domain relevance and appropriateness of test development. When these elements are applied to teacher made tests, domain definition simply involves the areas where test items are going to be drawn from. Test items should be drawn from the syllabus (Gronlund, 2003). Domain representation implies that teachers must ensure that test items represent the content areas of the syllabus in proportion to the demands of each content area.

Recent studies on the validity and reliability of teacher made tests show that a student's grade point average is usually not consistent with the same student's scores on standardized tests (Kinyua & Okunya, 2014). Although many researchers claim that teacher made tests are flawed (Notar et al., 2004; Oescher & Kirby, 1990) and, inadequate (Wiggins, 1989) due to poor training, there is limited empirical evidence on how content validity of TMTs compare in terms of item-syllabus alignment, content representativeness and cognitive functioning level.

***Item cognitive functioning level***

Benjamin Bloom introduced the Bloom's taxonomy, which consists of three domains: cognitive, affective and psychomotor. According to Anderson *et al*. (2001), cognitive domain comprises six skills: remembering, understanding, applying, analyzing, evaluating and creating. Therefore, as teachers specify the content sub-areas, they should also consider the cognitive levels the items are going to measure (Sireci, 1998). Oescher & Kirby (1990) conducted a research study in secondary Mathematics in which the findings revealed that 78% of the items were at knowledge level

and 13% were at comprehension level. Test items that predominantly assess learners' ability to remember encourage rote learning. According to Baroudi (2007), good test items require more than remembering a fact or reproducing a skill.

Since there is a thin gap between higher adjacent levels, the cognitive skills in this study have been put into two categories: lower order and higher order. Lower order cognitive skills consist of remembering and understanding while higher order skills consist of applying, analyzing, evaluating and creating.

***Guidelines for test development***

In order to enhance validity and reliability of teacher made tests, teachers must stick to standard guidelines for test development. Teachers must understand that developing a test is an art. Before engaging in the actual test development, teachers must firstly, consider the purpose of the test. This is because an assessment may be appropriate for one purpose but inappropriate for another purpose (Young, So & Ockey, 2013). If the test is not appropriate for the purpose for which it was designed for, then it is not a valid test.

The teacher must develop a test plan that describes the instructional objectives, the content to be measured and the relative emphasis given to each learning outcome (Gronlund, 1981). This is what Sireci (1998) described as the domain definition, domain representation and domain (content) relevance. In other words, the teacher must consider the content from where the test items are going to be developed, how the items are going to represent the content areas or core elements of the syllabus as well as the levels of cognitive skills, the items should operate on. Normally, the syllabus or curriculum dictates the scope and sequence of the content area from which to develop test items.

Thirdly, teachers must be able to develop a table of test specifications (TOS). A TOS is defined as a test blueprint which helps teachers to align objectives, instruction, activity and assessment (Fives & DiDonato-Barnes, 2013). It is a two-way grid that captures content domain as well as cognitive levels of the Bloom's taxonomy. Table of test specifications is important in test development. Notar *et al*. (2004) and Parr & Bauer (2006) in separate research studies found that developing a table of specifications ensures the content validity of a test. Table of specifications helps the test developer to ensure appropriate level of difficulty of items, varied types of items and wide content coverage of the syllabus (Parr & Bauer, 2006). In addition, a study by Fives and DiDonato-Barnes (2013) revealed that when teachers do not use a TOS, there is often a mismatch between the content that is examined in class and the material assessed at the end of unit test. Contrary, a research study conducted by Ing *et al*., (2015) found that TMTs were valid in terms of content validity although most of the teachers did not even refer to TOS when developing the test items.

It is assumed that if teachers apply most of the guidelines above, they are likely to come up with valid and comparable tests. According to Chakwera (2004), teachers who were knowledgeable in acceptable assessment skills prepared their candidates for national examinations better than the less knowledgeable ones.

## Theoretical Framework

The study used Classical Test Theory (CTT). CTT is a theory about test scores that introduces three concepts: test score which is also called observed score; true score; and error score (Hambleton and Jones, 1993). The main aim is to come up with error-free test items which, in turn, make the test valid and reliable. In CTT, external Subject Matter Experts (SMEs) evaluate the validity evidence based on test content (Sireci, 1998; Sireci & Faulkner-Bond, 2014). The common methods used to gather validity evidence are matching test items to their respective content areas, rating the degree of item-content representation as well as cognitive levels and the degree of relevance of items to the content area tested (Sireci & Faulkner-Bond, 2014). CTT models are easy to meet in real test data because item statistics are accurately calibrated on small sample of examinees. Therefore, this study used CTT to evaluate the content validity and reliability of test items in Mathematics.

## Methodology

The study used descriptive research design. Itused both quantitative and qualitative approaches to assess comparability of content validity of TMTs for Mathematics. Mathematics was chosen because most secondary school Mathematics teachers are underqualified, as such, some topics of the syllabusare left untaught and unassessed (Chikoko, 1988).

The study was carried out in secondary schools of Zomba Urban Education District in South East Education Division (SEED). Zomba Urban has 20 secondary schools. Using random sampling technique, 10 secondary schools were selected from which TMTs for Mathematics for the end of terms 1, 2 and 3 for Form 3 students for academic year 2016/2017 were used to generate data.

Subject Matter Experts (SMEs) were used to analyse the data qualitatively by allocating each item to a particular content area and cognitive level. To avoid biasness, the SMEs came from schools which did not participate in the study. The experts had at least 10 years' experience teaching Mathematics in secondary schools. Then, the data were analysed using descriptive statistics. Reporting of the results was in the form of tables and graphs.

## Presentation and Discussion of Findings

The SMEs were provided with a sample of core elements and topics from Form 3 syllabus for Mathematics to guide them on allocation of test items to different content areas.

**Table 1:** ***Core Elements and Topics from Form 3 Syllabus for Mathematics***

| Core element | Symbol | Topics |
|---|---|---|
| Number and numeration | NN | Quadratic; irrational numbers; subject of the formula; exponential and logarithmic equations |
| Structure | S | Sets; transformation |
| Space, Shape and Measurement | SSM | Circle geometry (chord properties / angle properties); trigonometry; similarity |
| Patterns, Relations and Functions | PRF | Mapping and functions; coordinate geometry; variations; inequalities; graphs and quadratic functions |
| Statistics | STAT | Statistics; probability |

## Research Question 1

*To what extent do TMTs for Mathematics align with the syllabus?*

TMTs for the schools had different number of test items as shown in Table 2.

**Table 2:** ***Total Number of Test Items per School per Term***

| School | Number of items | | |
|---|---|---|---|
| | Term 1 | Term 2 | Term 3 |
| Sch.1 | 21 | 17 | 18 |
| Sch.2 | 16 | 20 | 17 |
| Sch.3 | 20 | 20 | 24 |
| Sch.4 | 20 | 21 | 20 |
| Sch.5 | 20 | 22 | 19 |
| Sch.6 | 21 | 18 | 18 |
| Sch.7 | 18 | 22 | 22 |
| Sch.8 | 19 | 21 | 21 |
| Sch.9 | 18 | 20 | 19 |
| Sch.10 | 21 | 21 | 20 |

SMEs assigned each item to its appropriate content area. An item was accepted as belonging to a particular content area and cognitive level when 75% of the SMEs reached a consensus. Tables 3, 4 and 5 display the results.

**Table 3***: Item syllabus alignment for term 1 Tests*

| Core element | Number of Items | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sch.1 | Sch.2 | Sch.3 | Sch.4 | Sch.5 | Sch.6 | Sch.7 | Sch.8 | Sch.9 | Sch.10 |
| NN | 11 | 10 | 13 | 9 | 12 | 13 | 9 | 19 | 11 | 21 |
| S | 3 | 4 | 1 | 1 | 0 | 3 | 1 | 0 | 1 | 0 |
| SS | 5 | 2 | 2 | 4 | 5 | 4 | 3 | 0 | 3 | 0 |
| PRF | 2 | 0 | 4 | 6 | 3 | 0 | 5 | 0 | 3 | 0 |
| STAT | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| TOTAL | 21 | 16 | 20 | 20 | 20 | 21 | 18 | 19 | 18 | 21 |

**Table 4:** *Item syllabus alignment for term 2 tests*

| Core element | Number of items | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sch.1 | Sch.2 | Sch.3 | Sch.4 | Sch.5 | Sch.6 | Sch.7 | Sch.8 | Sch.9 | Sch.10 |
| NN | 5 | 7 | 8 | 11 | 16 | 8 | 12 | 14 | 12 | 14 |
| S | 1 | 2 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 2 |
| SS | 3 | 5 | 5 | 3 | 3 | 2 | 5 | 4 | 3 | 3 |
| PRF | 3 | 5 | 5 | 6 | 1 | 6 | 3 | 1 | 2 | 1 |
| STAT | 5 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 2 | 1 |
| TOTAL | 17 | 20 | 20 | 21 | 22 | 18 | 22 | 21 | 20 | 21 |

**Table 5:** *Item Syllabus alignment for term 3 tests*

| Core element | Number of items | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sch.1 | Sch.2 | Sch.3 | Sch.4 | Sch.5 | Sch.6 | Sch.7 | Sch.8 | Sch.9 | Sch.10 |
| NN | 9 | 12 | 10 | 9 | 6 | 9 | 12 | 12 | 8 | 10 |
| S | 2 | 0 | 1 | 6 | 3 | 3 | 4 | 2 | 3 | 1 |
| SS | 3 | 2 | 2 | 0 | 3 | 2 | 3 | 2 | 2 | 3 |
| PRF | 4 | 2 | 7 | 4 | 5 | 4 | 2 | 3 | 4 | 4 |
| STAT | 0 | 1 | 4 | 1 | 2 | 0 | 1 | 2 | 2 | 2 |
| TOTAL | 18 | 17 | 24 | 20 | 19 | 18 | 22 | 21 | 19 | 20 |

Table 3 shows that schools 1, 6 and 10 were allocated 21 items each, school 2 was allocated 16 items, school 3, 4 and school 5 were allocated 20 items each, schools 7 and 9 were allocated 18 items each and school 8 was allocated 19 items. Table 4 shows that school 1 was allocated 17 items, schools 2, 3, and 9 were allocated 20 items each, schools 4, 8 and 10 were allocated 21 items each, school 6 was allocated 18 items and school 7 was allocated 22 items. Table 5 shows that school 1 was allocated 18 items, school 2 was allocated 17 items, schools 3 was allocated 24 items, schools 4 and 10 were allocated 20 items each, school 5 and 9 were allocated 19 items each, school 6 was allocated 18 items, school 7 was allocated 22 items and school 8 was allocated 21 items.

The number of items in Tables 3, 4 and 5 for all ten schools corresponds to the number of items for the tests for the schools in Table 2. This shows that all the test items for all the ten schools were assigned to a core element. Therefore, no item was developed from outside the syllabus.

**Research Question 2**

*How do TMTs for Mathematics compare in terms of content representation?*

Mean percentages of the number of test items per core element for the three terms were calculated from the data in Tables 3, 4 and 5 and the results were used to draw Figure 1.

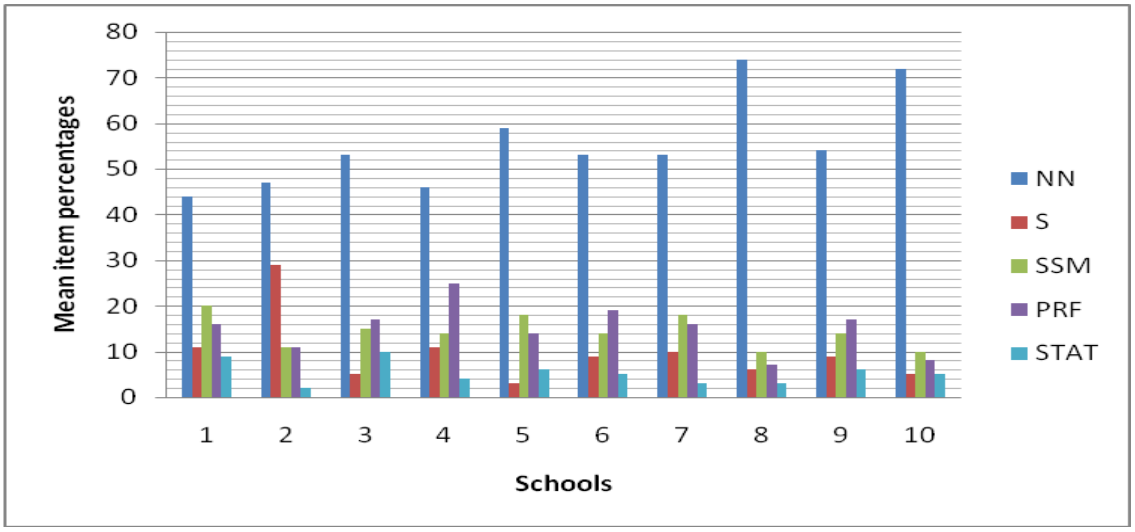


**Fig. 1:** ***Mean percentage of content representation of test items per core element for terms, 2 and 3***

Figure 1 evidently shows that there was variance in content representation of the test items of the same core element by the schools. For example, core element NN, content representation ranged from 44% to 74%, core element S, content representation ranged from 3% to 29%, core element SSM, 10% to 20% content representation, core element PRF, content representation ranged from 7% to 25% and core element STAT, content representation ranged from 2% to 8%.

**Research question 3**

*How do TMTs for Mathematics compare in terms of item cognitive functioning levels?*

**Table 6:** *Bloom's Condensed cognitive levels*

| Cognitive level | Behavioural solicited |
|---|---|
| Lower order (remembering and understanding) | Remembering or recognizing previous learnt information<br>Demonstrating understanding of processes |
| Higher order (applying, analyzing, evaluating and creating) | applying knowledge to actual situations<br>Breaking down ideas or objects into their component's parts<br>Making judgements about values of ideas or materials<br>putting parts together to form a whole or creating something new |

SMEs also assigned each item of each test to its appropriate cognitive level based on the information in Table 6. Mean percentages of test items for terms 1, 2 and 3 of different core elements but falling within the same *cognitive functioning level* were calculated and were used to draw Figure 2.

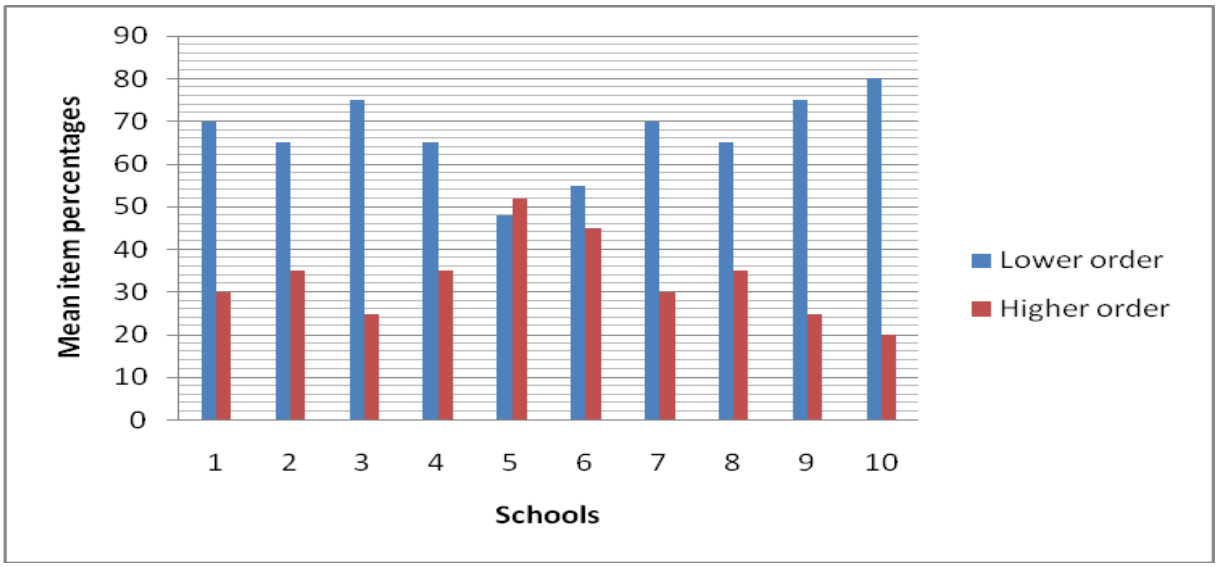


**Fig. 2:** ***Mean percentages of item cognitive functioning levels for terms 1, 2and 3.***

Figure 2 demonstrates that for each of the ten schools, the mean percentages of test items functioning at lower level of cognitive skills were much higher than the mean percentages of higher order test items except for school 5, which had higher percentage of higher order

items than lower order. Figure 2 also illustrates that there were substantial differences of mean percentages of items functioning within a specific level of cognitive domain. For example, the mean percentage for lower order test items for the 10 schools ranged from 48% to 80% while for the mean percentages for higher order test items for the 10 schools ranged from 20% to 52%. The study, therefore, revealed that there were variations amongst the schools regarding the cognitive abilities of the test items and that most items tested lower order cognitive skills.

**Conclusions and Recommendations**

The findings of the study revealed that teachers develop test items from the syllabus. However, they differ in content representation and item cognitive functioning levels. That is, some core elements were overrepresented at the expense of others and also that most TMTs dwelt more on lower order cognitive skills than higher order. This is in agreement with Newel (2002) who indicated that TMTs usually measure a limited part of subject area, do not cover a broad range of abilities and rely heavily on memorized facts and procedures. The results, therefore, imply that tests developed by teachers are not comparable to the extent of their results being integrated as CA in national examination results. Based on the findings of the study, there is need for secondary school teachers in Zomba to be trained on the development of standard tests for secondary school TMTs to be comparable in terms of content representativeness and cognitive functioning levels for quality assessment. There is also need for MANEB/MoEST to scale up the study to all districts in Malawi to assess the validity of TMTs before adopting the assessment system of secondary education of integrating final examination score with CA score.

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# Factors influencing effective implementation of College Based Assessment in Primary Teacher Training Colleges in Kenya

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## Abstract

*The purpose of this study was to establish the factors influencing effective implementation of college-based assessment in primary teacher training colleges in Kenya. Basic research questions were formulated. The questions emphasized the extent to which tutors implement college-based assessment, assessment options applied by college principals when monitoring assessment of learners, the procedures employed during classroom assessment, the extent to which college tutors discharge their responsibilities and the challenges existing in the implementation of college-based assessment were investigated. The study adopted a descriptive research design. The study targeted eight teacher training college principals, ten college tutors and three hundred and twenty second year students who were selected randomly from the eight colleges purposely selected from the four zones of Kenya's geographical location. To draw conclusions on the objectives, the study analysed each objective based on statistics from the results and findings of statistical modelling. The study fit the various frequency, percentage, mean and t-test which were utilized to analyze quantitative data. The findings of the study indicated that student assessment was not objectively done. This included ineffective monitoring of tutors by college principals and heads of departments during curriculum delivery leading to inadequate coverage of the syllabus; lack of relevant in-service training programs for college tutors, lack of policy by the Ministry of Education on teacher education to guide college-based assessments and lack of coordinated systems within colleges on how assessment is to be carried out. The study recommends re-training of college tutors on teaching methodologies; remunerating 'best-performing' tutors with a view of increasing their remuneration; upgrading certificate in primary teacher training to diploma in education; increasing the training period to three years to strengthen the teaching methods and the Ministry of Education to consider increasing grants to government funded teacher training colleges to improve the teaching/learning resources.*

## Introduction

In an era of increased demands for accountability and limited financial resources in education, the assessment of college student outcomes has become crucial. The process by which teachers are educated is the subject of political discussion in many countries, reflecting both the value attached by societies and cultures to the preparation of young people for life, and the fact that education systems consume significant financial resources (of which teacher salaries are often the largest single element).

Teacher education is a vital aspect because it influences all aspects of education hence its quality cannot be compromised. Kafu, (2011) identifies quality indicators for teacher education that could be used as effective measures to determine quality training of teachers. Therefore, it is important for teacher training in Kenya to reflect on these indicators to ensure that public and private teacher training in colleges operate under a unified curriculum. The Kenyan government regulates the admission to teacher training colleges by ensuring that equal numbers of male and female teacher trainees are admitted. In Kenya, teacher training is for two years and is typically a combination of academic education, professional training and practical training (Shiundi & Omulando, 1992).

Teacher training, therefore, should enable teachers to acquire sufficient subject mastery and pedagogy (MOEST, 2005). Even though at the college level teachers specialize in either humanities or sciences, when they are to be recruited as teachers, they are required to teach twelve subjects offered by the Kenya government primary school curriculum. Teaching practice is mandatory for all student trainees and tutors are expected to evaluate the trainees in all teaching subjects. It is a requirement that all trainees must pass the teaching practice for them to be awarded a certificate in primary teacher education (MOEST, 2005).

Over time, the Kenyan National Examination Council has been administering the Primary Teacher Education Examination and trainee teachers' academic performance has been on a declining trend with the national average pass rate at 0.25% distinctions, 8% credit, 6% pass and 15% referred cases between 2011 to 2017.

## Research problem

The success of trainee teachers depends on the quality of the trainers. With the advent of standard based reforms, the quality of teachers graduating from teacher training colleges has become a major concern to policy-makers, educators and the public in general. Every child deserves a quality teacher. In an era of increasing standards and accountability in education, teacher quality and training will be more important than ever.

Godwin (2003) proclaims that inadequately equipped teachers cannot implement sound education programmes but contribute to the low level of performance and poor academic attainment among students. According to Uwezo Report (iq4news.com) 50% of standard eight pupils in primary schools in Kenya cannot read and write. This means that annually, many students joining high school from primary schools are illiterate. The report further states that nationally, only three out of ten children in class three can do class two exercises. According to MOE (2011) for Kenya to realize a globally competitive system, well qualified and competent teachers are required in

classrooms at all levels by uplifting teacher-training standards.

The Uwezo Report (iq4news.com) attributes the high illiteracy level to poverty, teenage pregnancies, laxity by education stakeholders, and poor government policies. Little information is known about how college-based assessment in the teacher-training colleges is implemented and how it affects the quality of the teachers who directly influence learning in the primary schools. This study, therefore, intends to fill this gap by establishing the factors that influence effective implementation of college-based assessment in Teacher Training Colleges in Kenya.

**Objectives of the study**

The objectives of the study were;

(i) to establish the extent to which the level of competency of teacher trainers influences effective implementation of college-based assessment in primary teachers' colleges in Kenya.

(ii) to establish how teacher trainees' academic qualifications affect effective implementation of college-based assessment in primary teachers' colleges in Kenya.

(iii) to establish other college related factors which affect effective implementation of college-based assessment in primary teachers' colleges in Kenya

(iv) to make recommendations on how to improve effective implementation of college-based assessment in primary teachers' colleges in Kenya.

**Research Questions**

The research questions of the study were:

(i) to what extent does the level of competency of teacher trainers' influences effective implementation of college-based assessment in primary teachers' colleges in Kenya?

(ii) how do teacher trainee's academic qualifications affect effective implementation of college-based assessment in primary teachers' colleges in Kenya?

(iii) What are the factors which influence effective implementation of college-based assessment in primary teachers' colleges in Kenya?

(iv) Which recommendations can be made to improve effective implementation of college-based assessment in primary teachers' colleges in Kenya?

**Justification of the study**

The performance of candididates pursuing primary teacher education has been on the decline. There has been a negative correlation between what the colleges submit as college based assessment with the end of course performance. The study aims at establishing the factors which affect effective implementation of college based assessment so as to make recommendations on how to improve it. This is so that the scores submitted by the colleges to the Kenya National Examinations Council are reliable and valid and will positively correlate with the final examination scores when the final external assessment is carried out by the Council.

**Significance of the Study**

The country's primary education is the bedrock upon which all future learning depends on. The findings will highlight the challenges facing teacher training colleges in Kenya and provide recommendations on how to improve college-based assessment in teacher training colleges.

## Literature Review

### Preview of Primary Teacher Education in Kenya

The Primary Teacher education syllabus in Kenya has undergone improvement since its introduction in 1964 and revision in 1986. The Third Teacher Education conference held in 1994 and the conference of the Kenyan Teachers Training College Principal Association in the year 2000 discussed how to improve the training of teachers. After the revision of the primary school education syllabus in 2002, there was disharmony with the PTE syllabus and the two had to be harmonized. This led to the revision of the PTE syllabus in 2004. The issues addressed were to make the teacher education curriculum manageable and evaluate it by removing overloads and overlaps in order to make the curriculum more responsive to the needs of the society (MOE, 2009). Teacher education is an important component of education and its quality cannot be compromised (Kafu, 2011). The national assessment and accreditation council (Bangalore, 2007), identified quality indicators for teacher education as an effective measure to determine quality training/education. It is therefore important for teacher training in Kenya to reflect these indicators to ensure quality.

### Teacher Professional Development

Continuous professional development of tutors has not been formally undertaken. Although tutors have already had basic trainings and compulsory on-the-job training, their knowledge should be continuously upgraded (MOE, 2009). The International day for teachers is celebrated worldwide every 5th October. This ought to be one of the days that are set aside for rewarding best achieving teachers. Unfortunately, this has not happened to local teachers (UNESCO, 1997). In this regard, the day 5th day of October could provide a forum for addressing quality teacher training. This is in line with master plan of 1998 on education and training observation which states that a relevantly qualified and highly motivated teaching force is a prerequisite for promotion of high achievement among learners (MOEST, 1998).

Nafukho (2002) stated that the quality of instruction is one of the most important determinants of the level of learning achievements. This involves transfer of skills, knowledge, behavior and attitudes in order to become competent employees. Fullan (1991) states that the teacher as an advocate for change can become skilled at integrating the change and change process, and that he or she can become one of the most powerful forces for change. Thus, the role of the trainer in curriculum delivery and professional development is very important.

### Period of Training

Both public and private primary teacher training colleges operate under a unified curriculum in Kenya. Both male and female teacher trainees are admitted which is an indication that gender parity has been achieved in the admission criteria. The five core subjects are English, Kiswahili, education, physical education and information communication technology (ICT) and each student is then required to choose four subjects from either option A or B. Option A subjects include science, home science, agriculture and mathematics. While option B subjects include music, art and craft, social studies and religious education (MOEST, PTE, Syllabus, 2001). Teaching practice is mandatory and is

conducted in three sessions. Teaching practice incorporates practical experience as its pillar, but this has been lacking and, in some cases, it is haphazardly done for a short duration. Teachers are important in the teaching and learning process. Their training should enable them to acquire sufficient subject mastery and pedagogy, (MOEST, 2005).

During training, teacher trainees are evaluated in both academic and professional studies. Continuous assessment is an important component of formative evaluation and normally thirty percent of the total mark. Towards the end of the first-year students sit for mid-course examination, mock examinations are done during the second term in the second year and then final examinations are administered by KNEC. Students are also evaluated during teaching practice and those who fail in it fails do not make it no matter how they perform in the subject area (MOEST, 2005).

**Trainee Academic Qualification**

Preparing teachers begins with the selection of those who are to enter teacher training. In the developing world, it stems from a need in many countries to attract large number of teachers in order to expand access to education quickly and reduce class size (Lewin, 2004). High performing countries have resisted the temptation to lower standard by keeping access to teacher training selective in order to maintain quality and the esteem of the profession. But in some other countries people with low academic qualification do enter teacher training (Lewin, 2004) as cited by UNESCO, (2007). According to UNESCO (2007), in Britain until early 20$^{th}$ century holders of teaching qualification, by selection examination became temporary teachers. Admission into teacher training is highly competitive and only ten percent of applicants succeed. Even pre-primary teachers need a university degree. Every teacher has a master's degree in two subjects. There is no concession of teacher quality even where shortage exists (UNESCO, 2007). South Africa also offers an example of making training pathways towards the teaching profession more flexible.

In Kenya, the entry requirement for primary teacher education certificate (PTEC) is a minimum C (Plain) or its equivalent and must have attained D (plain) in mathematics and C- in English (MOE, 2004). It has been argued that education emphasizes achievement and student select courses as per their performance (UNESCO, 1999). Students who have previously performed better in their subjects will perform better and will exhibit some degree of expertise in their areas of choice (Chamblisis 1996). This is essential in improving quality training.

**Teaching/ learning Resources Factor**

According to Abenga (2009), schools must be safe, have acceptable levels of learning resources, get parents' and communities' support, have curriculum connected to the reality of children's lives, prepare them for the future and focus on development of problem-solving and higher order thinking skills. The teacher training colleges for primary school teachers are still using training manuals and traditional methods of training (Abega, 2009). E-learning is yet to be fully established and applied effectively. Content delivery using computers or E-learning is fast especially the PowerPoint technique, while trainers who make use of computer design, development and presentation of training programs have an

advantage over those who do not use computers (Nafukho 2011).

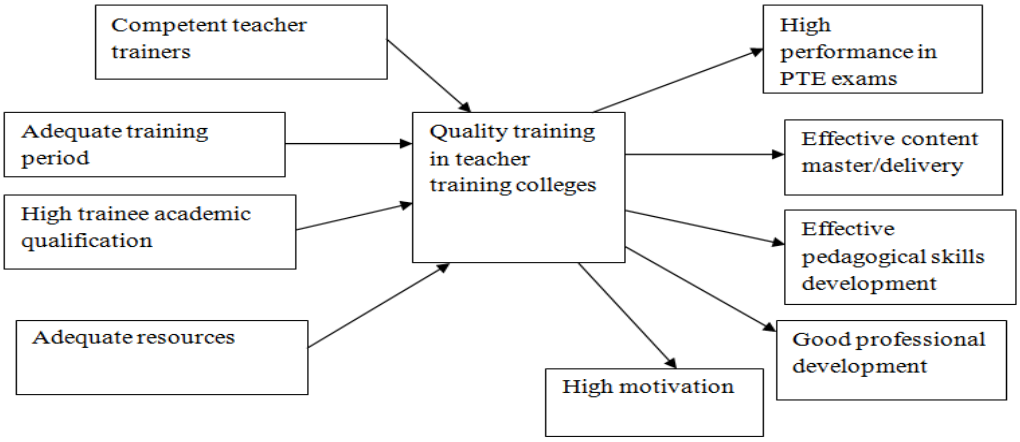
According to Katu (2011), globalization of teacher education as a new development is the process of sharing experiences, ideas and technology globally in teacher education using technological appliances, exposure and expertise. According to Malaba (2004) the learning resource centers are no longer functional. Teacher training colleges have insufficient, old worn out and unutilized facilities such as laboratories, workshops and home science rooms. This is coupled with congestion in halls, classrooms and hostels, which affect quality training (MOEST, 1994). Training materials should be locally written and produced, but these materials are scarce or insufficient and irrelevant (Lewin, 2004).

**Theoretical framework**

This study adopted Malcom Knowles (1968) theory of Andragogy which is specifically generated for adult learning. Knowles emphasizes that adults are self-directed and are expected to take responsibility for their decisions. Based on this theory, teacher training in colleges involves adults who are easily directed. Andragogy is based on six principles /assumptions about the design of learning: Adults need to know why they need to learn something: teacher trainers should be competent to explain subject matter and methodology in teacher education in order to enable trainees to know the benefits of learning and search for futuristic applicability of what is learned. Adults are self-directed: The teacher trainee's self-concept is highly valued. Trainees should be able to discover things for themselves and only guided when mistakes are made. They should not be spoon-fed though attention should be provided according to individual differences. Adults need to learn experientially; trainees should have had life experience. This implies that teaching – learning resources should be adequate to enrich previous heterogeneous experiences. Adults are motivated to learn incentives such as increased job satisfaction during teaching practice assists trainees to become experts or professionals, hence uplifting their self-esteem.

**Conceptual framework**

A Conceptual framework involves forming ideas about relationships between variables in a study and showing the relationships graphically or diagrammatically (Mugenda & Mugenda, 2010). The conceptual framework of this study is represented in the Figure below.



**Outcome of quality indicators on training**

The conceptual framework of this study was based on the idea that Quality training in teacher training colleges which is the moderating variable is determined by Competent teacher trainers, adequate training period, adequate resources and the trainee academic qualifications. This will impact on the performance during the PTE external examinations, effectiveness of the content delivery by the tutors, aspects dealing with motivation and the good professional development. Therefore, the assessment carried out at the college level will be influenced by the moderating variable which is the quality of the teaching at the institution. This will answer whether assessment will influence the extent to which the level of competency of teacher trainers influences effective implementation of college based assessment or establish how teacher trainees' academic qualification affects effective implementation of college based assessment or the factors which influence effective implementation of college-based assessment in Teacher Training colleges in Kenya and make the best recommendations.

Research MethodologyResearch methodology entails the research procedures that were used to carry out this study. The research methodology section is organized according to the following sub-headings: research design, target population, description of sample and sampling procedures, description of research instruments, validity and reliability of research instruments, description of data collection procedures, description of data analysis procedures and ethical issues.

**Research Design**

Research design is regarded as an arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance with the research purpose. It is the conceptual structure within which research is conducted. It constitutes the blue print for the collection, measurement and analysis of data (Kothari, 2009). The study employed a descriptive survey design. This is a method of collecting information by interviewing or administering questionnaires to a sample of individuals (Mugenda & Mugenda, 2010). It is commonly used to collect information about peoples' attitudes, opinions, habits or any variety of social issues (Orodho, 2009).

**Target Population**

According to Orodho (2009) target population refers to all the members of a real or hypothetical set of people, events or objects to which the researcher wishes to generalize the result of the study. The researcher constructed three different sets of questionnaires for the principals, college tutors, and students. One public and private teachers training college was selected from the four regions in Kenya. These zones are coastal region, central region, rift valley region and western region.

The target population of the study consisted of eight college principals, eighty college tutors and four hundred second year students drawn from the eight colleges. They were all relevant to the study because they undertook the TTC curriculum in Kenya as implementers and participants in Kenya Teacher College. The second-year students were targeted because they had been in the college for a significant length of time.

**Sample size and sampling techniques**

This study adopted both probability and non-probability sampling. The probability sampling was simple random sampling which involved thirty percent of the target population of

students and teachers (Mugenda and Mugenda, 2010). Non-probability sampling was purposive sampling which involved selection of a few relevant cases made up of eight college principals, eighty college tutors (ten from each college) and a total of three hundred and twenty second year students from each of the selected colleges. Four hundred and eight questionnaires were administered during the study.

**Research instruments and data collection procedures**

Research instruments are the tools used for collecting data and how those tools are developed (Oso & Onen, 2009). In this study, data was collected by questionnaires and document analysis. The researcher constructed three different sets of questionnaires for the principals, college tutors, and the students.

**Data analysis techniques**

Data analysis refers to examining what has been collected in a survey or experiment and making deduction and inferences (Kombo & Tromp, 2006). Data obtained was analyzed using both qualitative and quantitative data analysis procedures. Responses from the closed ended questions were assigned numbers with the open-ended questions numbered according to themes based on the research questions which were assigned codes. A frequency tally was then used to assign each expected response in the data to the theme it closely corresponds to. Descriptive statistics was used to analyze quantitative data, which included the use of frequencies and percentages. The researchers analyzed collected data and generated tables and bar graphs after analyzing and discussing the findings.

**Data Presentation and Analysis**

The Interpretation is organized under the following sub-headings; questionnaire return rate, the respondents' demographic data and finally their opinions regarding various issues raised in the research instrument.

**Questionnaire Return Rate**

Questionnaire return rate is the total number of the questionnaires that are returned after they have been administered to the respondents. Four hundred and eight questionnaires were administered to the respondents. Two hundred and eighty-eight questionnaires were returned hence the return rate was 70.6%.

**Professional qualification of teacher trainers**

For an individual to work in any field of education competently, he/she must have relevant qualifications. It was, therefore, imperative to ask teacher trainers to indicate their professional qualifications. Table 1 below shows the professional qualifications of the college tutors.

**Table 1: Tutor professional qualification**

| Level | Frequency | Percentage |
|---|---|---|
| Master of Education (M. Ed) | 22 | 25 |
| Master of Arts (MA) | 12 | 12.6 |
| Bachelor of Education (B. Ed) | 47 | 53.4 |
| BA/PGDE | 3 | 3.4 |
| Diploma in Education | 4 | 4.6 |
| Other Qualifications | 0 | 0 |

Table 1 above shows that the majority of tutors (53.4%) hold B. Ed with only 25% and 13.6% with Master of Education and Master of Arts respectively. This means that 38.6% have

furthered their education. Those with B. Ed are not specialists in primary teacher training and require emphasis on methodology.

**Teaching experience of teacher trainers**

| Years | Frequency | Percentage |
|---|---|---|
| < 1 year | 0 | 0 |
| 1-5 years | 8 | 9.1 |
| 6-10 years | 22 | 25.0 |
| >11 years | 58 | 65.9 |
| **Total** | **88** | **100** |

**Table 2: Teaching experience of teacher trainers'**

The data in Table 2 shows that in terms of teaching experience, a majority of the college tutors (65.9%) had worked for eleven years and above. This implies that these tutors are familiar with primary teacher education as they have been in the field for many years, 9.1% have less than five years teaching experience. This is shown in the chart above.

Work output and productivity largely depends on appropriate experience. Thus, it was necessary to establish the experience of teacher trainers in teacher colleges. Table 2 below shows the teacher trainers experiences

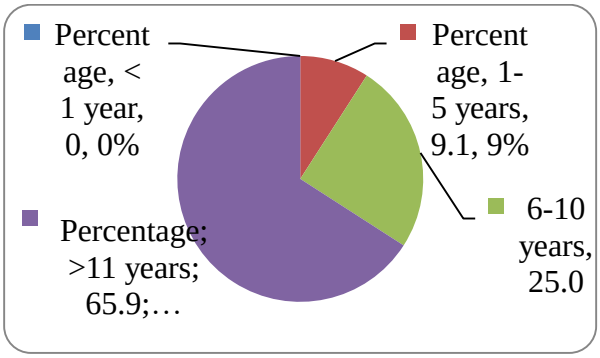



**Fig 1: Teaching Experience of teacher trainer**

**Level of competency of teacher trainers**

The trainees were asked to indicate the extent to which the trainers adequately prepared them in developing the ten competency skills drawn from the 2002 primary teacher curriculum. The findings are illustrated in Table 3 below.

**Table 3: Level of competency of teacher trainers**

| Competency skills | Highly adequate | | Adequate | | Not adequate | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Freq | % | Freq | % | Freq | % | Freq, | % |
| Knowledge of content subject matter | 13.8 | 53.5 | 117 | 45.3 | 3 | 1.2 | 258 | 100 |
| General pedagogical knowledge | 42 | 16.3 | 118 | 45.7 | 98 | 38 | 258 | 100 |
| Curriculum/syllabus knowledge | 108 | 41.9 | 128 | 49.6 | 22 | 8.5 | 258 | 100 |
| Current approach of teaching | 113 | 43.8 | 129 | 50 | 16 | 6.2 | 258 | 100 |
| Adoption instructional materials, designing games, teaching aids and ICT compliant | 15 | 5.8 | 111 | 43 | 132 | 51.2 | 258 | 100 |
| Developing positive attitude and motivation towards teaching | 133 | 51.6 | 101 | 39.1 | 24 | 9.3 | 258 | 100 |
| Proficiency level of English language | 130 | 50.4 | 122 | 47.3 | 6 | 2.3 | 258 | 100 |
| Classroom management skills | 142 | 55 | 86 | 33.4 | 30 | 11.6 | 258 | 100 |
| evaluation of student achievement by use of test using feedback to improve learning | 98 | 38 | 135 | 52.3 | 25 | 97 | 258 | 100 |
| Teaching Practices | 86 | 33.3 | 98 | 38 | 74 | 28.7 | 258 | 100 |

From Table 3, the trainees rated the ten competency skills as adequate. This portrayed that the trainers are competent in the competency skills significant in teacher training.

The results showed that a majority of the trainers (53.5%) agreed that tutors were knowledgeable. This is attributed to the high number of B.Ed. and master's degree holders. The table also showed that 1.2% disagreed which is critical. The deficiency could be attributed to lack of initial training or induction of tutors or individual tutor's negligence.

The results further showed that tutors' pedagogical knowledge was adequate as rated by 45.7% of the trainees, but 38% felt that it was not adequate. 49.6% of the trainers felt that curriculum/syllabus knowledge was adequate; a majority of the trainees (50%) also felt that tutors used current approaches to teaching but 8.5% and 6.2% indicated that curriculum knowledge and tutors using current approaches of teaching respectively are inadequate.

**Teacher trainee preparedness after two years' period**

Tutors were asked to rate the trainees in their colleges in relation to their preparedness to teach after a two years' period. The response is illustrated in Table 4 below.

**Table 4: Preparedness of teacher trainees after a two-year training period**

| Response | Frequency | Percentage |
|---|---|---|
| Very prepared | 28 | 31.8 |
| Fairly prepared | 55 | 62.5 |
| Inadequately prepared | 5 | 5.7 |
| **Total** | **88** | **100** |

The results indicate that the majority of the trainees (62.5%) are fairly prepared. 5.7% are inadequately prepared and it was believed that academically good teachers would be in a position to prepare their pupils well.

**Trainees' opinions on teaching all subjects once posted**

The researcher asked the students to indicate whether they can teach all subjects offered in the primary education curriculum upon completion of training. Table 5 below shows the percentages in terms of their responses.

**Table 5: Trainers opinion on teaching all subjects once posted**

| Response | Number of Trainees | Percentage |
|---|---|---|
| Yes | 98 | 38 |
| No | 160 | 62 |
| **Total** | **258** | **100** |

**This is depicted by the pie chart below**;

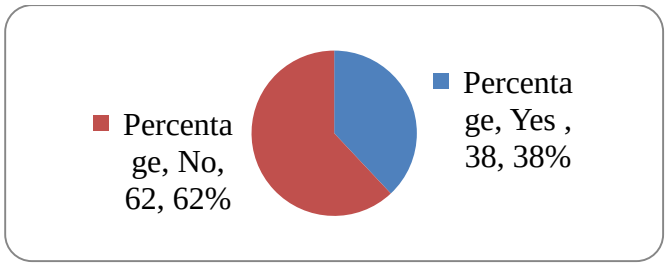



**Figure 2. Trainers' opinions on teaching all subjects once posted**

The majority of the trainees (62%) said that they cannot teach all subjects offered in primary schools as always practiced in primary schools, 38% of the respondents feel

that they can teach all subjects in primary school.

**Trainees' Academic Qualification**

The questionnaire intended to establish the extent to which the trainee's academic qualification influences quality training in primary teacher colleges. Trainers were asked to indicate their academic qualification and Table 6 below indicates their KCSE academic average grades.

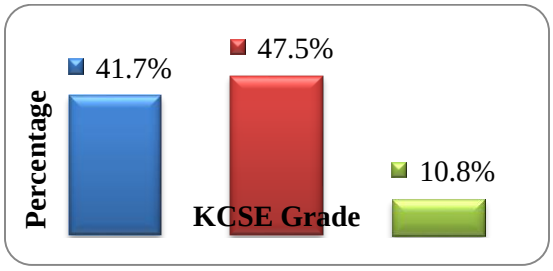



**Figure 3. Trainees' Academic Qualifications**

**Table 6: Trainees' Academic Qualifications**

| KCSE GRADE | Frequency | Percentage |
|---|---|---|
| C | 108 | 41.7 |
| C+ | 122 | 47.5 |
| B- | 28 | 10.8 |
| **Total** | **258** | **100** |

The minimum admission grade by Kenya Ministry of Education for students admitted to train as primary school teacher trainees is a minimum KCSE grade of C or its equivalent and they must have attained D (plain) in mathematics and C- in English (MOE, 2004). Table 7 above has shown that most trainees scored a mean grade of C+, which is a minimum university entry grade translating to 47.5% with 10.8% scoring B- in KCSE.

**Adequacy of teaching and learning resources**

The researcher intended to establish the adequacy of teaching and learning resources in the selected teacher training colleges. Teacher educators were asked to rate the adequacy of teaching and learning resources and Table 8 below indicates their responses.

**Table 7: Adequacy of teaching and learning resources**

| Rating of teaching and learning resources | Trainers sampled | Percentage |
|---|---|---|
| Excellent | 0 | 0 |
| Very Good | 0 | 0 |
| Good | 18 | 20.4 |
| Average | 38 | 43.2 |
| Poor | 32 | 36.4 |
| **Total** | **88** | **100** |

From Table 7 above 36.4% of the tutors indicated that the resources are inadequate This is critical as the resources should be provided to facilitate learning.

**Challenges facing primary teacher training**

The researcher endeavored to elicit information from the respondents on the problems that are facing primary teacher training colleges. The teacher-trainers and trainees were required to list problems facing teacher training and the result is presented in Table 8 below.

**Table 8: Challenges facing primary teacher training**

| Challenges facing primary teacher training | Trainers | | Trainees | |
|---|---|---|---|---|
| | Freq, | % | Freq, | % |
| Insufficient training period | 58 | 65.9 | 112 | 43.4 |
| Inadequate facilities/resources | 32 | 36.4 | 228 | 88.4 |
| Wide/congested syllabus content | 34 | 38.6 | 213 | 88.4 |
| Inadequate trainers | 21 | 23.9 | 86 | 33.3 |
| Lack of motivation | 18 | 20.6 | 86 | 33.3 |
| Subject specialization | 18 | 20.6 | 196 | 45 |
| Strict administrative rules | 4 | 4.5 | 98 | 38 |
| Financial constrain | - | - | 108 | 41.9 |
| Insufficient T.P materials | - | - | 94 | 36.4 |
| Sanitation/hygiene | - | - | 43 | 16.4 |
| Admission of academically poor Students | 12 | 13.6 | - | - |
| Communication barriers in lower classes during T. P | - | - | 28 | 10.9 |
| Lack of enthusiasm by some trainers | 4 | 4.5 | - | - |
| Implementation of regular College based assessment | 16 | 19 | 65 | 24 |

From Table 8 above, various challenges were cited by the respondents in the open-ended questions. Lack of enthusiasm by some trainers was indicated by 4.5% of the trainers' inadequate trainers by 23.9% of the trainers and 33.3% of the trainees.

The majority of the trainers (82.3%) and trainees (38.6%) cited wide syllabus as a challenge. This, together with a majority of the trainers (69.5%) and 43.4% of the trainees cited insufficient training period as a challenge influencing quality training. This confirms that the training period is inadequate and should be adjusted.

About 13% of the trainers also indicated that admission of academically poor students/trainees is a challenge though they had the minimum entry requirements of Grade C at KCSE. This negatively influenced trainees' academic achievement and professional development while undergoing training. Inadequate resources/facilities and insufficient teaching practice materials were cited by 36.4% trainers and 88.4% trainees as a challenge in teacher training.

**Suggestions of how to improve primary teacher training**

From the open-ended questions, the respondents came up with the following suggestions to improve primary teacher training as shown in Table 9 below;

**Table 9: Suggestion of how to improve primary teacher training**

| Suggestions of how to improve primary teacher training | Trainers | | Trainees | |
|---|---|---|---|---|
| | Freq, | % | Freq, | % |
| Increase training period | 58 | 65.9 | 112 | 43.4 |
| Upgrade P1 to diploma in education | 38 | 43.2 | 18 | 7 |
| Increase T.P duration | 58 | 65.9 | 112 | 43.4 |
| Review the syllabus | 58 | 68.9 | 202 | 78.3 |
| Provide adequate resources | 32 | 36.4 | 228 | 88.4 |
| Admit students with good grades | 38 | 43.2 | 18 | 7 |
| Recruit/Employ more tutors | 33 | 37.5 | 93 | 36 |
| Tutors to advance or in education | 18 | 20.5 | 14 | 5.4 |
| Specialization in two subjects | 18 | 20.6 | 116 | 45 |
| College initiate income generating activities | 21 | 23.9 | 48 | 18.6 |
| Increase tutors' salaries | 21 | 23.9 | 46 | 17.8 |
| Encourage practical approach | 27 | 33.9 | 36 | 40.9 |
| Government to provide grants in- aid to colleges | 21 | 23.9 | - | - |
| Provide students with loan | 33 | 37.5 | 108 | 41.7 |

On improving the primary teacher education training, Table 9 above shows 20.5% trainers and 5.4% of the trainees suggesting that college tutors need to progress in education. Most tutors have a Bachelor of Education degree and were initially trained as secondary school teachers with specialty in a particular subject area.

On the same note 20.5% of the trainers suggested that there is a need to employ more tutors to reduce workload and boost competency. Respondents also cited suggestions in relation to the training period. These included, increasing training period (65.9% trainers and 43.4% trainees), increasing Teaching Practice duration as shown by 65.9% trainers and 43.4% trainees. They further suggested review of the syllabus as seen by 65.9% trainers and 78.3% trainees.

They also indicated the need of upgrading P1 course to diploma in education status. Suggestions cited by respondents in solving problems of inadequate resources / facilities include grants in-aid of colleges, government to provide adequate resources to colleges to initiate income generating activities and providing students with loans.

**Conclusion**

To establish the extent to which the level of competency of teacher trainers affect effective implementation of college-based assessment in primary teachers' colleges in Kenya, the researcher concluded that additional training of college trainers to be provided with emphasis on methodology to enhance their pedagogical knowledge.

To establish how teacher trainees' academic qualification affects effective implementation of college-based assessment in primary teacher's colleges in Kenya, the researcher concluded that the Primary Teacher Education course should be upgraded to diploma in education to make teacher training attract trainees with good academic grades. The government should give adequate grants in aid

to colleges in order to enable the various public colleges acquire relevant and adequate resources and intensify the quality assurance of the private teacher colleges.

The research further found out that the training period was inadequate for preparing primary school teachers according to the trainers and the trainees. The respondents felt that the syllabus is wide in scope and in some subjects; the syllabus is not always completed by the end of the two-year course, there is an inadequate period for teaching practice.

The study found out that trainee academic qualification is average. The low number of trainees scoring distinction grades in primary teacher examination (PTE) illustrated in the document analysis is attributed to a majority with average grades. If colleges could select students with high grades in K.C.S.E, then the percentage of those scoring distinctions will increase. It is, therefore, important to attract students with high grades.

The study established that teaching and learning resources are inadequate. Books and equipment were obsolete and learning resources contents, which are either ICT or E-learning enabled were not available. This goes hand in hand with learning facilities, which were considered inadequate and not compliant. This, therefore, means that tutors hardly use ICT techniques in teaching.

On finding out if there were college management related factors which influence students' college Based Assessment in Primary Teacher Colleges in Kenya, the study established that there is a need to employ more tutors to reduce workload, increase the motivation of college trainers and review the primary teacher education syllabus to make it teacher friendly,

**Recommendations**

**Level of competency of college tutors**

The study recommends tutors to be provided with additional training with emphasis on methodology to enhance their pedagogical knowledge. There is need for universities to increase the number of trainees to be enrolled in the primary option offered in Kenyatta University so as to effectively meet the demand-supply of tutors to colleges.

**Academic Qualification of the learners**

This study recommends the primary teachers certificate course to be upgraded to diploma course in education, to make teacher training attractive to trainees with good academic grades the passion to teach. The study also recommends that the primary teacher education syllabus be reviewed.

**College Based Assessment of the Trainees**

The research further found out that what affects the college-based assessment was the period of training which was inadequate in preparing primary school teachers according to the trainers and the trainees. This study recommends that the training period be increased to three years to enable the trainers prepare trainees adequately.

**Teaching and Learning Resources**

On other factors which affect effective implementation of college-based assessment in primary teacher's colleges in Kenya the researcher recommends that government provide adequate grants in aid to colleges in order to enable the public institutions acquire relevant and adequate resources. As for private teacher training colleges, the Directorate of Quality Assurance and Standards of the Ministry of Education should consider inspecting all the private teacher-training

colleges to establish the status of teaching and learning resources to enhance effective quality teacher training.

In order to increase the motivation of college tutors, the researcher recommends the Ministry of Education in collaboration with the Teachers Service Commission to consider establishing ways of measuring the quality of work of individual college trainers and come up with systems to identify the 'best-performing' tutors with an aim of remunerating them accordingly. The study recommends Continuous Professional Development (CPD) by which teachers (like other professionals) reflect upon their competences, update them and further develop, re-apply periodically for their licenses to teach upon conducting relevant professional examinations. The Ministry of Education in liaison with the Teachers Service Commission should consider increasing the number of college tutors to cover in-service course and come up with an education policy on in-service training for Primary Teacher Education.

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# Effect of School Location on Pupils' Academic Performance in Kenya

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## Abstract

*The provision of quality basic education is crucial in laying the foundation for social, economic, cultural, and political development in any country. The social pillar of Kenya's Vision 2030 commits the country to achieve regionally and internationally competitive quality and relevant education. However, studies reveal that disparities across regions and other backgrounds persist. This paper is based on a study conducted by the Kenya National Examinations Council (KNEC) in 2016 which aimed at assessing learner achievement in Numeracy and Literacy (English and Kiswahili) competencies, as well as factors that impact upon achievement of these competencies. The study adopted a descriptive survey design. The Sample Design Manager (SAMDEM) software was used to sample 250 primary schools from each of the 47 counties of the Republic of Kenya. A random sample of 5,522 pupils participated in the study from 247 schools that were reached. Standardized Numeracy and Literacy tests developed by subject and curriculum specialists as well as questionnaires were used to collect data. The Census and Survey Processing System (CSPro) software was used to capture data. The data were then transfered to Stata for cleaning and analysis. Results were presented in form of tables and bar graphs. The study revealed that less than 50% of Class 3 learners attained Level 4 competencies in Numeracy and Literacy. Another major finding of the study was that school location had a significant influence on pupils' academic achievement in Numeracy and Literacy at 99% confidence interval. Pupils in urban schools performed better in Literacy and Numeracy than their counterparts in rural schools. Based on the findings, it is recommended thatthe Government should put in place specific measures/interventions that will help bridge the gap in pupils' academic performance between schools in rural and urban areas by providing adequate and essential teaching/learning facilities and resources that will in turn provide conducive learning environments for all learners. These include ensuring equitable distribution of teachers across all schools as well as provision of essential teaching/learning resources so as to expose pupils to a conducive learning environment.*

***Key words:*** *Competencies, Numeracy, Literacy, Pupils' performance, School location*

**Background of the Study**

Over the centuries, education has played a central role in ensuring that social, economic, cultural, and political development in any country is achieved. The provision of equal and quality educational opportunities to children is one of the key ways through which economic development across the world can be attained (UNESCO, 2015). Despite concerted international efforts to eliminate occasions that might disadvantage some learners, disparities persist.

Kenya became a signatory to the Inchon Declaration in September 2015, in South Korea during the Education World Conference on Sustainable Development Goals (SDGs). The fourth Sustainable Development Goal (SDG) seeks to ensure inclusive and quality education for all and promote lifelong learning by 2030 (UNESCO, 2015). The right to quality basic education for all is guaranteed in the Constitution of Kenya 2010 (Republic of Kenya, 2010). Furthermore, the social pillar of Kenya's Vision 2030 commits the country to achieve regionally and internationally competitive quality and relevant education (Republic of Kenya, 2007).

However, despite efforts by the Government of Kenya, disparities across different social backgrounds persist which in turn have continued to disadvantage many learners by limiting their chances of accessing good quality educational opportunities. There is need, therefore, to carry out regular and timely monitoring of learning outcomes so as to ensure that all learners have equitable access to education of good quality.

This paper is based on a study carried out by the Kenya National Examinations Council (KNEC). One of the key objectives was to establish the combinations of factors such as school location, school type among others, that influence pupil learning achievement at Class 3 level in Numeracy and Literacy in Kenya (KNEC, 2016). The findings would then be used to formulate relevant policies to address the disparities and hence reduce, if not eliminate, the difference in performance between learners in rural and urban schools.

**Research Problem**

At the dawn of the 21st century, the government of Kenya made major reforms and innovations in the education sector with the objective of fulfilling the internationally set goals. In 2003, Kenya introduced the Free Primary Education (FPE) resulting in increased enrolment in public primary schools from 5.9 million in 2002 to 6.9 million in 2003. The FPE program has been sustained for nearly 15 years now even as the world seeks to attain the SDGs by 2030. However, major challenges in schools continue to be experienced in Kenya. These include inadequate teaching/learning resources and facilities especially in urban slums and rural regions, declining support by communities, and poor school management. These challenges have a direct negative impact on educational access, equity and quality hence affecting learners' academic performance and lifelong achievements.

There has been continued debate on whether school location has any impact on the academic performance of learners. The Organisation for Economic Co-operation and Development (OECD) reported in 2013 that there was an 'urban advantage' in student performance across all countries that took part in the 2009 Programme for International Student Assessment (PISA) (OECD, 2013). The PISA results revealed that the differences and

variations in performance between learners in urban and rural schools translated to about 20 score points.

The purpose of this study, therefore, is to establish if school location influences pupil achievement at Class 3 level in Kenya.

**Research Objectives**

The study was guided by the following key objectives:

- To determine Class 3 pupils' achievement levels in Numeracy and Literacy (English and Kiswahili);
- To find out the effect of school location on pupils' academic performance in Kenya.

**Purpose of the Study**

One of the main purpose of this study was to find out the effect of school location on Class 3 pupil academic achievement. This was achieved after controlling for pupil background variables using multilevel modelling technique (Multiple Linear Regression-MLR). This implies that the effect of school location on pupil learning outcomes was established after accounting for other variables that might influence academic performance.

**Scope and Delimitation of the Study**

This study targeted all the Class 3 pupils of 2015 attending registered mainstream public and private primary schools. However, the study excluded learners in purely special schools as they use an adapted syllabus. It also excluded schools with class sizes of less than fifteen (15) pupils at Class 4 in 2016.

**Definition of Terms**

**Competence:** The ability of a learner to successfully perform specific tasks in a given learning area after undergoing a guided instruction by a teacher/instructor. Competence is measured against specified proficiency levels.

**Pupil/Learner Performance:** Refers to what a pupil or learner can competently do in Numeracy and Literacy (English and Kiswahili) at the end of a learning process.

**School Location:** The environment/community within which a school exists. This can either be rural or urban/peri-urban setting.

**Literature Review**

**Impact of School Location on Pupil Academic Achievement**

The quest to establish the factors influencing academic performance has been in place across different parts of the world for a very long time. According to a study conducted in Western Australia by Young (1998), there are significant rural and urban differences in achievement in Science and Mathematics. A similar study in Australia found that learners from non-urban areas are more likely to achieve less academically and are likely to drop out of school despite schools in non-metropolitan regions having adequate teaching-learning resources and facilities (HREOC, 2000). In their paper which presented data on over 3,000 learners from financially disadvantaged backgrounds in Australia, Considine, G. & Zappala, G. (2002), noted that academic performance of children from rural and remote Australia was affected by socio-economic, family, individual, and contextual factors. Educational researchers continue to explore the factors that have a bearing on learner performance using new software with models that take into account interactions between variables. The current study sought to establish the influence of, together with other variables,

school geographical location in terms of rural-urban divide on pupil achievement.

According to a report by the Canadian Council on Learning (CCL) (2006), learners in urban Canada have been outperforming their rural counterparts in PISA. The report further notes that economic conditions in rural areas can negatively influence educational outcomes by encouraging absenteeism among learners (particularly males) who opt to seek short term employment to support their families. This is a clear indication that most, but not all, of pupils from urban areas are likely to come from well-to-do families and are exposed to a wide range of sources of information while their rural counterparts have limited resources and are least exposed to rich learning opportunities.

According to Sifuna and Sawamura (2010), many households, especially those in rural areas are too poor to afford direct and opportunity costs for their children to enroll in school. The provision of quality education requires an effective quality assessment mechanism so as to ensure that competencies spelt out in the curriculum are attained by children from all social backgrounds. This will in turn help reduce the existing gaps between sub-groups and provide equal opportunities to all learners in terms of teaching, assessment and access to educational opportunities and career progression in the world of work. Nworgu and Nworgu (2013) note that school environment has a larger impact on pupil academic performance. This implies that learners who study in unfavourable environments will be disadvantaged especially if selection for advanced grades will be based on same assessment criteria regardless of school location. Proponents of human capital theory argue that education plays a critical role in helping learners acquire requisite knowledge and skills which in turn increase their employability and earnings hence improved quality of life (Schultz, 1963).

The difference in performance among Class 3 learners is likely to persist in subsequent grade levels as revealed in a number of studies. Evidence from the study conducted in Kenya indicated that learners in urban schools outperformed their counterparts in rural schools in Mathematics and English (Wasanga, Ogle & Wambua, 2010). According to the findings of SACMEQ IV, a study conducted among Class 6 learners in fourteen countries in southern and eastern Africa, pupils in rural schools performed lower compared to their urban counterparts in both Mathematics and Reading (English) assessment (KNEC, 2017). Similarly, another study conducted by KNEC (2017) among Form 2 students revealed a similar trend where performance in Mathematics and English was higher among students in urban schools than those in rural schools.

This study sought to document the impact of school location on pupil academic achievement at Class 3 since a similar study at this level in Kenya was conducted in 2009.

## Research Methodology

### Design and Target Population

Descriptive survey research design was used. This design allow for data collection from a wide geographical coverage and a large sample as required without manipulation. A survey is an attempt to collect data from members of a given population in order to determine the current status of the entire population under study with respect to one or more variables (Mugenda & Mugenda, 2003). The defined target population for this study was all the Class

3 pupils of 2015 attending registered mainstream public and private primary schools.

**Sampling Procedure**

Out of the 27,117 primary schools in Kenya, 250 schools in the 47 counties were sampled. However, 247 (98.8%) schools were reached with three schools being non-responsive. The sampled schools were largely with an entry of 15 or more learners. The Sample Design Manager-SAMDEM (Sylla, K. et al., 2003) was used for sampling of schools. A stratified random sample of 25 pupils in each of the sampled schools was selected to participate in the study. In this study, 5,522 pupils were sampled with girls and boys comprising 50.3% and 49.7% respectively.

**Instrument Development**

The following instruments were developed to collect specific data from the respondents: Numeracy, English and Kiswahili achievement tests to measure the competency of pupils in numeracy and literacy respectively, and a school observation schedule which was used to assess school facilities and resources. The literacy and numeracy test items were developed by a team of researchers, test development specialists, curriculum specialists, and practicing primary school teachers drawn from KNEC, Kenya Institute of Curriculum Development (KICD), Teachers Service Commission (TSC), among other organizations.

**Data Collection**

The data collection exercise started with training of 31 regional coordinators (RCs) at a central place. The Regional Coordinators subsequently trained data collectors in their specific areas using a common data collectors' manual. The trained data collectors were then deployed to the sampled schools. Five hundred (500) data collectors participated in this exercise. Two (2) data collectors were assigned to collect data from each of the sampled schools. Data collection in each school was undertaken in two (2) days under the supervision of regional coordinators.

**Data Processing and Analysis**

Data capture was done using the Census and Survey Processing System (CSPro Version 6.3). The statistical analysis produced results in terms of frequencies and means which were described in the form of tables and bar-graphs. The Item Response Theory (IRT)–2 Parameter Logistic (2PL) was used to analyze pupils' competency levels. To determine factors influencing learning outcomes, a multilevel analysis of the data was carried out using Multiple Linear Regression (MLR) in STATA version 14 software.

**Discussion of Findings**

This section presents the findings of the study in terms of overall performance in Numeracy and Literacy across the four (4) competency levels. Results of performance of learners by school location as well as multilevel analysis of factors influencing pupil achievement with a focus on school location are also presented and discussed.

**Overall Pupil Performance in Numeracy and Literacy (English and Kiswahili)**

***Table 1: Percentage of Pupils Attaining the Different Competency Levels in Numeracy***

| Level | % of pupils |
|---|---|
| Level 1 | 83.1 |
| Level 2 | 71.1 |
| Level 3 | 36.1 |
| Level 4 | 4.5 |

Table 1 indicates that majority of the pupils attained Levels 1(83.1%) and Level 2 (71.1%) competencies in Numeracy. About a third (36.1%) of the pupils attained Level 3 of competency in Numeracy. However, only a small percentage (4.5%) attained the highest competency level (Level 4). These findings reveal that majority of learners are operating at the lower Levels 1 and 2 in Numeracy. There is need for teachers to focus on facilitating the acquisition of higher order numeracy skills. Acquisition of higher order abilities at this level will play a critical role in preparing learners for advanced content as they progress through the education system and the world of work as they pursue their careers of choice.

***Table 2: Percentage of Pupils Attaining the Different Competency Levels in Literacy (English and Kiswahili)***

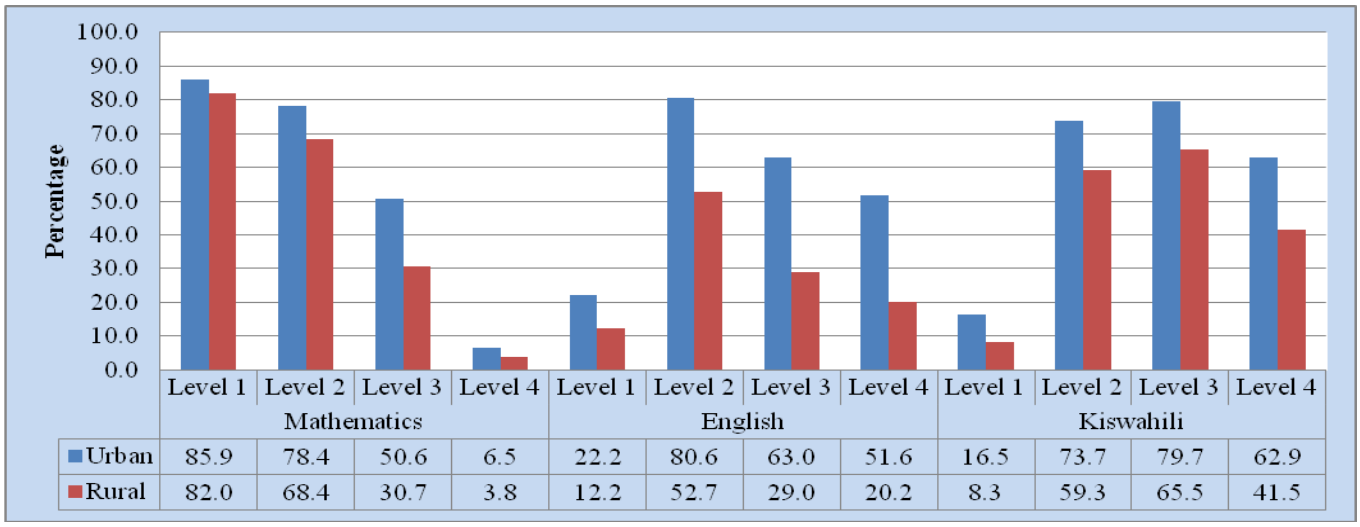
| | English | Kiswahili |
|---|---|---|
| Level | % of pupils | % of pupils |
| Level 1 | 14.9 | 10.5 |
| Level 2 | 60.1 | 63.1 |
| Level 3 | 38.1 | 69.2 |
| Level 4 | 28.6 | 47.1 |

It can be observed from Table 2 that the percentage of pupils who have attained the pre-reading skills in both English and Kiswahili is very low at 14.9% and 10.5% respectively. Notably, pupils at this level are expected to have attained the competency of arranging words in alphabetical order and using the dictionary. On the other hand, majority of the pupils have attained Level 2 competencies in English and Kiswahili at 60.1% and 63.1% respectively. At Level 3, majority of the pupils (69.2%) have attained basic reading competency in Kiswahili while only 38.1% have attained the same in English. The percentage of pupils who have attained the highest level of competency in English and Kiswahili is 28.6% and 47.1% respectively. It is notable that, overall, more than half of learners did not attain the desired competencies at Class 3 in both English and Kiswahili yet they had completed the syllabi for this grade. It is therefore critical for teachers to ensure that

the gap between their teaching of curriculum content and acquisition of the appropriate abilities, skills and attitudes by learners is bridged. Continuous assessment of learner capabilities by teachers is essential in ensuring that appropriate interventions and teaching strategies are put in place to address individual needs of the learners.

**Pupils Competency Levels in Numeracy and Literacy by School Location**

Pupil performance in numeracy and literacy were further analyzed by school location in order to establish whether there were disparities in achievement between learners in urban and rural schools. The findings are presented in Figure 1.




| | Mathematics | | | | English | | | | Kiswahili | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Level 1 | Level 2 | Level 3 | Level 4 | Level 1 | Level 2 | Level 3 | Level 4 | Level 1 | Level 2 | Level 3 | Level 4 |
| Urban | 85.9 | 78.4 | 50.6 | 6.5 | 22.2 | 80.6 | 63.0 | 51.6 | 16.5 | 73.7 | 79.7 | 62.9 |
| Rural | 82.0 | 68.4 | 30.7 | 3.8 | 12.2 | 52.7 | 29.0 | 20.2 | 8.3 | 59.3 | 65.5 | 41.5 |

**Figure 1: Competency Levels in Numeracy and Literacy by School Location**

Figure 1 shows that majority of pupils in urban and rural areas reached Level 1 competency in Numeracy, with pupils in urban schools leading at 85.9%. Only 30.7% of pupils in rural schools attained Level 3 competency in Numeracy compared to 50.6% in urban schools. However, fewer pupils from both urban and rural schools attained the highest level of competency (Level 4) in Numeracy. Fewer pupils in urban and rural schools attained Level 1 competency in Literacy (English and Kiswahili) with only 12.2% of pupils in rural schools attaining Level 1 competency in English compared to 22.2% in urban schools. It is notable that in all the four competency levels in the three subjects, pupils in urban schools performed better than their counterparts in rural schools. This implies that some of the learners in rural schools have not adequately acquired the expected competencies in both numeracy and literacy at this foundational level of early grade learning. Class 3 is a key stage as it marks the end of early grade cycle in Kenya's education system as learners transit to upper primary level where they are expected to build on the competencies acquired at lower primary.

**Factors Influencing Pupil Achievement in Numeracy and Literacy**

**Multilevel Analysis Model**

Multiple Linear Regression (MLR) is a form of linear regression analysis used to explain the relationship between one continuous dependent variable (pupil achievement) and two or more independent variables (e.g. school location). This approach was used to determine whether, along with other variables, school location had a significant impact on pupil performance.

When interpreting the results from this study, it should be noted that urban schools constitute a heterogeneous category and may differ from one another as much as they differ from rural schools. In particular, schools in urban slums differ significantly from those located in well to do areas of urban settings. Multivariate analysis, therefore, seeks to take into consideration other factors that might influence learning outcomes before any meaningful comparisons are made. This paper highlights the impact of school location as part of a full model. The findings are presented in Table3.

***Table 3: Final Results Using Multilevel Models***

| **Variable** | **Mathematics** | | | | **English** | | | | **Kiswahili** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Coef** | ***p*** | **95% CI** | | **Coef** | ***p*** | **95% CI** | | **Coef** | ***p*** | **95% CI** | |
| **School location-Rural** | -15.0 | | -33 | 3.2 | -37.1 | ** | -54.0 | -20 | -24.9 | ** | -42 | -8 |

**Key**

* Significant at 0.05 level ** Significant at 0.01 level

From Table 3, it can be observed that school location has an influence on pupil achievement ($p$<0.01) . Pupils in rural schools scored lower in Mathematics, English and Kiswahili by 15.0, 37.1 and 24.9 points respectively than those in urban schools. This indicates that learners in rural schools will need more time of teaching-learning to catch up with their urban counterparts especially in Literacy (English and Kiswahili).

## Conclusions and Recommendations

### Conclusions

There are major differences in the percentages of pupils attaining desired competencies in Numeracy between urban and rural schools. It is observed that only 30.7% of pupils in rural schools have attained Level 3 competency in Numeracy as compared to 50.6% in urban schools. It is also notable that in all the 4 competency levels in Numeracy, pupils in urban schools performed much better than their counterparts in rural schools. This paper has shown the significant differences that exist between performance of pupils in rural and urban schools. This implies that locality of school has an influence on pupil achievement in Numeracy and Literacy.

### Recommendations

There is need for the Government, through the Ministry of Education, to put in place specific measures/interventions that will help bridge the gap in academic performance between pupils in schools in rural and urban areas by providing adequate and essential teaching/learning facilities and resources that will in turn provide conducive learning environments for all learners. The relatively poor performance among learners in rural schools could be associated with lack of adequate resources accessible to pupils.

The Government and teacher employment agencies should provide incentives to teachers, especially those in arid and semi-arid areas in order to motivate them to remain in school and ensure effective teaching and learning process. There is also need to further investigate other reasons behind regional disparities in achievement in numeracy and literacy. This

will ensure that appropriate interventions are put in place in order to ensure that all learners have equal access to education of high quality, regardless of the location of their schools.

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# Acceptance of Kenyan Primary School Teachers on Implementation of the School Based Assessment into Kenyan System: A Case of Nairobi County

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## Abstract

*The government of Kenya rolled out the new competence-based curriculum, which took effect in primary schools in January 2018. According to an evaluation report by the Kenya Institute of Education 2008, the previous education system was not holistic to the learners. The new curriculum is aimed at establishing and building on the learners' competencies that are established to be of significant strength, while at the same time responding to individual pupils' strengths and weaknesses. The study sought to establish the acceptance of the new curriculum and the school based assessment amongst teachers. The study was based on a descriptive survey design. The target population was lower primary school teachers in 75 public and 40 private primary schools in Nairobi County. A sample size of 40 public and 25 private primary schools was randomly selected through stratified sampling. Purposive sampling was used to select 150 teachers. Data was collected through the use of questionnaires and interview schedules. Descriptive and inferential statistics were used in data analysis. Descriptive statistics included mean, percentages and standard deviations while inferential statistics used Pearson correlation analysis. The study established that a high percentage (76%) of teachers positively identified with the new curriculum. However, only 30% had a good idea about the change in curriculum. It showed that a significant percentage of the teachers embraced the new curriculum and the concept of school based assessment. However, there were varied challenges in the availability of human resources, as well as technological and physical structures essential for the implementation of the new curriculum. The study recommends further sensitization of the stakeholders in order to boost the acceptance and ultimate success of the new curriculum, further training of teachers and reducing the pupil-teacher ratio. In addition, more resources are required to improve on technological and physical structures.*

***Keywords**: Curriculum review, Education Reform, Competence-based Curriculum, School- based assessment*

## Introduction

Education systems around the world are going through reforms in an effort to improve quality of life. The education system has always benefited from technological advances to explore new research areas and improve the teaching-learning process (Serdyukov, 2017). Over recent years, there has been an increased interest in incorporating competencies into educational curriculum to ensure the teaching meets market demands. Kouwenhoven (2003) defines competence as the ability to choose and use the knowledge, skills and attitudes that are needed for performance at a desired level. In addition, Mosha (2012) defines competence as an integrated set of skills, knowledge and attitudes that enable one to effectively perform the activities of a given occupation to the standards expected at school and later in the world of work.

A Competence-based Education (CBE) focuses on the outcomes of learning by defining goals and processes to achieve them (El Falaki et al., 2011). Educational programs based on CBE describe skills and capacities that one needs to achieve, and should be aligned with both industry and academic standards (Johnstone & Leasure, 2015). Competence-based Education involves methodology to describe, model and assess competencies. CBE mostly incorporates competence framework and competence assessment. The competence framework describes the skills, abilities and knowledge needed to perform a specific task. Competencies must be clearly defined, measurable and related to the knowledge or skills needed for future endeavors, whereas, competence assessments are used to determine mastery of the content learned and practiced. Assessment quality has been an important research topic for as long as CBE programs have existed. In 1976, John Harris and Stephen Keller outlined several key considerations in competence assessment and concluded; “The major development effort in competence-based education should not lie in design of instructional materials but in design of appropriate performance assessments”.

Kenya has been practicing centralized education and assessment systems. In assessment, learners have gone through common public examinations that were developed and administered by the Kenya National Examination Council. The national examinations include the primary school assessment evaluation in class/year 8 and the secondary school level in form 4/year 12 under the previous 8-4-4 education system in Kenya. Kenya has developed and started implementing competence-based curriculum that took effect in primary schools in January 2018. The reforms aim at preparing and producing manpower that will be globally competitive and that will give learners the opportunity to excel and realize their potential. The reforms also aim at uplifting the bar of learners’ performance and reducing or closing the gap, especially among the lower performing group of learners.

Kenya is a signatory to the Jomtien Agreement (1990) and the Dakar Framework for Action (2000) to achieve the education for All (EFA) and Millenium Development Goals (MDG’s). Kenya’s vision 2030, a blend of these two agreements and other related policies, articulates the development of a middle income country in which all citizens have embraced entrepreneurship. This is so that citizens are able to engage in lifelong learning, learn new things quickly, perform more non-routine tasks, be capable of more complex problem-solving,

be willing and able to take more decisions, understanding more about what they are working on, require less supervision, assume reasoning and expository skills (MOE, 2012 & Orodho et al., 2013). In line with Kenya's Vision 2030 and the Constitution of Kenya 2010, the overall aim of the new curriculum is to equip citizens with skills for the 21st century, and hinges on the global shift towards education programs that encourage optimal human capital development. In-line with this, education should be viewed in a holistic spectrum that includes schooling and the co-curriculum activities that nurture, mentor, and mold the child into productive citizens. With the new curriculum, Kenya emphasizes on the learner's character, patriotism, citizenship, and ability to coexist as a responsible citizen without sectarian inclinations.

Under the current curriculum reforms and implementations, competence-based assessment is a key reformation that will facilitate the adoption of formative assessment practices that promote diagnostic approaches. This will, in turn, enhance learning and improve learning outcomes. It is a departure from the assessment practices that seek to compare learners with each other and is a shift towards assessment practices that seek to collect evidence and make judgements on the extent and nature of progress towards a learner's achievement. As school-based assessment (SBA) is a fairly new innovation in the Kenyan education system, and is also a directive from the Ministry of Education, there is a possibility that some teachers may have concerns which deserve due attention from the ministry. Hamzah & Sinnasamy (2009) quoted Tan Sri Dr Murad Mohammad Nor, the former Education Director General as claiming that, "The most important part in the implementation of any plan is the teachers. However good the plan, it will be of no use if the teachers do not implement it well."

Many factors can encourage or inhibit teaching. One is attitude. eEucation scholar Garcia, (2003) believes that a teacher's attitude has the largest impact on a pupil's success in school. According to Maliki (2013), teachers with good professional competent and interpersonal skills are more effective in their classrooms in terms of students' behavior, better understanding of concept by pupils and disposition of positive and mental alertness by learners. Additionally, teachers with good attitudes create a good learning environment for pupils (Vermunt & Verschaffel, 2000). Thus, the quality of any teaching programme cannot rise above the quality of its teachers. Therefore, the teacher is key during the teaching/learning process and should be a helper who challenges the learner to discover things himself/herself.

**Research Problem**

In implementing School-based Assessment (SBA), it is of high importance to remember that assessment is not there for its own sake. Its goal is to improve learning outcomes through curriculum innovation that develops and enhances teaching practices. Therefore, the perception of the teacher who is directly involved in practicing the competence-based curriculum (CBC) and SBA in the education sector is very vital. However, teachers' understanding of SBA is limited and has different interpretations. The study, therefore, sought to determine the acceptance of primary schools' teachers on implementation of the CBC and to what extent they practice SBA in the teaching/learning process in the classrooms.

**Purpose of the Study**

The purpose of this study was to assess the extent to which the primary school teachers had accepted the implementation of the new curriculum and the modes they use in practicing school-based assessment in classrooms.

**Specific Objectives**

1. To determine teachers' awareness and attitude of the new curriculum
2. To examine teachers' practices on competence-based assessment in classrooms
3. To establish the challenges teachers were facing in the implemented curriculum and practice of school-based assessment

**Research Questions**

1. To what extent are the teachers aware of the competence-based curriculum?
2. Do teachers practice competence-based assessment in the day-to-day teaching and learning process?
3. What are some of the challenges encountered by the teachers in the practice of school-based assessment and competence-based curriculum as a whole?

**Literature Review**

The competence-based curriculum can be traced back to the early 1970s when competence-based education first emerged in the United States of America (Richard & Rogers, 2001). It spread into European countries such as the United Kingdom and Germany in the 1980s (Wolf, 2001). Australia adopted the competence-based curricula in the 1990s, and since then, other countries have been motivated to implement it in schools. The assessments modes also changed due to the introduction of the competence-based curriculum. Mosha (2012) records that a competence-based curriculum seeks to develop in learners the ability to know and learn how to do things and work with other people. The shift to the CBC has pedagogical implications as Rutayuga (2010) notes that CBC requires a shift from assessing a set of learning content to assessing each learning outcome. In line with this, Wolf (2001) emphasizes that the move towards competence-based curricula necessitates student-centred teaching and learning. In addition, Harris, Guthrie, Hobart & Lundberg (1995) state that a competence-based curriculum is a solution to the implementation of education and training for the complex contemporary world.

The Kenya Institute of Curriculum Development (KICD) designed a Basic Education Curriculum Framework (BECF) to help education stakeholders better understand the curriculum to enhance efficient curriculum delivery. The BECF has adopted the Competency Based Curriculum (CBC). This has been informed by various policy documents such as Kenya Vision 2030, Constitution of Kenya 2010, the Task Force report on the Re-alignment of the Education Sector, and the Sessional Paper No. 2 of 2015 on 'Reforming Education and Training. Other documents that informed the curriculum reforms include the 21st Century skills, the harmonized curriculum for the East African States, the sustainable development goals and KICD needs assessment report 2016 among other documents. With the previous Kenyan education system, education offered in primary schools predominantly aimed at preparing the pupils for secondary school (Sifuna & Sawamura, 2008). Black & Wiliam (1998) state that formative assessment, if properly implemented in schools, is a powerful means to improve learners

holistically, and aims at equipping the learners with adequate life and career skills to lead meaningful lives after school and to function proficiently in a given society.

Utomo (2005) conducted a study on challenges of curriculum reform in the context of decentralization in Indonesia, which revealed that the in-service primary school teachers were equipped with only one third of the training needed for the effective implementation of CBC. As a result, they were unable to implement it in the classroom and went back to the traditional ways of teaching, which were based on content.

Mlaudzi (2009) conducted a study in South Africa whose main objective was to investigate how educators in South Africa perceived the Outcome Based Education (OBE) system and found that the successful implementation of OBE was hampered by lack of resources and lack of professional framework of continuing professional development and support programmes. In addition, Suseela & Hoon (2010) did a study on teachers' perspectives of school-based assessment in Oral English assessment (OEA) in a secondary school in Kuala Lumpur. The findings revealed that since the teachers have been exposed to the summative testing by the central examination syndicate of the Ministry of Education for a long time, the introduction of the school-based OEA was something new, which needed proper guidance on the objectives to effectively practice the new formative assessment.

In summary, innovative modes of assessment require teachers to move from the routine limited factual questions to questions that are more open-ended and problem solving tasks, which evoke broad ranging discussions and thinking in classroom (Black, Harrison, Lee & William, 2004). Since these studies were conducted outside the Kenyan context, the need to investigate the acceptance of Kenyan primary schools' teachers' on the implementation of the new curriculum into the Kenyan system was pertinent.

**Theoretical Framework**

The study was based on the **instructional design theory,** in which learning depends on: - determining the needs of the learners, defining the end goals and objectives of instruction, designing and planning assessment tasks and designing teaching and learning activities to ensure the quality of instruction. The Association for Educational Communications and Technology (AECT) defines **instructional design** as "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning" (Reiser & Dempsey, 2002). Instructional design theory is the science of creating instructional curriculum that is geared towards producing specific learning outcomes, based not only on pedagogical research, but also on current instructional practices. The role of instructional design theory is to create instructional experiences that facilitate the acquisition of knowledge in a way that is not only efficient, but also effective and appealing to learners. As a framework for developing learning modules, the focus of instructional design is on enhancing the learning acquisition process with the goal of engaging, encouraging, and motivating learners to gain deeper, more significant, and meaningful levels of understanding and knowledge.

The study also took cognizance of the Rand change agent theory (1973-1978) which cites that there is need to first inform the teachers on

the need for the change. The study equally cites that the abilities of the teachers determine, to a great deal, the effectiveness and success of the innovation. There is also need for follow up activities and in-service activities. Belief and commitment are equally important, and a clear understanding of the process goes a long way in ensuring the success of the innovation. Any curriculum innovation requires change agents, key among them being the teacher. The teachers, therefore, play a key role and should be given key consideration in the development of any innovation. The study adopted this theory because the issues raised about the teachers' attitudes, their experience and their mode of teaching and assessing styles are crucial in the implementation of the curriculum.

## Conceptual Framework

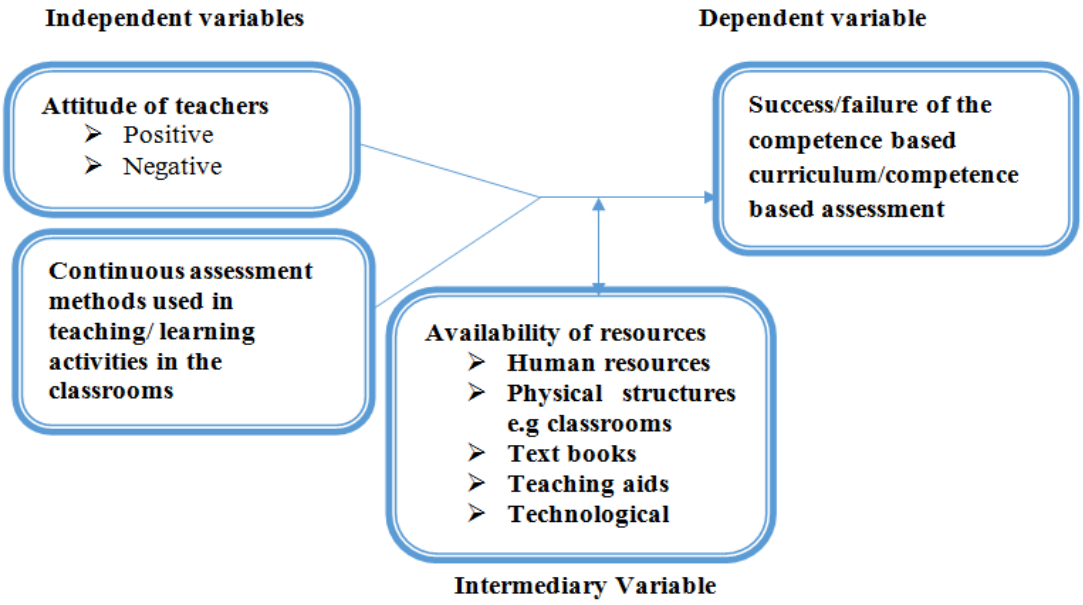


***Figure 1***

The conceptual framework (Figure 1) is derived from Chen & McCray (2012). It shows input involved in the study, which included teachers' attitude towards new curriculum, continuous assessment methods practiced in classrooms and the availability of resources in the teaching/learning activities. The dependent variable is the outcome caused by independent variables. These outcomes include success or failure of the competence-based curriculum, together with its component competence-based assessment. For success to be achieved, teachers ought to be aware of the existence of the new curriculum and have a positive attitude towards it; teachers need to practice continuous school-based assessment in teaching/learning activities. The resources to facilitate these activities should be availed to them.

## Methodology

### Research Design

The study adopted a descriptive research design, which is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. It enabled the researcher to capture quantitative data to provide in-depth information about the

acceptance of the Kenyan primary school teachers on implementation of the school-based assessment into Kenyan education system. The study was conducted in Nairobi, which is a cosmopolitan city where the population is composed of people from various backgrounds in terms of ethnicities, culture, social class, beliefs and economic status. The researcher used stratified sampling in which the schools were randomly selected. A sample size of 150 lower primary school teachers was obtained from 40 public primary schools and 25 private primary schools using a formula by Yamane (1973) quoted in Mugenda & Mugenda (2003). After the sample size was obtained, purposive sampling was used to obtain the 150 respondents from the primary schools.

$$n = \frac{N}{(1+Ne^2)} = \frac{240}{(1+240*0.05^2)} = 150$$

Where n: sample size

N: target population

$e^2$ : standard error with 0.05 level of significance

This is demonstrated in the table below:-

**Table 1: Distribution of the Respondents According to Categories of Schools**

| School Category | Number of Schools | Number of Teachers | Sample size |
|---|---|---|---|
| Boys boarding | 4 | 10 | 6 |
| Girls Boarding | 4 | 10 | 5 |
| Mixed Day | 51 | 202 | 134 |
| Mixed/day Boarding | 6 | 18 | 5 |
| **Total** | **65** | **240** | **150** |

## Data Processing and Analysis

The data was analyzed using both descriptive and inferential statistics. Descriptive statistics included the use of mean, standard deviation, percentage and frequencies. For ease of understanding and analysis, tables and charts were also used to present the data collected. This helped to generate quantitative reports through tabulations, percentages and measure of central tendency.

## Discussion of Findings

### Demographic Information

In terms of gender, there were more female teachers compared to male teachers, with a ratio of 2:1. The number of teachers used in the study was 150. As demonstrated in Figure 2 below, the majority of the teachers ranged from young to middle aged. In terms of category of schools, 82 teachers (54.7%) were from public primary schools whereas 68 teachers (45.3%) were from private primary schools. The demographics of the teachers involved in the study are presented in the charts below:

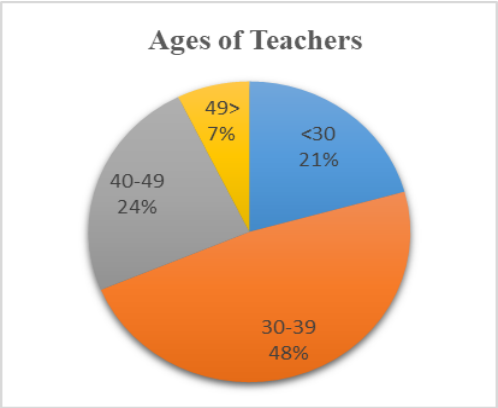


*Figure 2: Age of the teachers involved*

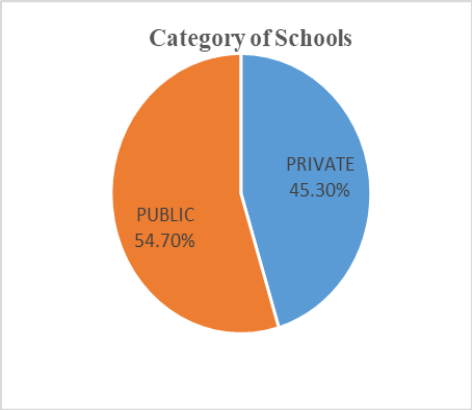


*Figure 3: Category of schools*

**Teachers' awareness of, and attitudes towards, the new curriculum**

The first objective of the study was to determine the awareness and attitude of primary school teachers on the implementation of the new school-based curriculum. Callahan & Clark (1983) defined attitude as tendency to act in some manner towards a person, structure or idea. They also point out that attitude exists within all persons with regard to every topic,

object, concept or human being that a person evaluates. This means that at any one time an individual is able to selectively respond to an object within the environment, either positively or negatively. This objective was informed by the fact that the successful implementation of competence-based curriculum was essentially dependent upon the teachers' readiness and understanding of the initiative.

The data indicates that teachers do not consider competence as a new concept or term but they anticipate that change in education in connection with the new method will be attained. The respondents believe that with the new system, learners will identify their abilities in terms of skills and talents rather than exam-oriented minds. This is well represented in the chart below:-

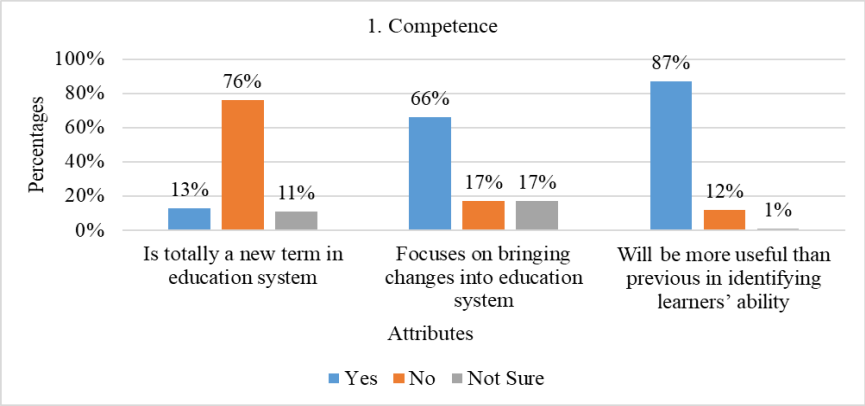


*Figure 3: Chart showing the teachers' understanding of Competence as related to education*

The responses also showed that teachers consistently conceived competence as 'learners' capability to perform'. Some of the teachers defined competence as, 'the ability to perform something' and 'what students can perform after the lesson'. The responses also showed that competencies are acquired after the learning process, normally under the guidance of a teacher. One of the teachers explained that 'competence is an ability which the learner has to be able to practice after learning'. Similarly, another teacher added 'competence is something that a teacher wants students to achieve or understand. From the teachers' interpretation of competence, it does not stress on the 'desired standards or level of performance'. Based on teachers' responses, it is evident that teachers have a basic understanding of the concept of competence in the new curriculum.

The second item was on Competence-based curriculum and the findings are demonstrated on Figure 4 below. Where competence-based education is perceived as time-consuming and a demanding activity, preparation for competence-related and non-competence-based lessons is definitely different, as it requires special instructional knowledge and more resources that are special.

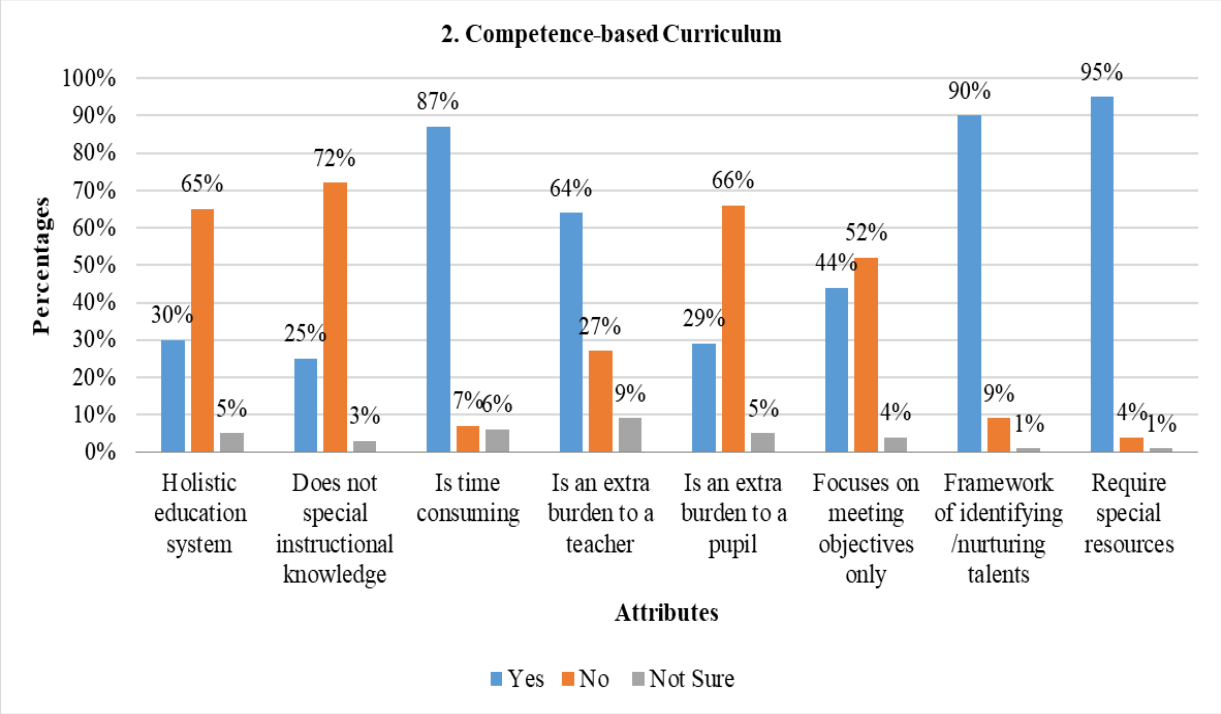


***Figure 4: Attributes of Competence-based Curriculum***

The third item was on the competence-based assessment, where the responses are summarized below:-

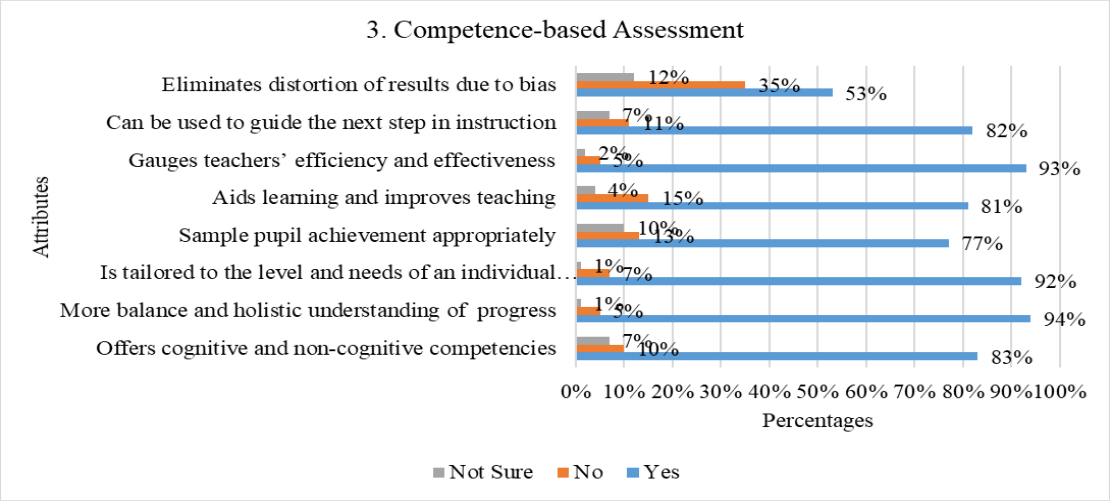


***Figure 5: Attributes of competence-based assessment***

The majority of the teachers were in agreement with the fact that competence-based assessment aids learning and improves teaching, and that it directly or indirectly determines teachers' efficiency and effectiveness in the teaching process. A discrepancy was visible in connection with teachers' attitude depending on the type of schools they teach. A higher percentage of teachers from private primary schools agreed and supported opinions about competence-based education compared to teachers from public primary schools. Teachers from private primary schools also felt inspired about competence-based lessons. Based on the analysis of cross tabulations, these teachers considered the role of the teacher as being based on knowledge transfer only.

**Teachers' practices on competence-based assessment in classrooms**

The second objective of this study was to examine teachers' abilities in practicing competence-based assessment in classroom. Interview responses showed that 92% of the interviewed teachers named verbal questioning as the most frequently used method of assessing learners, followed by assignments and homework as presented in Figure 6.

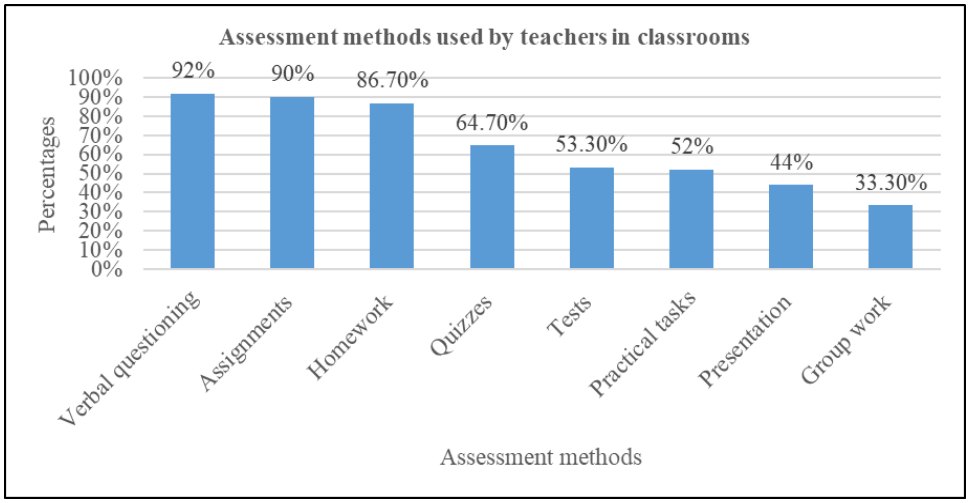


***Figure 6: Chart showing frequency of Assessment methods used***

Classroom observations also revealed a similar pattern, where verbal questioning was observed to be the most frequently used assessment method, particularly during the introduction part of the lesson and at the end of the lesson. Other methods and their respective frequencies are presented in Figure 7.

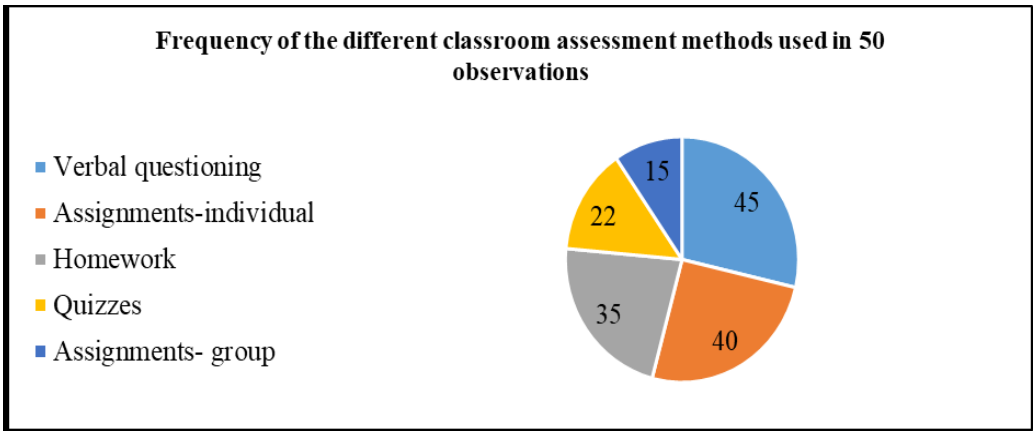


***Figure 7: Assessment methods used in the frequency of 50 observations***

The findings imply that the majority of the teachers still rely on traditional paper-pencil assessment methods despite changes in competence-based curriculum that demands the adoption of authentic and performance-based assessment methods. Teachers asked verbal questions to assess what learners remember about the previously learned lesson and at the end of teaching to see what they have mastered. They combined their lectures with verbal questioning, which called forth memory of facts learned. The researcher further observed and rated teachers' classroom questioning basing on several attributes as indicated on Table 2 below. Descriptive statistics were used to compute the mean and standard deviations of the results.

**Table 2: Observation on teachers' questioning**

| Attributes | Number | Mean | Standard deviation |
|---|---|---|---|
| Teacher encourages pupils' questions and engagement in the learning process | 150 | 4.45 | 1.013 |
| Encourage pupil to question one another | 150 | 2.79 | 0. 463 |
| Gave pupils enough time to respond to questions | 150 | 2.64 | 0.387 |
| Teachers ask factual questions which call for memorized facts, ideas and methods | 150 | 4.60 | 1.042 |
| Teachers ask open ended questions which call for opinion, debates and dialogue | 150 | 2.59 | 0.304 |
| Provided feedback that gave pupils direction for improvement | 150 | 2.90 | 0.591 |
| Teachers ask pupils pertinent questions and respect pupils' ideas | 150 | 2.7 | 0.402 |
| Teacher provides collaborative tasks for pupils to do in the classroom | 150 | 2.68 | 0.400 |
| Teacher invites pupils to make demonstrations on the board | 150 | 2.82 | 0.529 |
| Teacher directs question to specific pupils to respond | 150 | 3.67 | 0.956 |

Findings presented on Table 2 above illustrate that although teachers encouraged and asked questions (mean=4.45), questions were mostly posed by teacher to pupils than pupil to teacher or pupil to pupil. Most of the questions were factual and called forth memorized facts

(mean=4.60) with short wait time between the question posing and requiring responses from pupils. Most of the teachers whose lessons were observed did not allow more than ten seconds 'wait time' between questions and pupils' response. Short wait time denied pupils the opportunity to think and formulate answers. It was observed that wait time given prevented most pupils from taking part in the classroom. Further, teachers' feedback to pupils' responses to verbal questions consisted short non-specific remarks of praise or censure depending on whether the answer was right or wrong. It was also observed that most teachers directed questions to specific pupils to respond to them (mean=3.67). This could cause other pupils who wanted to volunteer to respond to shy off. Lack of awareness and consequently low level of adoption of the prescribed assessment methods for competence-based curriculum among teachers is likely to be an indication of gaps in teachers' skills on how to conduct learning assessment under competence-based curriculum.

The researcher also observed how teachers practiced competence-based assessment during the teaching and learning process using five indicators. The findings are illustrated on the table below.

**Table 3: Classroom observation on teachers' practices on competence-based assessment**

| Statements | | | | |
|---|---|---|---|---|
| | **ND** | **PD** | **D** | **WD** |
| Teachers provide appropriate and regular performance tasks during the teaching and learning process | 5 (10%) | 25 (50%) | 10 (20%) | 10 (20%) |
| Teachers guide the pupils through the process of teaching/learning to self-assess and understand both peer and teacher feedback | 4 (8%) | 22 (44%) | 11 (22%) | 13 (26%) |
| Teachers provide opportunities for pupils to express their understanding and classroom dialogue that focused on exploring understanding of concepts and ideas | 4 (8%) | 30 (60%) | 10 (20%) | 6 (12%) |
| Teachers provide verbal or written feedback which was detailed and guided pupils to make further progress and improvements | 3 (6%) | 25 (50%) | 17 (34%) | 5 (10%) |
| Pupils are given opportunity to interact among themselves in a bid to develop and demonstrate their understanding of concepts | 28 (56%) | 12 (24%) | 6 (12%) | 4 (8%) |

**KEY: Note. ND= Not Done; PD= Partially Done; D=Done; WD= Well Done**

As shown on the table above, teachers did not seem to practice competence-based assessment in most of the observed classroom sessions. This seemed to be a challenge, considering that the information from competence-based assessment of pupils is essentially relevant when there is a need to adopt teaching and learning to meet pupils' needs.

**Challenges teachers were facing in the implementation of new curriculum**

The third objective of the study was to establish the challenges teachers were facing with the new curriculum. From the analysis of the data obtained from the interviews, observations and the questionnaires filled by the teachers, they revealed that:

There were insufficient guidelines on the implementation of the new curriculum. This was represented by 68% of the respondents;

59% of the teachers claimed that facilities and equipment were lacking;

Large class sizes were stated by 48% of the teachers as the major challenge they were facing during the period of collecting the data.

**Insufficient Guidelines**

Teachers who participated in the study exhibited basic knowledge of school-based assessment. However, their knowledge was limited to aspects such as the frequency of assessment, content, objectives and some ideas of carrying out the assessment. Teachers disclosed that during the training for the new curriculum not all teachers were trained.

**Scarcity of facilities and equipment**

The majority of the respondents from public primary schools lamented that they had inadequate teaching/learning resources and equipment. These affected the appropriateness of teaching and learning of the new curriculum.

**Large class sizes**

Teachers cited the large class sizes in most public primary schools as major challenge. Free primary education in Kenya has brought about high enrolment in primary schools, resulting in large class sizes and congested classrooms. Teachers indicated that most of these classes have more than 60 pupils. They also indicated that the workload with the new curriculum was more demanding, and as a result a good number of them failed to appreciate the need to administer assessments on an on-going basis.

**The relationship between the attitude and awareness by the primary school teachers, competence-based curriculum and the practice of school-based assessment in teaching/learning process**

The relationship was established through the Pearson correlation analysis and the results presented in Table 6.

| | Attitude and awareness | Competency based curriculum | School-based assessment |
|---|---|---|---|
| Attitude and awareness. Total score Pearson correlation | 1 | 0.287 | 0.391 |
| Sig. (2 tailed) | | .000 | .000 |
| N | 150 | 100 | 150 |
| Competency based curriculum. Total score Pearson correlation | 0.287 | 1 | 0.566 |
| Sig. (2 tailed) | .000 | | .000 |
| N | 150 | 150 | 150 |
| School-based assessment. Total score Pearson correlation | 0.391 | 0.566 | 1 |
| Sig. (2 tailed) | .000 | .000 | |
| N | 150 | 150 | 150 |

***Table 6: Correlation Analysis Test Results***

***** α=0.01 (Correlation is significant at 0.05 level (2-tailed)***

The findings on correlation analysis indicated that there was a positive relationship between the attitude and awareness of the teachers on practicing the new curriculum implemented as indicated by r=0.287, with p<0.01. This suggests that the attitude and awareness had a positive influence on the new curriculum implemented. The results also indicated that there was a positive relationship between the competency based curriculum and school-based assessment practices in schools as shown by a coefficient of r=0.566 and p<0.01. Results show that there was a positive relationship between attitude and awareness and school-

based assessment with a relationship coefficient of r=0.391 and a standard error, p<0.01. This suggests that with the new curriculum implemented it was obligatory to practice school-based assessment in the teaching and learning process.

**Conclusions and Recommendations**

Competence-based curriculum and the school-based assessment is a new venture in the Kenyan education system. The shift from knowledge-based to competence-based education forces teachers to change their way of thinking and working. The traditional knowledge-based curriculum was not very demanding, with regard to the design of instruction in the form of learning tasks. In the new competence-based curriculum, teachers have to think holistically in terms of the wholly authentic task that competent professionals perform.

This study concludes that teachers are aware of some aspects of the new competence-based curriculum, which includes the learner-centred teaching methods prescribed for the implementation of competence-based curriculum as well as the competencies intended to be acquired by learners. Nevertheless, teachers are not aware of the competence-based assessment methods prescribed for the implementation of competence-based curriculum. Despite their awareness, they are not adopting the teaching methods envisaged for the implementation. It is likely that their knowledge of these methods is theoretical, thus they are unable to apply them in their actual classroom teaching. Therefore, they have continued using paper and pencil assessment methods to assess learning contrary to the demands of the new competence-based curriculum for primary schools.

The study recommends that the Ministry of Education develop the skills of teachers in formative and continuous assessment in order to improve effectiveness and efficiency of ways of assessing and diagnosing the learning needs of individual learners. It is of high importance for all teachers to be trained on the approved methods of collecting, recording, compiling and interpreting evidence of learners' growth and progress, where teachers need to embrace assessment of cognitive, psychomotor and affective domains and be well grounded in the principles of assessment. There is need for the teachers to understand and own the paradigm shift in authentic assessment where the teachers' involvement in significantly crucial. In addition, the Ministry of Education needs to sensitize the stakeholders on the competence-based assessment in order to boost the acceptance and ultimate success of the new curriculum by all involved parties. Coupled with proper policy implementation strategies, the new competence-based curriculum and school-based assessment initiative can become a successful initiative in the education sector.

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# Implicit formative assessment in LGCSE Home Economics: a case study of Lesotho and South Africa

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## Abstract

*The aim of the study reported here was to conduct in-depth analysis and benchmarking of formative assessment as an aspect which supports effective teaching in LGCSE Home Economics and FET (Further Education and Training) Phase Consumer Studies (South Africa). The purpose of the investigation was to identify best practices, potential gaps and weaknesses regarding formative assessment, in order to meet educational needs of learners, and to make recommendations for the improvement and strengthening of the curricula of the stated subjects. The methodology was approached from a social constructivist world view. A structured curriculum analysis and benchmarking was conducted by teams of subject curriculum experts from each country. The analysis was guided by a validated curriculum analysis instrument developed by Umalusi (2014), which supports qualitative analysis for benchmarking. The study revealed that there was no assessment guidelines for formative assessment aspects which supports effective teaching in the LGSCE Home Economics curricula, indicating a gap between the National Curriculum Development Centre (NCDC) and the Examinations Council of Lesotho (ECOL) for that subject. In the South African Consumer Studies curriculum, detailed formative assessment guidelines were included for grades 10, 11 and 12. The number of assessment tasks, as well as mark allocation and weighting of content for assessment, is specified for tests, projects, practical assessment tasks and written examination. It is recommended that structured guidelines for subject-specific informal assessment of the various skills associated with these subjects be developed and included in the curriculum document for LGSCE. There is also need to reduce the emphasis on written summative examinations and focus more on the development of continuous, formative assessment of the various skills associated with these subjects, which will benefit both teachers and learners in Lesotho and South Africa.*

***Key-words**: Assessment, curriculum, Consumer Studies, education, LGCSE, Home Economics, formative assessment, summative assessment.*

## Introduction

An effective curriculum gives attention to high quality assessment practices and balances between formative and summative assessments. It guides all forms of assessments because the latter do not measure success standards only, but also assists learners to identify and analyze their own strengths and limitations, understand how they can overcome their limitations and improve on their strengths (Gloria, Sudarmin, Wiyanto and Indriyanti; 2018:4). The supportive curriculum provides written guidelines for valuable and measurable feedback which teachers should give to learners in daily collaborations, comments, marks and reports. Feedback that teachers get from students' comments in class and work is critical in helping them understand how the learner is thinking too. Assessment information needs to be recorded and tracked in a way that is meaningful. A curriculum that includes guidelines for criterion-referenced reporting aligned with clear learning and assessment objectives is a user friendly tool that eases teaching-learning progression. Such a curriculum will ensure that teachers have a common understanding of when and how and what to teach and assess, following more or less the same standards across different schools. Education stakeholders will also know how to use assessment data for the education development planning process and the implementation of the curriculum **(**CIE 2015:2**,** Gloria et al. 2018:2). The Lesotho General Certificate of Secondary Education (LGCSE) curriculum for Home Economics, and the Curriculum and Assessment Policy Statement (CAPS) for Consumer Studies in South Africa are both broad and include vast amounts of knowledge content and large practical skills development components. Continuous assessment in LGSCE Home Economics consists of summative (assessment of learning) and formative (assessment for leaning) assessments. Curricula should include clear guidance to support teachers in the effective planning and implementation of subject-specific assessment. .

## Aim of the study

The aim of the study was to conduct an in-depth analysis and benchmarking of formative assessment as an aspect which supports effective teaching in the LGCSE Home Economics and Consumer Studies in the Further Education and Training Phase (FET) in South Africa. The latter is to identify best practices, potential gaps, and weaknesses regarding formative assessment in each of these curricula, as well as to make recommendations for the strengthening of both countries' curricula for these particular subjects.

## Research Problem

Taylor (2017) submits that a teacher would define formative assessment as the feedback from learners that is used to promote learning and that it is a method of providing a clear image of what learners need to reach their goals in learning. In the LGCSE Home Economics curricula, there are no documented standardized learning and grading guidelines for formative assessment and its reporting system, and as a result, assessment is left to the discretion of the teachers in individual schools; for this reason, the curriculum focuses on assessment of learning, rather than assessment for learning. This encourages the notion of coaching learners for examination, rather than apportioning equal value and attention to knowledge and skills development throughout the duration of study. This implies that learners'

work assessment is likely to be unfair, inconsistent and inaccurate; because teachers' understanding of subject content and assessment standards differs. On the other hand, the curriculum of Consumer Studies (in South Africa) offers detailed guidance for formative assessment that includes various aspects (such as theory and practical content) of each subject. This study attempted to investigate how the LGCSE Home Economics curricula in Lesotho and Consumer Studies in South Africa endeavour to strengthen and improve the curricula in order to meet educational needs of learners.

**Overview**

Assessment is a vital and an integral part of the teaching and learning process. It provides feedback to all education stakeholders. It further promotes and monitors learners' learning progress (Curriculum Development Council and The Hong Kong Examinations and Assessment Authority, 2014:41). Assessment is one of the factors that influence learners' motivation to learn. Since assessment has an impact on learners' interest and effort to learn (Alonso-Tapia & Garrido-Hernansaiz, 2017), it is imperative that teachers be cognisant of the most suitable assessment procedures. In most cases, assessment is associated with a summative process in which learners have little opportunity to correct or improve their work. On the other hand, effective teachers continually assess learners' learning in order to advance the latter (Black et al., 2003). Alonso-Tapia & Garrido-Hernansaiz (2017:171) submit that there are two perspectives about assessment:

The test culture, whose main objective is to identify how much knowledge has been "put" in the learner's mind (assessment "of" learning), and the assessment culture, which provides both the teacher and learner with information in order to overcome perceived difficulties and to self-regulate learning (assessment "for" learning). Muskin (2017:15) proposes that continuous assessment comprises a combination of summative (assessment *of* learning) and formative (assessment *for* learning) assessments. Assessment should engross learners completely and purposefully in their learning. In addition, "assessment must measure what matters" as 'what matters' may vary from one context to the next (Muskin, 2017:15). Assessment methods should enable progress in all important learning goals to be facilitated and reported (Muskin, 2017:15-16). Alonso-Tapia & Garrido-Hernansaiz (2017:171) note that teachers who approach assessment in this manner, who utilize various types of assessment and who offer quality and constructive feedback, will positively affect learners' efforts.

Performance based assessment includes the assessment of processes, products or both (Kubiszyn & Borich, 2007). Kubiszyn & Borich (2007) further maintain that teachers might use performance tests to assess intricate cognitive learning, including attitudes and social skills. Performance tests are appropriate tools for assessing habits of mind and social skills such as cooperation, sharing and negotiation. They use direct measures of learning instead of indicators that simply suggest that cognitive, effective, or psychomotor processes have occurred. Portfolio assessment is another type of performance assessment. Kubiszyn & Borich (2007:181) define portfolio assessment as "a planned collection of learner's achievement that documents what a learner has

accomplished and the steps taken to get there. The collection represents a collaborative effort among teacher and learner, to decide on portfolio purpose, control, and evaluation criteria."

Palmer, Bach and Streifer (2014:3-4) submit that the curriculum should include documented plans for formative assessment which provide immediate feedback from various sources. At times, the curriculum does not capture the details of all types of formative assessment but indicates structures which support such activities which have to happen during the course of study. The formative assessments give learners a chance to acquire knowledge and skills through practice, before summative assessments. The curriculum should evidently pace and scaffold all assessments including formative assessments; throughout the course.

The curriculum is not balanced when it lacks formative assessments. Gloria et al. (2018) believe that well-designed, documented and functional formative assessment has a significant and positive impact on learners' motivation and achievement, independent and creative thinking, and perseverance in learning, listening with understanding and empathy. Furthermore, formative assessment also facilitates thinking and communicating with clarity and precision, intelligent behaviour, optimistic feelings, problem-solving skills, lifelong learning, decision making and research skills, accurate evaluation of their own work, development of motivation, metacognitive awareness, self-regulation and independence. Cambridge International Education (2015:2) describes this as extended formative assessment.

Formative assessment or assessment for learning according to Taylor (2017:17) is described as "helping learners in their learning process by identifying where they are in terms of current level of understanding and knowledge compared to desired learning outcome, that is, "to fill the gap," to revise and modify teaching methods, and to give learners metacognitive tools to help them become efficient independent learners, that is, "learner training. This assessment focuses on the understanding of the teaching and learning process with clear aims which direct learners as to where they are going, with progress check lists that verify where they are now, and feedback provision of how to arrive at the expected destination (CIE 2015a:1). According to Black, Harrison, Marshall and William (2003); formative assessment evokes information about learning and then uses it to modify the teaching and learning activities in which teachers and learners are engaged. Black et al., (2003:67, 79, 85) note the benefits of formative assessment ability to monitor one's own learning, improve students' scores in national curriculum texts and examinations.

University of Cambridge Local Examinations Syndicate (UCLES) (2017) and Ulster University (2017) assert that documented formative assessment guidelines provide the teacher with strategies to better meet diverse learners' needs and demands through differentiating and reworking of teaching, to raise impact of teaching on learners' achievement, and to attain a greater equity of learners' outcomes. A teacher can then easily use these guidelines to design and pace, select different strategies, differentiate, and give feedback to individual learners. Good and timely feedback motivates learners to push their own learning forward. Furthermore, formative assessment is a pedagogical activity, which

should not be separated from the teaching–learning process (National Institute of Education, 2014:36). This assessment functions well in the classroom setting. It is recurrent, collaborative assessment of learner advancement and identification of learning needs, and appropriate adjustment to successful teaching and learning. It also relates assessment objectives with teaching-learning objectives and establishes very clear assessment criteria (Organisation for Economic Co-operation and Development, 2008:1). Nitko (2004) proposes that formative uses of assessment assist teachers to guide or monitor on-going learning. This type of assessment is informal and is useful in appraising students.

UCLES (2017) and Kibble (2017) indicate that summative assessment sums or adds up together the learning of students at the end of periods of learning to measure the outcome of student learning, for example, once a school term or a course has been completed. Some summative assessment is a must for the purposes of certification and admission for further studies. Cambridge International Education (2015a:1) suggests that summative uses of assessment help teachers to evaluate learners and their own teaching and is applied at the end of a teaching unit (such as a chapter or section of work) or at the end of a particular interval in time (such as at the end of a term or year). Summative information about learners' achievements is often used to count toward the grade used for progression for the period under consideration.

The important role of assessment as part of the learning process is therefore clear. Curricula should include subject-specific guidance to support teachers in the effective implementation of suitable and varied assessment strategies, which should include guidance for summative assessment *of* learning, as well as formative assessment *for* learning. This will contribute to more balanced assessment of the whole learning process, rather than simply preparing learners to pass a written examination. It is for this reason that the current investigation was undertaken (CIE 2015a:1)

**Methodology**

The methodology used was based on a social constructivist worldview, which emphasizes the importance of others in the co-construction of knowledge and understanding (Schrader, 2015:32). The study was built on a structured curriculum analysis and bench marking approach, and teams of subject curricula experts from each country were involved. A qualitative and structured curriculum document analysis of LGCSE Fashion and Textiles (0191), as well as the LGCSE Food and Nutrition (0192) were benchmarked to the CAPS for Consumer Studies in South Africa. This investigation was conducted subsequent to a previous in-depth qualitative and structured document analysis of the South African Consumer Studies Curriculum and Assessment Policy Statements (CAPS). The analysis was guided by a validated document analysis instrument provided by Umalusi (2014) and adapted by Kruger (2018), which supports qualitative analysis with the purpose of benchmarking curricula. In particular, this article focuses on reporting the analysis and benchmarking of the inclusion of references to and guidance for subject-specific assessment in the curriculum or syllabus documents for these subjects.

**Findings**

In the Consumer Studies CAPS, subject-specific guidance was given regarding both formative and summative assessment, including detailed specifications regarding the mark contribution of each task towards the final assessment mark for each grade (Department of Basic Education, 2011:60-61). Formative assessment tasks (in general) were mentioned and described, and more detail was included regarding projects, written tests and examinations (DBE, 2011:62).

In the LGSCE, subject-specific guidelines regarding the planning of summative assessment and detailed specification regarding the mark contribution of each task toward the final summative assessment mark were included in the syllabus of Fashion and Textiles. Mark sheets and descriptions were provided (Appendix 7, National Curriculum Development Centre & Examinations Council of Lesotho, 2016:28-29) as well as a specimen paper and marking scheme. Guidelines on how to develop different forms of assessment and assessment instruments such as rubrics and memoranda were included in the syllabus documents (NCDC & Ecol 2016:23-24). Marking memoranda were included on a separate document, which is not ideal, since that would require teachers to plan and prepare their assessment from various documents.

The practical section of Consumer Studies is considered an essential part of the subject for skill development and clear guidance regarding this aspect of the subject should; therefore it should be included in the curriculum document. Guidance regarding practical task assessment was, however, limited in curriculum document (DBE, 2011:63-64) and could probably lead to different interpretations. A separate practical guide is produced nationally every year in South Africa, per practical option (such as Food production, Clothing production, or Knitting and Crocheting). Similarly, in the LGCSE marking memoranda teachers used different documentation for their preparation and assessment, which wastes time.

In the LGSCE for Home Economics, guidelines regarding the planning of summative assessment in Food and Nutrition were included in the syllabus as Appendix 5 – a practical test, mark sheets, description and provision of coursework mark sheet (NCDC & Ecol 2016:18-27), together with a specimen paper and mark scheme. Coursework assessment tasks as well as teachers' and learners' guidelines start from page 16-18 for Fashion and Textiles syllabus (NCDC & Ecol 2016:16-18). Summative assessment of Fashion and Textiles leads to a qualification in the subject to be offered by The Examinations Council of Lesotho as the final authority. Table 1 below summarizes the number and types of assessments included in each country's curriculum documents for Consumer Studies and Home Economics respectively. The degree of clarity of guidance was judged using a scale of low, moderate or high, based on the specificity of the guidance provided. Table 1 below also indicates the explicit presence of subject-specific assessment guidance that were included in the documents.

**Table 1: Findings of the number and types of assessments in curriculum documents**

| **Assessments** | **South Africa (CAPS)** | | | **Lesotho (LGCSE)** | |
|---|---|---|---|---|---|
| | Gr. 10 | Gr. 11 | Gr. 12 | Form D | Form E |
| Number of assessment pieces | 12 | 12 | 11 | 0 | 1 |
| Type of assessment pieces | Both general and subject specific:<br>Tests<br>Projects<br>Practical assessment tasks<br>Written examination | | | Written examination<br>Practical examinations for Food and Nutrition only in Form E<br>Coursework with 2 folders and 2 items for Fashion and Textiles in Form D and E | |
| Clarity of guidance | Moderate | | | Moderate | |

From the summary of the findings in Table 1, the following is evident:

In the South African curriculum (CAPS) formative assessment guidelines are specified; for example, in South Africa assessment was done over three years; that is in grades 10, 11 and 12. There were 12 assessment tasks in grade 10 and 11, and 11 assessment tasks in grade 12 plus a written examination. The assessment tasks comprised of tests, projects, practical assessment tasks and written examinations.

Unlike in South African CAPS, in the LGCSE curriculum there was no specified number of assessment tasks in form D, and only one specified summative assessment in Form E. Fashion and Textile summative assessment comprised of one fashion garment and a folder (or portfolio), and one fashion accessory and folder, as well as written examinations. For Food and Nutrition, in Form E only summative assessment, which comprises a written examination and practical examinations, was indicated. Practical assessment was explained in detail, but in a separate document from the CAPS, resulting in document proliferation.

In the CAPS, school-based assessments contributed 25% and the written examination 75% of the total marks in a given grade (DBE, 2011:61). In South Africa, Consumer Studies assessments were mostly conducted internally (school based assessment). Additional generic guidance regarding assessment (not subject-specific) can be found in the National Protocol for Assessment (DBE, 2012).

In Lesotho, guidance regarding assessment was provided for the calculation of school based assessment (SBA) marks for the end of the two years program (NCDC & Ecol. 2016:16-24). For Fashion and Textiles, the total mark for the coursework component comprised a folder for fashion item or fashion accessory. This mark was then added to the theoretical examination mark obtained by the candidate to form part of the final grade (Appendix 7, NCDC & Ecol. 2016: 28). This is the only instance where there was guidance concerning formative assessment with the result that there was formative and summative assessments over a two year period. For Food and Nutrition, assessment guidance for practicals conducted at the end of the two years was stipulated in the Food and Nutrition Syllabus (NCDC & Ecol 2016:22).

The documented assessment for learning guidelines which are integral and essential to teaching for learning were lacking within the

LGCSE Home Economics curriculum. This implies that learners' work assessment was likely to be unfair, inconsistent and inaccurate; because teachers' understanding of subject content and assessment standards of the particular teaching and learning subjects differs. Formative assessment guidelines would standardize the level of teaching-learning process to be attained alongside assessment criteria at the stipulated time. Producing a robust guiding system for standardizing formative' assessment would provide an accurate, fair and reliable assessment data which every stakeholder can use confidently to track learners' progress. Targets set on teaching and learning would be built on reliable teaching and learning guidelines.

**Conclusion**

This investigation established that the curricula for Home Economics / Consumer Studies for both Lesotho and South Africa included moderate levels of guidance for assessment, with South Africa's curriculum being more detailed. The inclusion and description of details regarding both summative and formative assessment in the CAPS, as well as comprehensive guidance for calculating formal assessments in both the CAPS and the LGCSE were deemed as strengths. However, a number of gaps also emerged regarding assessment guidance for these subjects. The South African Consumer Studies curriculum did not include detailed assessment of practical tasks as part of the subject-specific curriculum document and this was identified as a gap that needed to be addressed in that curriculum. There were discrepancies between the assessment of Food and Nutrition and Fashion and Textiles in the LGCSE. These need to be better aligned to balance the value of learning in the stated subjects. Another gap in the LGCSE is the dearth of guidance for informal assessment *for* learning. This gap means that teachers might not implement informal assessment effectively in these subjects, which will have a negative effect on the learning process of the learners. There should also be a shift of emphasis from examination assessment to equally include skills development as these are valuable in life and deserve more attention as part of formative assessment. Lastly, the assessment focus of both sets of subjects (Consumer Studies and Home Economics) on learners having to pass a formal written examination is a matter of great concern. These subjects offer so much more than just knowledge that can be written down. The skills development in these subjects – including practical (making) skills, as well as personal skills such as time management, communication and teamwork – are valuable in all spheres of life and deserves more attention as part of formative assessment in the associated subjects. These subjects have significant value to offer learners – it is time that the assessment thereof contributes to learners' positive experiences in Consumer Studies and Home Economics.

All forms of assessment are essential in the educational process. In LGCSE Home Economics curriculum, the documented assessment guidelines are for summative assessment. Formative assessment guidelines would standardize the level of the teaching-learning process to be attained alongside assessment criteria at stipulated times. It is, therefore, difficult to hold schools accountable for learner performance and a lack of connection between the education system, schools, and classroom approaches to assessment and evaluation. There should also

be a shift of emphasis from examination assessment to equally include skills development as these are valuable in life and deserve more attention as part of formative assessment in subjects.

**Recommendations**

It is recommended that structured guidelines for subject-specific informal assessment of the various skills associated with these subjects be developed. Such assessment guidelines should be included in the curriculum document for LGSCE Home Economics curricula. It is also recommended that less emphasis should be placed on the writing of a formal examination, and that more emphasis needs to be shifted to the development and formative assessment of the various skills associated with these subjects, to improve and augment the learning experience of both teachers and learners and Lesotho and South Africa. Guidance regarding practical task assessment of Consumer Studies in the South African syllabi should be improved from the current state available in the curriculum document.

The impact or perceptions of curricula without formative assessment guidelines for teachers should be investigated in further research.

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# Assessment of Grade 1 learners' pre-school knowledge in Lesotho – What counts?

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## Abstract

*This paper aims at addressing two questions: How can we assess what Basotho Grade 1 learners know and can do at the start of school? What are the complexities of adopting assessment tools developed in a different context to that of Lesotho? Assessment of pre-school knowledge had not been part of the educational agenda in Lesotho for decades. Hence, the purpose of the study was to assess pre-school knowledge that Grade 1 learners brought to Lesotho primary schools. The first year of school is an important phase of any learner's education and future academic development. It is, therefore, critical to gather information relating to what each learner knows and can do at the entry point of formal schooling. Providing Grade 1 teachers with information about the abilities of learners might help them to plan lessons accurately and target their teaching at an appropriate level as well. In order to study and understand Basotho learners' knowledge (numeracy & literacy) when they begin school, the International Performance Indicators in Primary Schools (iPIPS) framework was used. In order for this framework to be useful in this study, we had to translate items from English to Sesotho (home language). The translation process showed that there were complexities associated with translating technical tools from English to Sesotho. Further findings show that some learners get into school already having skills of writing at least their names and reading short sentences. At the policy level, it is hoped that knowing what children bring to school might lead to quality teaching and learning in Lesotho primary schools.*

***Key words:*** *Assessment tools; Assessment manual; International Performance Indicators in Primary Schools; Pre-school knowledge; Numeracy; Literacy*

## Introduction

Teachers in Lesotho are faced with teaching very large classes (some have more than 100 children) and this suggests that it might be difficult for them to assess and record the developmental levels of their pupils, and the progress that they make (Lesotho Educational Sector Strategic Plan 2005 – 2015; Urwick, Griffin, Opendi, & Khatleli, 2012; Mpalami, 2013). Furthermore, with no formal assessment of children's development and ability during primary school, it is difficult for schools to know whether their teaching is pitched at the right level and whether children are making good progress. At system level, policy-makers have little data on the effectiveness of early schooling. Yet these processes are a fundamental step towards providing effective education. The UNESCO Education for All (EFA) Global Monitoring Report has indicated that, although progress has been made in improving school enrolment since targets were set at the World Education Forum (Dakar) in 2000, the critical issue that remains is the quality of education being provided in poor countries such as Lesotho. The report calls for greater focus to be placed on raising the quality of education, in part by developing strategies to assess and monitor the knowledge and skills of pupils. It is on this premise that the study reported in this article aims at addressing the following research questions:

1. How can we assess what Basotho Grade 1 learners know and can do at the start of school?
2. What are the complexities of adopting assessment tools developed in a different context (British) to that of Lesotho?

Drawing from practice, teachers teach and test learners' ability to recall concepts that were taught. There are rare cases where teachers would feel comfortable to assess learners on previous knowledge. This paper is exploring this area. Hence, the purpose of the study was to assess pre-school knowledge that Grade 1 learners bring to Lesotho primary schools. Inevitably, the first year of school is an important phase of a learner's education and effective educational provision during Grade 1 is associated with later outcomes right up to the end of secondary school (Tymms, Merrell & Bailey, 2017). Providing Grade 1 teachers with information about the ability of individual learner might help them to target their teaching at an appropriate level. In order for us to assess learners' knowledge when they begin school, we used the International Performance Indicators in Primary Schools (iPIPS; www.ipis.org) framework (Tymms et al. 2017). According to Tymms et al. (2017) iPIPS is a unique international monitoring system for children starting school. It is a model developed at Durham University, UK. Given that iPIPS is developed in a different culture and language to that of Basotho, we had to adapt framework to suit the local context (Lesotho). This process involved a cultural review and a translation from English to Sesotho. There are complexities identified that are associated with translating technical tools from English to Sesotho.

## Objectives of the study

The study was aimed at achieving the following objectives:

1. To firstly establish iPIPS in Lesotho. This would create an assessment tool which is tailored to the country's context and from which much-needed information would be collected about children's social and cognitive development at the start of

school and their progress during the first school year.

2. To train teachers to interpret the assessment data from iPIPS and to use it in a formative way, integrating in with research-based teaching and classroom management strategies to improve pupil outcomes.
3. To work with other stakeholders in Lesotho, including Ministry of Education and Training (MoET) officers, teacher trainers and in-service training providers to integrate the iPIPS data with other information as a means of continuously evaluating their education system to understand where challenges are being successfully overcome and where additional resources and interventions are required.

**Background**

In the year 2000, the government of Lesotho introduced free and compulsory primary school education. This initiative made it possible for children from economically challenged backgrounds to have access to education. Children in Lesotho graduate from reception class (Grade R) at the age of 5 and start Grade 1 at the age of 6. According to the language policy, learners at grades 1 to 3 are to be taught in home language (Sesotho). From Grade 4 upwards the medium of instruction is officially English. Children attend public primary school for seven years and then continue for a further five years to secondary school where they complete a Lesotho General Certificate of Secondary Education (LGCSE) (school leaving certificate).

What do the individual Lesotho Grade 1 to 4 syllabi documents say about assessment?

From Grades 1 to 4, for each unit of each grade, there are 5 components:

An overview of the unit – a brief indication of the Learning Outcomes (LOs) (*headings only*)

An ‘activity plan’, providing much more detail about the LO

A ‘literacy window: Sesotho’

A ‘literacy window: English’

A ‘numeracy window’

Only components 2 to 5 are relevant to this study, as they are the only parts where assessment is indicated. In the ‘activity plan’, for each learning outcome (LO) suggestions are made in a column entitled, ‘what to assess’ about exactly what the teachers should assess. However, in most cases in Grades 1 and 2, these merely repeat what the LO says, perhaps separated out into multiple things to assess if the original LO is complex.

Mathematics is part of the curriculum from Grade 1) and is integrated into other subjects. Mathematics forms part of the Integrated Curriculum from Grade 1 up to Grade 6 (age 11) known as a ‘numerical and mathematical learning area. This area emerges as a standalone subject in Grade 7. The Curriculum and Assessment Policy (2009) states that the numerical and mathematical learning area is aimed at promoting learners’ “application of numerical and mathematical skills in solving everyday problems” (p. 32) amongst others. All learners must take Mathematics until Grade 10 (age 15). From Grade 11 to Grade 12 (age 17) learners are at liberty to choose between Mathematics Core and Mathematics Extended. Mathematics Core is taken by students who are not mathematically strong, or students who choose not to take mathematically related careers beyond secondary school.

**Theoretical Framework**

International Performance Indicators in Primary Schools (iPIPS) is designed for two purposes. One is to provide reliable and comprehensive information for policy makers concerning the cohort of children starting school and their progress during their first year, providing a backdrop against which policies and challenges faced can be interpreted and against which changes can be monitored. Secondly, it is used by schools for pedagogical purposes, providing a comprehensive profile of children's strengths and weaknesses from which teachers can plan activities at an appropriate level. The iPIPS has been developed from the well-established Performance Indicators in Primary Schools (PIPS) Baseline Assessment System which was originally created in 1994 in England and has been used extensively since, both in the UK and internationally. The Centre for Evaluation and Monitoring (CEM) at Durham University runs the iPIPS. With 20 years' experience, and over three million individual pupil assessments conducted to date, this assessment system has been proven to have very high reliability (0.98) and very good predictive validity (0.68 to later assessments at age 11) in the UK context (www.ipips.org). Test properties from international versions of the assessment are of similar magnitude (Dutch, Russian, German, Australian versions as examples). Comparative PIPS data from several countries has already been used to monitor the implementation of policies. More information about iPIPS and the countries involved can be found at www.ipips.org.

Policy makers and practitioners seeking to improve educational systems need high quality data to inform their decisions and actions. For practitioners, the data needs to be in a format that can be readily used to inform teaching and learning. For policy makers, such data should be internationally benchmarked and collected on a regular basis to monitor pupils' outcomes in response to changes in practice and policy. There are well established sample-based monitoring systems in place run by international organizations such as Organisation for Economic Co-operation and Development (OECD) and the International Association for the Evaluation of Educational Achievement (IEA) which fulfil this role for policy makers from Grade 4 upwards. However, to date, nothing equivalent has been developed for the early grades of schooling, which is a crucial stage of education and the foundation from which the effectiveness of education systems can begin to be evaluated. The gap is starting to be filled by the new International Performance Indicators in Primary Schools (iPIPS) project. For the first time it offers high-quality information about children's social and cognitive development when they start school, and their progress during their first year, providing accurate benchmarks across countries. Additionally, it is able to provide teachers with data at pupil level to inform practice directly. This system has a potential, particularly for developing countries such as Lesotho, which currently do not have reliable data at the start of school or system level to inform teaching and learning, as well as policy making.

**Methodology**

The study adopted a case study. Mouton (2001, p.149) defines case studies as "studies that are usually qualitative in nature and aim at providing an in-depth description of a small number of cases". However, Bryman (2008, p.

53) on the contrary argues that "there is a tendency to associate case studies with qualitative research, but such identification is not appropriate". He presents a broader position of a case study and strongly contends that case studies are sites for the employment of both quantitative and qualitative research. Either of these methods could be used to gather data from case studies. According to Bryman (*ibid.*), case studies should not be confined to empirical sites such as a school. He makes the following point:

> I would prefer to reserve the term 'case study' for those instances where the 'case' is the focus of interest in its own right. (p. 53)

The implication, therefore, is that the researcher must pay attention to the focus of the study when he or she identifies cases. For instance, if the study is concerned with how a certain teacher assesses learners' work, the case should not be the school where the teacher works; rather it must be the teacher and his class where learners are being assessed. Therefore, the ten schools where participants in this study come from are not regarded as cases per se. What remains the case are the children who participated in the study. Opie (2004) concurs with Bryman that a case study might involve one student or a class of a hundred students. The number of participants here is not considered so important; what seems crucial is the in-depth description of what emanates from the cases concerned.

For this study, we employed a convenience sampling (Bryman, 2008) to access participants (children). According to Lincoln and Guba (1985) convenience sampling saves time, money and/or effort. In this instance, we chose to work with only teachers around Maseru for these three reasons. Ten primary school teachers participated in the study and were trained to use the assessment manual accurately with their thirty (30) Grade 1 learners. The assessment manual had to be adapted to the local context before being used by teachers. The process involved translating the manual from English to Sesotho language. Every Grade 1 teacher chose three learners randomly from their respective schools just before learners could begin formal lessons. In order to address ethical issues, parents and guardians were requested to fill in consent forms for the selected children. Learners were assessed on their literacy and numeracy skills in January 2018.

The iPIPS is designed as a pre-test and post-test study and administered to learners on a one-on-one basis by a trained assessor (teacher) using a booklet with a tablet/note book to capture the data. This paper reports only on the pre-test data. The iPIPS was administered within the first few weeks of learners starting school to establish a baseline; and repeated at the end of that first year to monitor progress. Teachers were asked to complete some information about the learners' personal and social development and about their behaviour. Background information is also collected from teachers and parents/carers by the assessor about the learners' socio-economic status and some additional aspects of their home background. However, in this case, the focus was only on children's preschool knowledge with regards to numeracy and literacy.

As indicated earlier in this article, iPIPS assessment covers literacy and numeracy. A record sheet shows the competence level for each child on both areas. The record sheet shows how far each child has answered correctly. The record sheet is such that there are

different levels from 'Ground level' through to 'Advanced level'. Consider the following two tables:

**Table 1: Record-sheet for literacy**

| | |
|---|---|
| Advanced Level | Reading comprehension: The child can read passages and understand the meaning of the sentence. Usually, this section is included in the end of year assessment |
| Proficient Level | Reading aloud short sentences |
| Moderate Level | Reading aloud individual, common words such as cat, dog and house |
| Basic Level | The child can say letter names or sounds |
| Ground Level | Ideas about reading, including person reading, person writing, some writing, pointing to a letter and pointing to a word |

Source: www.ipips.org

The record sheet for literacy has articulated level descriptors for the assessor (teacher) so that teachers know where to place each child correctly. Some children come to school with prior knowledge and skill to write their name. Others are able to recognize some letters especially those in their name. On the other hand, some children are not able to write and read at all. The variation could be because of different home backgrounds. Some children might have gone to pre-school while others did not. In some homes, there are books that children might have had access to. In some cases, parents/guardians take the initiative to teach children reading and writing.

**Table 2: Record-sheet for numeracy**

| | |
|---|---|
| Advanced Level | Greater understanding of place value and calculations such as 105 + 302 |
| Proficient Level | Harder math such as 15 +21, 'what is 8 more than 13?' |
| Moderate Level | Note: Zero and place value are introduced<br>Formally presented sums e.g. 7+3, 8+13, What is 3 more than 7? |
| Basic Level | Counting, naming, reading and writing numbers up to 9. Can do informal calculations such as 'here are four rockets, if we add three more, how many will there be?' |
| Ground Level | Counting up to 7 and recalling number counted. Ideas about maths such as largest and smallest |

Source: www.ipips.org

**Findings**

The findings of the study indicated that Basotho children usually come to school already knowing how to count at least up to 10. They would have come across some representations of numbers in their early years prior to formal schooling (Mpalami, 2013). Many scholars argue that representations are useful resources that have an inherent objective to enhance learners' mathematical proficiency (Barmby, Harries, Higgins, and Suggate, 2009; Kilpatrick, Swafford, and Findel, 2001). In Sesotho culture, there are several inherent mathematical representations that assist learners to comprehend counting. For example, counting from one to ten is recited as follows; 'ngoe (1), peli (2), tharo (3), 'ne (4), hlano (5), ts'ela (6), supa (7), robeli (8), robong (9), and leshome (10). Basotho use the fingers of their hands as representations for numbers when counting, and in most cases, this is done before formal schooling. What is interesting is that the word for 'six' in Sesotho is tšela, which means 'cross over'. The literal meaning is 'cross over to the next hand'. Then the word for seven (supa), means 'point at'. Robeli (8) means 'bend two fingers', and robong (9) means 'bend one finger.' For a typical Mosotho boy child, in most cases they would have herded cattle, sheep and goats before coming to school. As such, they would have acquired some basic numerical skills. Therefore, in relation to Table 2, they would join school being at the 'basic level'. Figure 1 below illustrates the reading results:

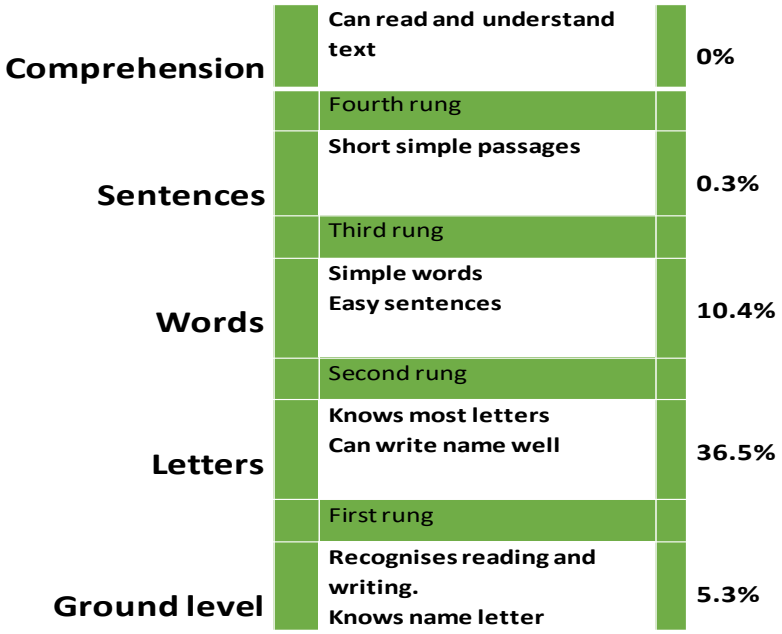


**Figure 1: Reading Ladder – start of school**

The ladder shows that the highest percentage (36.5%) was of children that 'know most letters' and were able to 'write their name well'. This affirms the assumption that some children come to school in year 1 already having writing knowledge and skills. The figure also shows that only 0.3% of children were able to 'read short simple sentences'. Although the study did not address the issue of participants' background, it could be that these are children who attended pre-school or are coming from families where parents are literate. It is also clear that some participants (10.4%) were able to 'read simple words' and/or 'easy sentences'. It is also worth noting that no participant was able to 'read and understand text'. It would be interesting to find out if by the end of the year 1 these participants would have reached this level. The following is a sample of children's writing:

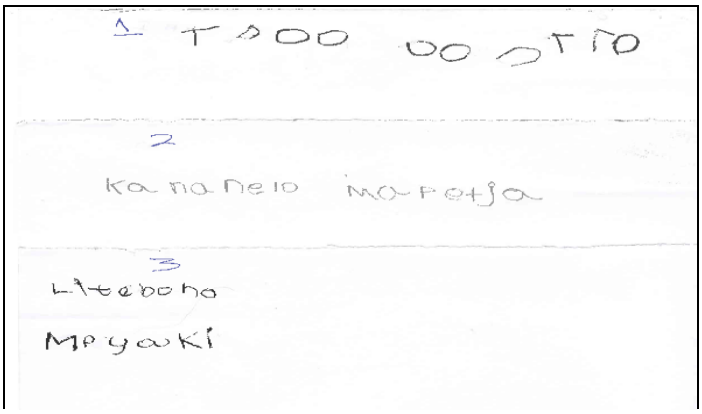

**Figure 2: Sample of children's writing**

Figure 2 above shows that children were at a different level as they started school. Child one could not write her/his name properly. However, they could realise that the first letter of their name is T. The second child was able to write her full name. The third child could write his/her name though the spelling for the surname is not correct because of the omission of the letter (n). The correct surname should be 'Monyaki' instead of 'Moyaki'. The variation in ability to write suggests that when children start school they are at different levels. This has to influence a teacher when planning for lessons. The planned lesson should take into consideration the varied abilities that learners have. A teacher might do well if he/she pays attention to each individual learner. However, this could be prohibited by crowded classes, which remain a problem in Lesotho Primary schools. Figure 3 below presents the mathematical ladder of learners at the start of school.

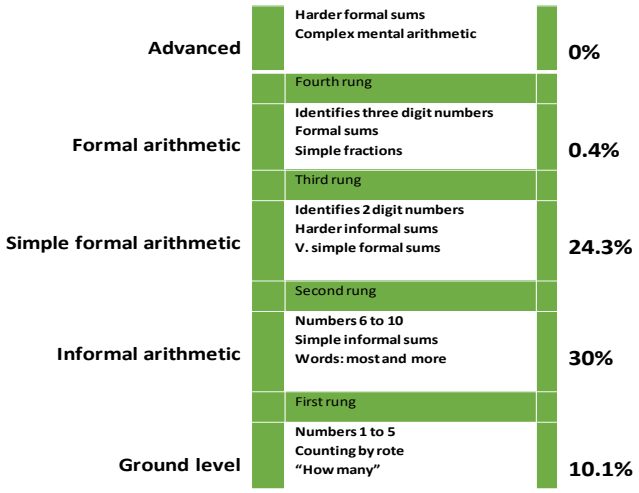


**Figure 3: Mathematics Ladder – start of school**

According to Figure 3 above, many children (30%) were able to do 'simple informal sums' and they were conversant with commonly used words in Mathematics such as 'most and more'. They were able to compare quantities and say which one was greater than the other. Twenty four (24%) of the participants were able to do 'harder informal sums' that involved two digit numbers. However, the figure shows that none of the participants was able to do 'complex mental arithmetic'. In general, Figure 3 suggests that some Basotho learners join school already with some level of proficiency in some basic mathematics operations and concepts. However, it must be taken into consideration that these are the participants drawn from around Maseru. Being the capital city of Lesotho, Maseru is more developed than other districts of the country. Children from Maseru are likely to be more exposed to an environment that enhances their mathematical skills than those coming from, say, Quthing district.

The analysis of the translation process showed that there were complexities associated with translating technical tools from English to Sesotho. For example, rhyming words in English could not find equivalent ones in Sesotho because rhyming does not exist in the

local language. As a result, innovative solutions had to be found. In the numeracy section, phrases such as "what is twice three doubled?" was very hard and it was difficult to translate. Some words were unfamiliar such as violin, yacht and saxophone to a Mosotho child. It was also found that letters D, V, W, Z and X are generally not used in Sesotho. However, these letters may be used in some children's names especially those that have Xhosa or Ndebele origins. In the Sesotho culture, letters Y, G and C are only used in compound letters. It was, therefore, important to include some compound letters and letters with accents in the assessment.

Figure 4 below shows an example of the activities that were translated from English to Sesotho.

**Figure 4: A sample of tasks that were translated from English to Sesotho**

Words such as apple, children, and money were translated as apole, bana, and chelete respectively. These words are accompanied by pictures. During the assessment, the assessor (teacher) would point at each picture and ask the participant to say what it represents. Children would also be asked to read the word. The phrase written on the board is '*khomo e tlola khoeli*' and it is a direct translation of 'the cow jumps over the moon'. While it is true that this sentence does not make any real sense, it is included here to check if learners were able to read the sentence. In one of the activities, the assessor asked the participant to point at a person who is reading a book. Participants were also asked to mention the number of people they could see on the picture. Participants were also asked to point at a person holding a kite. There is no Sesotho word for 'kite' so such a word was used as it is. All English words that could not find a direct match in Sesotho were retained in English. This was done to avoid confusing participants.

**Conclusions and recommendations**

Assessing children's pre-school knowledge is critical in Lesotho, where the new integrated curriculum calls for teachers to integrate concepts through windows (literacy and numeracy) (Curriculum and Assessment Policy, 2009). This study has shown that

Basotho children start school at age 6, and at this stage some of them already know how to write their names and are able to read simple sentences. However, a number of them could not write their names. In numeracy too, the same variation exists. It was noted that since the sample was very small (30 learners from 10 schools in Maseru), the findings cannot be generalised. It is hoped that these findings might influence Grade 1 teachers to organise their teaching plans such that each individual child is accommodated in lessons. Because the assessors were given prior training on how to assess children and keep children's profiles, this project has proven to be useful for Grade 1 teachers. It is, therefore recommended that the Ministry of Education and Training (MoET) provide support to this study so that it could be extended to the remaining nine districts of Lesotho.

It has been highlighted in the study that translating assessment tools from English to Sesotho is a complex and demanding task. As indicated, the issue of rhyming words in English became a challenge because we could not find equivalent ones in Sesotho. Rhyming words do not exist in Sesotho. The study established that some words such as violin were unfamiliar to a Mosotho child. Again, some letters such as 'W' were not used in Sesotho. It is, therefore, recommended that care must be taken when translation is made. It might not be wise to translate technical terms from English into local languages as such a move would complicate matters for children. It is recommended that during translation, technical words be retained in English. Finally, at policy level, it is hoped that knowing what children bring to school might lead to quality teaching and learning in Lesotho primary schools.

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## SUB-THEME D: RE–THINKING ASSESSMENT OF LEARNERS WITH SPECIAL NEEDS

# An investigation into the robustness of the assessment of learners with special needs: A Case of Leseli Community School

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## Abstract

*Education for learners with special needs remains a challenge for developing countries like Lesotho, where development of infrastructure and appropriate training for personnel is still at its infancy. With the number of learners with special needs on the rise, lack of basic necessities has compelled such learners to be absorbed into the main stream education system, leaving educators frustrated. Although having all-inclusive education as professed by the government may be an ideal situation for learners with special needs, what remains a barrier is the mode of assessment used for such learners. The study sought to establish the depth and breadth of the assessment of learners with special needs in Lesotho. The study was conducted using the qualitative methodology. The in-depth interviews were conducted in order to get a thorough and informed insight that reveals how learners with special needs are evaluated. Documents such as Education Act 2010, The National Constitution and Children's Protection and Welfare Act 2011 were analysed to assess whether they respond to the needs of such learners. The informant selection techniques employed were convenience and purposive sampling. Respondents were selected based on their availability and willingness to participate. The findings were analysed using the thematic method of analysis. The study revealed that the government has not done enough to ensure inclusive education. This is evidenced by lack of clear policies for learners with special needs, as well as facilities and trained personnel for such learners.*

***Key words**: assessment, inclusive education, learners, special needs, special education*

## Introduction

Delivery of education appropriate for pupils with special needs is a challenge in Lesotho, mainly due to lack of proper infrastructure, teaching and learning materials and most importantly, qualified personnel to cater for the special needs of these disadvantaged pupils. Kiyuba and Tukur (2014), looking at the situation of children with special needs in Uganda, state that with the universal declaration of human rights coming into force in 1948, and the realization of universal special education became the main agenda of many world conferences. This means that catering for the needs of children with special needs in education is a human right.

Emphasizing the fact that catering for children with special needs in education is a human right, Udoba (2014) says that the United Nations Organization is pushing the agenda for education for all and therefore children with development disabilities will need extra attention in terms of curriculum adaptation, teaching methods, availability of teaching and learning materials, assistive technology, assessment systems, as well as resources and funds for adapting school environments.

Advocating for education policies that promote inclusion in contemporary systems of education, Bouillet and Kudek- Mirosevic (2015) indicate that inclusive education allows children with and without disabilities to attend the same age-appropriate classes, with additional, individually tailored support where needed. Describing a situation that fits the one of Lesotho, Bouillet and Kudek- Mirosevic (2015) go on to say that children with disabilities are still faced with a lot of challenges in realizing their right to education and they are one of the most marginalized and excluded groups in education.

Identifying the importance of the need to train personnel providing education to children with special needs, Mpofu and Shumba (2012) submit that in order to improve the quality of primary and secondary education of children with special needs, policy makers are challenged to look closely at the preparation of those who work with young children before the eligibility age of primary education. In other words, the education system should start catering for disadvantaged children starting with qualified personnel who will teach and assess the educational development of these children with special needs skillfully and professionally. However, this study's main focus is on assessment systems for children with special needs in Leseli Community School. This school has a Pre and Primary school for mentally and physically challenged children. It also has able bodied children. The school inculcates among learners the culture of accepting one another despite the differences.

## Statement of the problem

Equipment and infrastructure for pedagogy and assessment of learners with disabilities in Lesotho is inadequate and basically caters for learners with visual challenges. This is a disadvantage to learners with other disabilities who also fall under the category of learners with special needs.

## Study objectives

This study sought to investigate the measures put in place by the education system in Lesotho to cater for learners with special needs at primary school level, and to establish how best such learners can be assessed without disadvantaging them because of their disabilities.

**Research questions**

- What are the teaching/learning and assessment methods at Leseli Community School for learners with disabilities?
- How effective are these methods for the pedagogy and assessment of learners with disabilities?
- To what extent is the Examinations Council of Lesotho (ECoL) equipped and prepared to assess learners with disabilities?

**Theoretical framework**

The theory that best informs this study on assessment of learners with special needs is constructivism. Sajadi and Khan (2011) submit that constructivism is an educational theory developed by Jean Piaget (1954) which explains how people learn in practice. Sajadi and Khan (2011) also cite Kirscher (2006) stating that constructivism learning theory focuses on the construction of new knowledge by the learner from active learner-driven experiences. The point of emphasis on learner centeredness of constructivism makes it the most relevant theory to inform this study because assessing learners with special needs should use the latter's needs as point of departure.

**Literature review**

The Ministry of Education and Training (2009) states that Curriculum and Assessment Policy 2008 emphasizes the learner centered approach, encouraging teaching and learning methods that can further develop creativity, independence, and survival skills of learners. The policy further elaborates that learners are expected to become more responsible for their own learning processes and thus should be able to identify, formulate and solve problems by themselves and evaluate their work. The Lesotho government took a step further in Education Sector Strategic Plan 2005-2015 (2005) which states that in Integrated Early Childhood Care and Development, special attention was made to undertake a study to establish the magnitude of the challenge of addressing children with disabilities and to design the best strategies to integrate them into the IECCD programmes.

Although the policies encourage inclusion and independence of learners, this may not apply to all learners across learning spheres. Sperotto (2014) argues that educational assessment of a student with special needs can be challenging and, if not administered correctly, can provide a misrepresentation of the child's actual academic abilities. Raselimo and Mahao (2015) indicate that Lesotho Curriculum and Assessment Policy 2008 state that for optimum learning, learners should take a minimum of six subjects. However, Hussua and Strleb (2010) state that the assessment of children with special needs is already a dilemma from the teachers', pupils' or parents' perspectives, and heavy workload for the disadvantaged would only be a burden, resulting in high dropout rates. Harris and James (2006) noted that assessment will be most effective if students understand its purpose, what they are required to do, and the standards that are expected.

Mkandawire, Mapahale and Tseeke (2016) state that for decades, Lesotho and Malawi have neglected special education, leaving it in the hands of non-governmental organisations, charitable organizations, individuals and churches. This meant that assessment was also left out in curriculum development.

Hussua and Strleb (2010) assert that although traditional education and assessment relied heavily on teachers' assessment of pupils' knowledge over a specified period as prescribed

by the curriculum, the current trends in education and assessment are to encourage pupils in learning to improve their personal skills. Anderson, 1998, in ElSaheli-Elhage and Sawilowsky (2016) considers traditional assessment as a passive process where students memorized knowledge from materials or the teacher. Hence, the frequent use of the empty vessel metaphor to describe learners. However, Watson (2017) states that assessments are important; as they provide the child with an opportunity to demonstrate knowledge, skill, and understanding. Sperotto (2014) adds that a typical standardized assessment in schools would not be relevant for students with special needs. However, Shriner, 2000, in ElSaheli-Elhage and Sawilowsky (2016) states that learning becomes meaningless without defined assessment, in a case where special education focuses on an individual student and her/his educational needs.

Gregg, 2009, in Sperotto (2014) urges educators to adopt assessment accommodation, which includes among others, modification of timing, setting, presentation, response, and scheduling of assessment. Woolfolk, 2002, in Hussua and Strleb (2010) writes that the assessment that is directed toward diagnosis is often understood as formative assessment. It can occur before or during the learning process and has two important goals: directing the teacher in planning the teaching process and helping the pupil in identifying the main study areas that have to be improved

Hussua and Strleb (2010) state that teachers use several approaches to motivate pupils, including planning the learning process with students. Some teachers like to organize their work in a different way, such as, through group work, projects, and experiments. Genishi (2000), cited by Villamero (2014) asserts that "nothing is scientific about this kind of assessment – it is based on developing a relationship with students, knowing who they are and being interested in who they are to become".

Villamero (2014) submits that Vygotsky introduced the concept of dynamic assessment, which is an approach to understanding individual differences and their implications for instruction that embeds intervention within the assessment procedure.

Despite attempts to ensure inclusive learning, ElSaheli-Elhage and Sawilowsky (2016) note that inadequate literature on the assessment of learners with special needs is a deterrent in the assessment of children with disabilities. Gaad (2010), cited by ElSaheli-Elhage and Sawilowsky (2016) adds that details on provisions for students with learning disabilities who are already in mainstream schools are difficult to gather. Information about the exact range of services and teachers' assessment practices and expertise available is heavily dependent upon word of mouth, not a central information provider. The other challenge highlighted by ElSaheli-Elhage and Sawilowsky (2016) is lack of evidence on the assessment of children with special needs. Koretz and Barton (2003) write that until very recently, many students with disabilities were routinely excluded from large-scale assessments.

Mkandawire, Mapahale and Tseeke (2016) state that the Ministry of Education in Lesotho made commendable strides through the publication of the education policy in 1989, to address specific requirements of special education. It was subsequently followed by the establishment of the special education unit

whose main purpose was to oversee the integration of children with special education needs into mainstream schools by the Ministry of Education in 1991.

**Methodology**

The study used qualitative methodology to gather, present and analyse data. In-depth interviews were conducted. Boyce (2006) writes that in-depth interviewing is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on an idea, program or situation.

Rivas and Gibson-Light (2016) suggest that in qualitative research and specifically for researchers carrying out in-depth interviews, the constructed representations about the world that subjects are able to express are the main source of scholarly knowledge. Rivas and Gibson-Light (2016) cite Denzin (2001:23) saying that we know the world only through our representations of it and that these representations can only be known through an "emic" perspective. This means interpreting thoroughly subjects' meanings of their own actions and of others' actions, and that this emic perspective is carried out within specific interpretative contexts (Rivas and Gibson-Light, 2016).

In-depth interviews were administered to authorities responsible for assessment of learners with special needs, at Leseli Community School and officials at the ECoL.

**Findings**

Findings from Leseli Community School revealed the challenge of lack of proper infrastructure and resources to cater for learners with different forms of disabilities. However, assessment of learners with disabilities is done at individual level depending on the learners' progress. The school used Vineland Adaptive Behaviour Scale for assessing the adaptive behaviour skills for children and adolescents of up to 18 years. This assessment method delves into three subscales of assessment, namely; communication (receptive, expressive, written), socialization (interpersonal relationships, play and leisure, coping skills), and daily living (person, domestic, community).

Assessment of learners with disabilities at Leseli Community School depended on the learner's level of disability as an individual, and determines how an educator adapts assessment to meet the requirements of each learner. It also included the rapport an educator develops with the learner for quick progression in the teaching/learning process. However, the school faced the challenge of trained personnel to cater for the learners with disabilities.

Findings from the ECoL established that assessment of learners with disabilities varied, depending on the needs of each learner. In the category of learners with disabilities, the ECoL catered for the assessment of learners with visual, hearing, physical and intellectual challenges. For learners with visual impairment, the ECoL provides the examination in Braille and in large font size for those with low vision. Visually, impaired learners are given 100% extra time during exams. For candidates with hearing impairment, the ECoL avails interpreters. The ECoL also provides scribes for candidates without hands. For candidates requiring scribes, the ECoL gives an extra 25% time to write the examination. For learners with mental disabilities, the ECoL encourages institutions of learning to submit reports highlighting

learners' capabilities for assessment based on their unique traits and capabilities.

**Discussion of findings**

Most learners with physical disabilities' mental capabilities are not different from those fully able. In a study on knowledge competencies, Mong (2014) established that those physical debilitations had no effect on the subjects' acumen. Assessors should therefore take this into consideration in order for inclusive education to be effective. Our study interviewees did not show consciousness of this fact.

Consistency in policy on inclusive education is a problem prevalent in the Lesotho education system and everywhere else in the world. Wapling (2016) writes of the results of a worldwide survey on inclusive education that there is lack of clarity and consistency over what inclusive education means and how it should be implemented with specific reference to children with disabilities. The result is that there are variations in educational provisions for children with disabilities and no overriding sense around what type of placement works most effectively.

for inclusive education content delivery and assessment to be effective, there is need to vary approaches. Villamero (2014) writes that assessment strategies for children with disabilities can be categorized according to their functions. These categories can be diagnostic, formative and summative. With diagnostic assessment, tests, observations and formal endorsements from the previous grade levels can be used to determine strengths and weaknesses of children with disabilities. It is evident from the study findings that variety in teaching/learning processes for children with disabilities in Lesotho lacks. Schools and the examinations authority lag behind in that sphere.

**Conclusion**

Assessment of learners with special needs remain a challenge for Lesotho, and a lot has to be done if the Education policy which calls for inclusive education becomes effective. The study established that the main challenge with the assessment of learners with disabilities emanate from poor infrastructural development for pedagogy and equipment for assessment. Assistance is mainly availed to learners with visual challenges as compared to those with other physical disabilities. The ECoL provides examinations on Braille and in enlarged font/print for the blind and visually impaired. This problem is no longer encountered in assessment processes at primary school leaving level since summative assessment has been phased out at that level, but can still be experienced at secondary and high school level.

**Recommendations**

In order for assessment of learners with disabilities to be robust, the study recommends that infrastructure and resources for learners with disabilities should be availed in all schools that enroll such learners. The study also recommends that assessment should consistently be done according to individual learners' incapacitations. The study also recommends training of teachers for learners with disabilities should be prioritized at national level.

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# Comparing Performance of Hearing Impaired Learners in Kenya Sign Language and Other Subjects in KCSE Examination

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## Abstract

*Learners with hearing impairment are vulnerable in educational assessment since the existing assessment methods disadvantage them and there is need to re-think assessment for such learners if a fair judgment is to be made about their academic potential. This study aimed at establishing the best way of assessing learners with hearing impairment in other than assessing them like the hearing peers. The study used purposive sampling of Kenya Certificate of Secondary Education (KCSE) examination results for 535 candidates for the last five years (2013 to 2017), 50 HI candidates who registered for the year 2018 KCSE examination, 15 teachers who teach KSL at secondary school level and five identified stakeholders in Special Needs Education. The data collection instruments used were questionnaires and interview schedules. Analysis of data was done using MS Excel. The study established that learners with hearing impairments perform poorly in other subjects but pass in KSL at KCSE because they cannot understand concepts taught and examined using English language. Most teachers do not have skills required in assessment of special needs learners and there is a misconception that learners with hearing impairment are generally weak academically. The study recommends use of KSL in the teaching and adoption of Signed English in the assessment of all subjects for candidates with hearing impairment. If these challenges are addressed the society will have a fair and accommodative education system for all learners.*

***Keywords:*** *Assessment, Kenya Sign Language, Hearing impairment*

## Introduction

Learning disability is defined by describing a discrepancy between ability and performance. Learners with hearing disabilities are of average to above-average intelligence (or IQ), but performance assessments and standardized tests indicate that their classroom achievement fails to match their evident ability (Individuals with Disabilities Education Act, IDEA). Learners with hearing impairment depend entirely on their observation skills in order to keep track of learning progress and therefore, it is up to the teacher to ensure that effective learning takes place for hearing impaired learners by imparting the relevant skills. The Kenya Certificate of Secondary Education (KCSE) examination is a summative assessment, which evaluates candidates' learning at the end of the four-year course (year 12) to determine if learners have learned what they were to learn. Every learner aspires to achieve academic excellence, which comes because of cumulative effort put in the course of learning process through regular practice, assignments and further consultation with teachers. Teachers on the other hand appreciate their efforts when learners understand concepts presented during teaching through regular assessment.

## Definition of Terms

Assessment: A wide variety of methods or tools that educators use to evaluate, measure, and document the academic readiness, learning progress, skill acquisition or educational needs of learners (*The Glossary of Education Reform*).

Kenya Sign Language: The language used by learners with hearing disability in Kenyan for communication and follow classroom instruction.

Hearing impairment: Inability to comprehend verbal communication or Standard English during classroom instruction and assessment.

## Research Problem

KCSE examination uses a twelve-point scale grading system to determine the candidates' level of competence as shown in the table below:-

| GRADE | | CATEGORY |
|---|---|---|
| 12 | A | Very Good |
| 11 | A- | |
| 10 | B+ | Good |
| 9 | B | |
| 8 | B- | |
| 7 | C+ | Average |
| 6 | C | |
| 5 | C- | |
| 4 | D+ | |
| 3 | D | Weak |
| 2 | D- | |
| 1 | E | Poor |

This scoring and grading is a criterion used for transition of candidates to higher levels of learning. The quality of a grade scored at KCSE level has much bearing in the academic progress of a candidate since it determines the professional course to pursue. This study sought to investigate the performance of candidates with hearing impairment in KCSE examination.

Whereas candidates with hearing impairment score very high in KSL, they score very low in other subjects i.e. English, Mathematics, Science subjects, Humanities and Applied subjects, (Appendix 1). A learner with hearing impairment who scores 12 points (grade A) in KSL and scores **1** point (grade E) in almost all the other subjects ends up with a very low performance and misses an opportunity to pursue a course of choice in college.

To be able to establish challenges in assessment of learners with hearing impairment, the study examined the performance of the HI candidates in Kenya Sign Language in comparison to their performance in other subjects, the competency of teachers who teach candidates with hearing impairment and the misconception that learners with hearing impairment are weak academically.

**Objectives of the Study**

The study sought:

- To determine the mode of assessing Kenya Sign Language compared to assessment of other subjects;
- To identify assessment skills possessed by teachers who teach hearing impaired learners;
- To establish the relationship between hearing impairment and academic performance

**Research Questions**

This study sought answers to the following research questions:

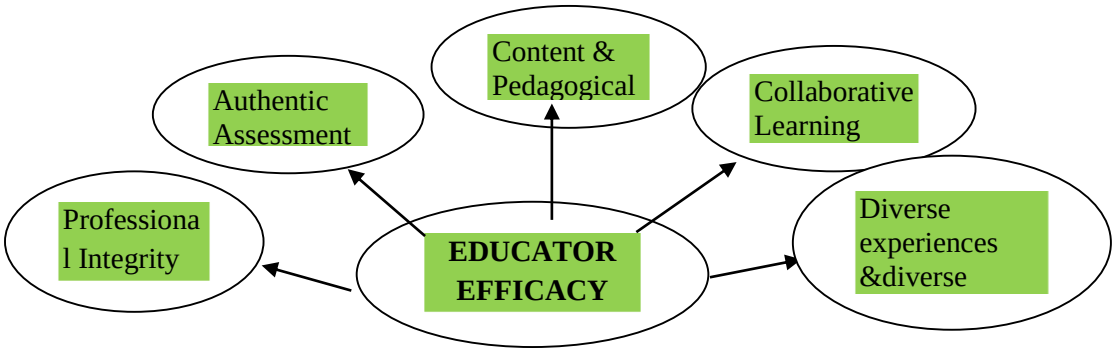
1. What instructional and assessment strategies can be explored to improve performance of learners with hearing impairment?
2. Can formative assessment be used to inform summative assessment for learners with hearing impairment?
3. What short term interventions do stakeholder have in place to bridge between communication and learning?

**Literature Review and Conceptual Framework**

The study used the College of Education (COE), University of Central Arkansas, conceptual framework that promotes a sense of professional efficacy. Professional efficacy affects an educator's sense of responsibility and competence to contribute to the growth and development of all learners and is grounded in:

- content and pedagogical knowledge
- guided clinical experiences with diverse students in diverse settings,
- collaborative learning communities,
- authentic assessment and reflective decision making.

**COE Conceptual Framework**




**Source:** https://uca.edu/education/conceptualframework

**Sign Language for Learning**

Knoors (2007) suggests that deaf people do not use a substandard form of English in their signing but an actual sign language with its own phonological and grammatical system. Sign language is not only a means of communication for people who are deaf, but also an effective learning tool that has powerful impact on literacy.

**Assessment skills for teacher handling HI learners**

It is critical that teacher-training programs focus on deaf learners. Every deaf education teacher-preparation should offer one or more courses to meet the needs of these learners Musyoka, Gentry and Bartlett, 2016). Furthermore, additional training at the pre-service and in-service levels can be included in teacher training curriculums and, prospective teachers should be enrolled in additional practicum experiences with deaf learners.

**Hearing Impairment Vis a Vis Academic Performance**

Marschark, Convertino and LaRock (2006) indicate that the academic performance of deaf students can be optimized through access, opportunities, and outcomes. The United Kingdom National Deaf Children's Society (2008) indicates that deafness is not a learning disability and there is no reason deaf children should be achieving any less than their hearing peers of similar abilities. However, it also indicated that the attainment of hearing-impaired children falls below the average compared to hearing peers. It also demonstrates that there exist barriers that have held too many deaf children back from achieving their potential at school for generations.

**Methodology**

The study employed survey design with modest use of qualitative research designs to gather an in-depth understanding of learners with hearing impairment. Correlational design was used to find whether a relationship exists between hearing impairment and performance as well as the nature of the relationship. Along with questionnaires administered to respondents for the statistical representation of the findings of the study, interview schedules with the respondents were conducted.

***Target Population***

The population used for the study included candidates who sat for KSL at KCSE level, HI candidates registered for the year 2018 KCSE

examination, teachers who teach KSL at secondary school level and stakeholders in Special Need Education. Table 3.1 below shows the distribution of the study population by categories.

| Targeted population | Population |
|---|---|
| KCSE results for HI candidates | 1828 |
| HI Candidates | 478 |
| Tutors | 85 |
| Stakeholders in SNE | 25 |
| **Total** | **2416** |

**Study Sample**

The study used two stage sampling: first, purposive sampling of results of candidates who had sat for KCSE examination and candidates who are currently in school was done, and then stratified random sampling of teachers and schools offering KSL at Secondary school level followed. This resulted in 535 candidates who sat for KSL at KCSE level for five years (2013 to 2017), 50 candidates who registered for the year 2018 KCSE examination, 15 teachers who teach KSL at secondary school level and five stakeholders in Special Needs Education.

***Selection of Schools***

There are 49 examination centres currently offering KSL in the KCSE examination in Kenya. Twenty out of the 49 examination centres are schools specifically for learners with special needs in education, 24 centres are integrated schools while five are private centres. This study targeted seven pure special needs schools and nine integrated schools.

**Selection of Candidates**

The stratified random sampling procedure was used to select KCSE examination results of candidates from the 16 sampled schools. For each of the selected schools, the results were stratified based on the subject the candidates sat for in KCSE examination.

Candidates who were interviewed during the study were selected randomly based on availability and willingness to participate in the study.

**Table 2: Candidates Sample Size**

| Stratum Candidates | Results of Candidates who sat for KCSE Examination (2013 - 2017) | | Candidates Registered for 2018 KCSE Examination | |
|---|---|---|---|---|
| | Target Population (N) | Sample Size 29% of N | Target Population (N) | Sample Size 25% of N |
| Kenya Sign Language | 1828 | 535 | 478 | 50 |
| English | 1828 | 535 | 478 | 50 |
| Mathematics | 1828 | 535 | 478 | 50 |
| Biology | 1828 | 535 | 478 | 35 |
| Chemistry | 1828 | 535 | 478 | 50 |
| History & Government | 1828 | 535 | 399 | 31 |
| Business Studies | 1828 | 535 | 114 | 21 |

**Selection of Teachers**

Sampling of teachers from the 16 selected schools was randomly done based on the availability and willingness of the teacher to participate in the study. It is important to note that in some schools more than 1 teacher was interviewed while in others, no teacher was interviewed.

***Data collection instruments***

The two data collection instruments were questionnaires and interview schedules were used as highlighted under: -

***Questionnaire***

Separate learner and teacher questionnaires were developed and to ensure content validity, the draft was given to three experts in assessment who gave their input. The questionnaires were then distrinuted to a sample of 5 teachers of KSL to assess the difficulty level and based on the feedback before the final version was prepared. The questionnaire required respondents to give information on learner's demographics and academic performance as well as teacher characteristics on qualifications, teaching methodology and assessment.

***Interview Schedules***

Interview schedules were organized and conducted in a free and friendly atmosphere in order to obtain the required information from participants.

***Data Analysis***

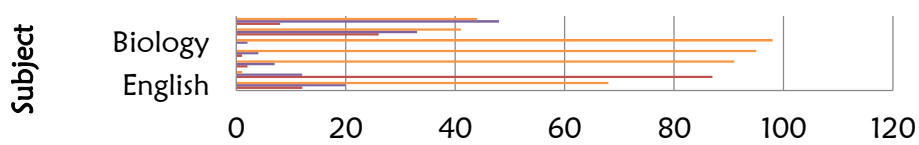
Descriptive statistics of the sample concerned were used in three instances i.e. to get a feel of the data, in the statistical tests themselves and to indicate the error associated with results output. Many of the descriptions or "parameters" such as the mean, which is familiar was used to compare the performance of candidates in KSL across the years.

**Discussion of Findings**

*Learner Results*

*Academic Performance*

This area aimed at obtaining information from students on how they performed in the various subjects assessed. Candidates were asked to give an honest opinion on how they rate their individual performance in the subjects indicated in Figure 3 below.




| | English | KSL | Mathematics | Chemistry | Biology | H &Govt. | B/Studies |
|---|---|---|---|---|---|---|---|
| Below Average | 68 | 1 | 91 | 95 | 98 | 41 | 44 |
| Average | 20 | 12 | 7 | 4 | 2 | 33 | 48 |
| Above Average | 12 | 87 | 2 | 1 | 0 | 26 | 8 |

***Figure 3: Individual Performance Self-Rating per Subject***

In KSL, 78% of the learners rated their performance as above average and only 1% indicated below average performance. There was an overwhelming below average performance of 98% in Biology, 95% in Chemistry, 91% in Mathematics, 68% in English while Business Studies and History and Government had 44% and 41% respectively.

***Teacher Results***

This area wanted to obtain individual teacher information about their level of education, area of specialization, effective teaching methods and assessment techniques.

*Teachers' highest level of education*

The study was able to establish the highest level of education for some of the teachers who teach learners with hearing impairment and the information is presented in Figure 4.

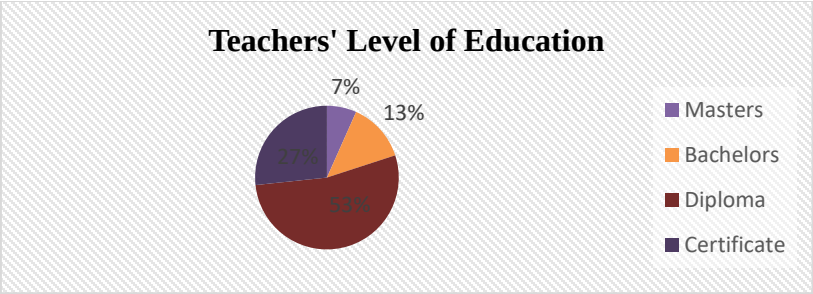



***Figure 4: Teachers' Level of Education***

It is evident that all teachers of learners with hearing impairment were professionally qualified, with 53% of the teachers being Diploma holders in Special Needs Education, 27% being holders of P1 Certificate and a few having advanced to Masters level.

Teachers Area of Specialization

This aspect aimed at establishing whether the teachers teaching learners with hearing impairment possessed the right skills for handling this group. Figure 5 presents the findings.

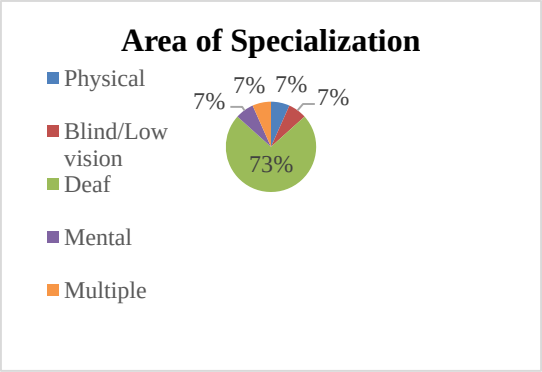



***Figure 5: Teachers' Area of Specialization***

Findings indicate that 73% of teachers who taught learners with hearing impairment possessed the requisite skills while 28% of those teachers did not have the requisite skills despite being professionals in Special Needs Education.

**Effective method of teaching HI**

Teachers were also required to give their opinions on how effective the various methods used to teach hearing impaired learners were, and the responses are as indicated on Figure 6 below.

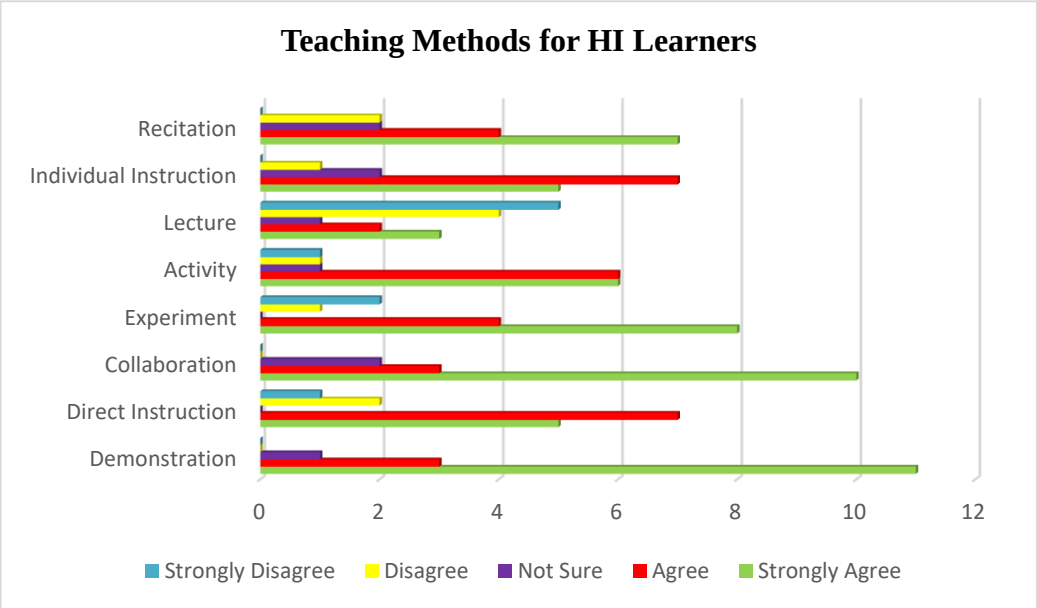



***Figure 6: Methods of Teaching HI Learners***

Despite varied opinions on this aspect, findings indicate that teachers strongly agreed with demonstration, collaboration, experiment and recitation as the most effective methods of teaching learners with hearing impairment. It was noted that there were less than 2 teachers who were not sure with the effective methods of teaching this special cohort of learners.

**Ways of presenting assessment tests in various subjects**

Teachers were also required to give the various ways in which assessment was being done in the various subjects. The findings are presented on Figure 7 below.

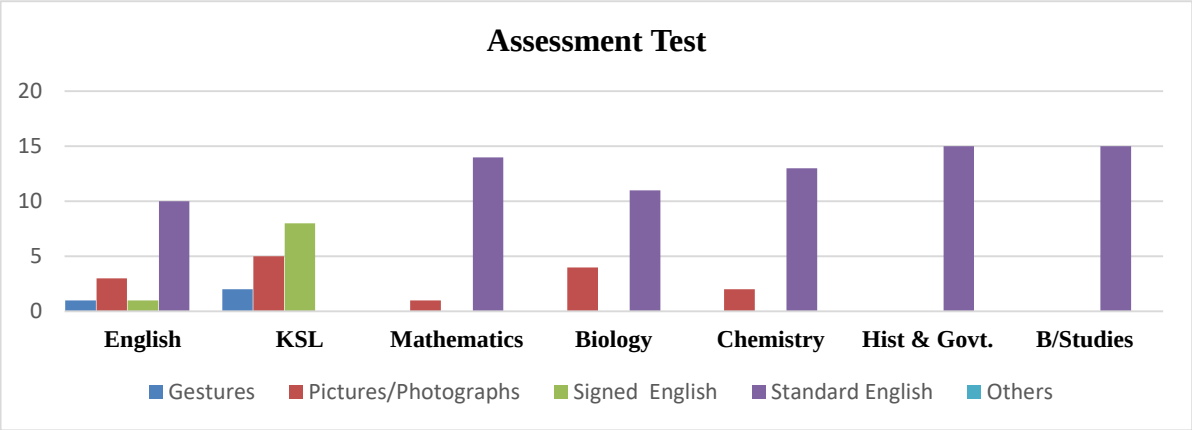



***Figure 7: Assessment of various papers***

The findings show that assessment across subjects is mainly by use of Standard English except in KSL, where gestures, pictures/photographs and Signed English are used. Sample KCSE examination question

papers for KSL and other papers corroborate this information.

***Table 1: Candidature Trends and Mean Scores in Kenya Sign Language for the last 5 years (2013 – 2017)***

| Year of Exam | Candidature | % Increase | Mean Mark | Mean Grade |
|---|---|---|---|---|
| 2013 | 235 | - | 60.58 | B (Plain) |
| 2014 | 323 | 37.45% | 57.33 | B- (Minus) |
| 2015 | 391 | 21.05% | 50.37 | C+ (Plus) |
| 2016 | 420 | 7.42% | 53.98 | C+ (Plus) |
| 2017 | 459 | 9.29% | 55.94 | B- (Minus) |

Analysis of Kenya Certificate of Secondary Education (KCSE) Candidature trends and mean scores for learners with hearing impairment, provided by Kenya National Examinations Council in the last five years is shown on Figure 8. The trends show that the academic performance for learners with hearing impairment is good in Kenya Sign Language, an indication that their academic potential can be translated into other subjects as well.

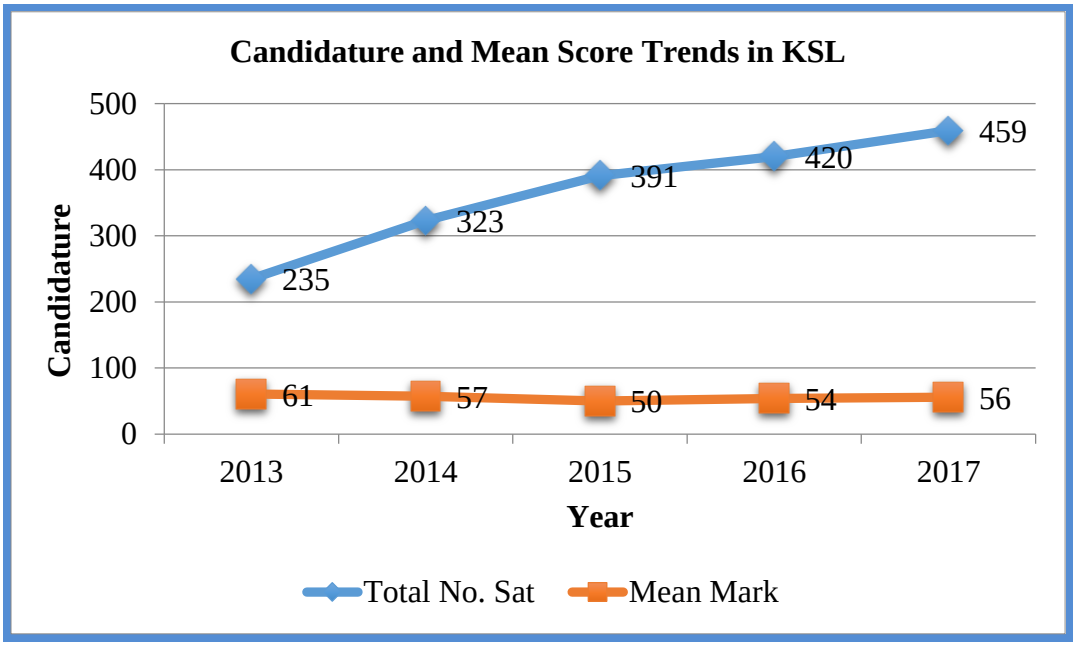



***Figure 8: KCSE, HI Candidature Trends and Mean Marks for years 2013 - 2017***

From the data, it is evident that there has been a steady increase of HI candidates and the performance in KSL has been consistently above average over the last five years in Kenya.

***Table 2: HI candidates who scored grade C and Above in KSL for the last 5 years (2013 – 2017) in KCSE Examination (Sample size: 535 Candidates)***

| **Year of Exam/ Grade Count** | **2017** | **2016** | **2015** | **2014** | **2013** |
|---|---|---|---|---|---|
| **A** (Plain) | 32 (19.05%) | 13 (8.44%) | 03 (4.62%) | 04 (5.19%) | 02 (2.82%) |
| **A-** (Minus) | 15 (8.93%) | 11 (7.14%) | 04 (6.15%) | 03 (3.90%) | 02 (2.82%) |
| **B+** (Plus) | 24 (14.29%) | 14 (9.09%) | 11 (16.92%) | 15 (19.48%) | 16 (22.54%) |
| **B** (Plain) | 21 (12.50%) | 23 (14.94%) | 12 (18.46%) | 16 (20.78%) | 13 (18.31%) |
| **B-** (Minus) | 20 (11.90%) | 20 (12.99%) | 03 (4.62%) | 06 (7.79%) | 15 (21.13%) |
| **C+** (Plus) | 20 (11.90%) | 34 (22.08%) | 14 (21.54%) | 15 (19.48%) | 14 (19.72%) |
| **C** (Plain) | 36 (21.43%) | 39 (25.32%) | 18 (27.69%) | 18 (23.38%) | 09 (12.68%) |
| **Sample** | **168** | **154** | **65** | **77** | **71** |

The sample grade counts obtained from the KNEC results database in table 2 indicates that HI candidates have posted good performance in KSL over the years with the majority of them scoring grade B+ and above in the year 2017 KCSE examination. The graphical presentation of quality grades (C plain and above) in KSL for the years 2015 to 2017 is given in figures 8, 9 and 10 respectively.

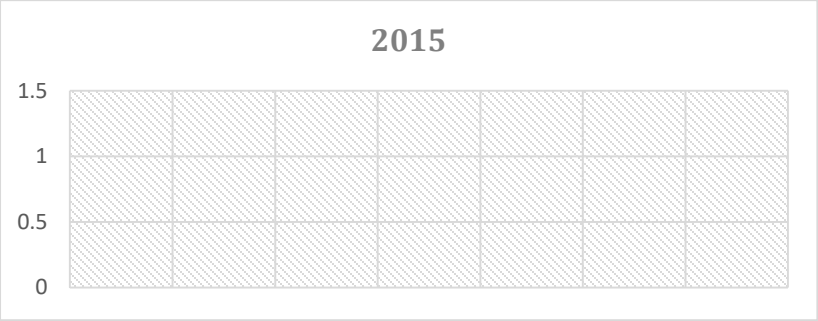



***Figure 9: Number of quality grades in KSL in 2015 KCSE exam***

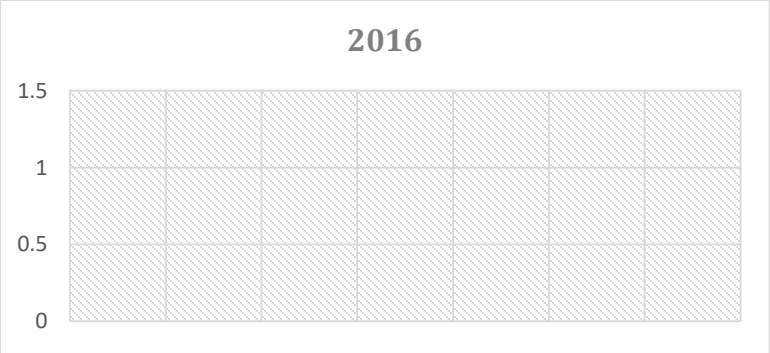



***Figure 10: Number of quality grades in KSL in 2016 KCSE exam***

***Figure 11: Number of quality grades in KSL in 2017 KCSE exam***

From Figure 9, 10 and 11 above it is observable that the performance of HI learners in KSL is skewed towards quality grades (A to C), which reflects their academic potential in concepts they can understand.

***Table 3: Mean Grade Count for HI candidates in KCSE Examination for the last 5 years (2013 – 2017) in (Sample size: 535 Candidates)***

| Mean Grade Count/Year | 2017 (%) | 2016 (%) | 2015 (%) | 2014 (%) | 2013 (%) |
|---|---|---|---|---|---|
| A | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) |
| A- | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) |
| B+ | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) |
| B | 1 (0.60%) | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) |
| B- | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) | 1 (1.30%) | **0** (0.00%) |
| C+ | **0** (0.00%) | **0** (0.00%) | **4** (6.15%) | 1 (1.30%) | **0** (0.00%) |
| C | **2** (1.19%) | **1** (0.65%) | **5** (7.69%) | **3** (3.90%) | **4** (5.63%) |
| C- | **6** (3.57%) | **3** (0.95%) | **6** (9.23%) | **2** (2.60%) | **6** (8.45%) |
| D+ | **13** (7.74%) | **8** (5.19%) | **10** (15.38%) | **6** (7.80%) | **16** (22.54%) |
| D | **50** (29.76%) | **28** (18.18%) | **24** (36.92%) | **29** (37.66%) | **23** (32.39%) |
| D- | **96** (57.14%) | **114** (74.03%) | **16** (24.62%) | **35** (45.45%) | **22** (40.00%) |
| E | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) | **0** (0.00%) |
| | **168** | **154** | **65** | **77** | **71** |

Table 3 above gives a sample summary of distribution of mean grades for HI candidates for the years 2013 to 2017. From the table, it is evident that the majority of HI candidates do not obtain quality mean grades which can secure them good professional courses in tertiary colleges and universities. Nevertheless, it is notable that HI candidates do not score grade E. This can be attributed to the good performance in KSL, which boosts their performance during computation of the final mean grade. Figures 12, 13 and 14 below give graphical presentation of overall performance by HI candidates in KCSE examination for the years 2015 to 2017.

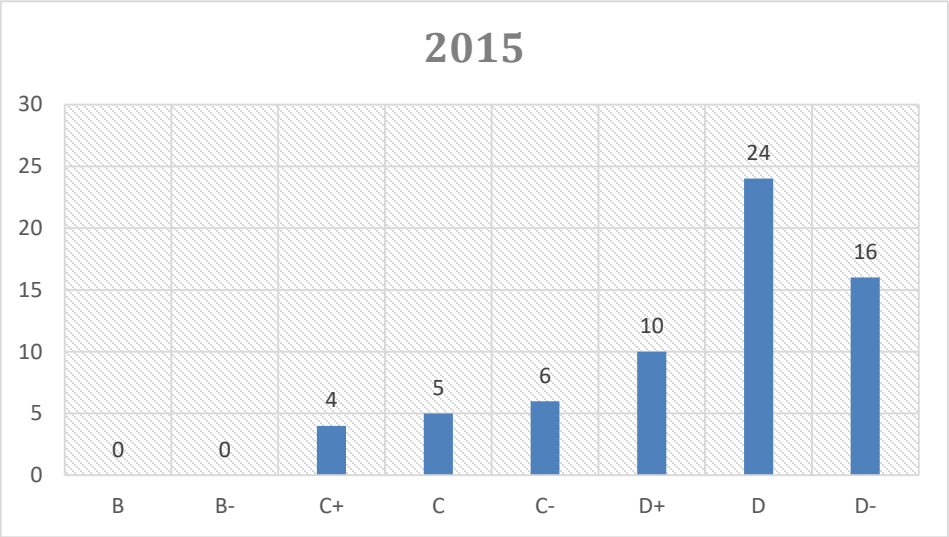



***Figure 12: Mean grades distribution for HI candidates in 2015 KCSE exam (Sample size 65)***

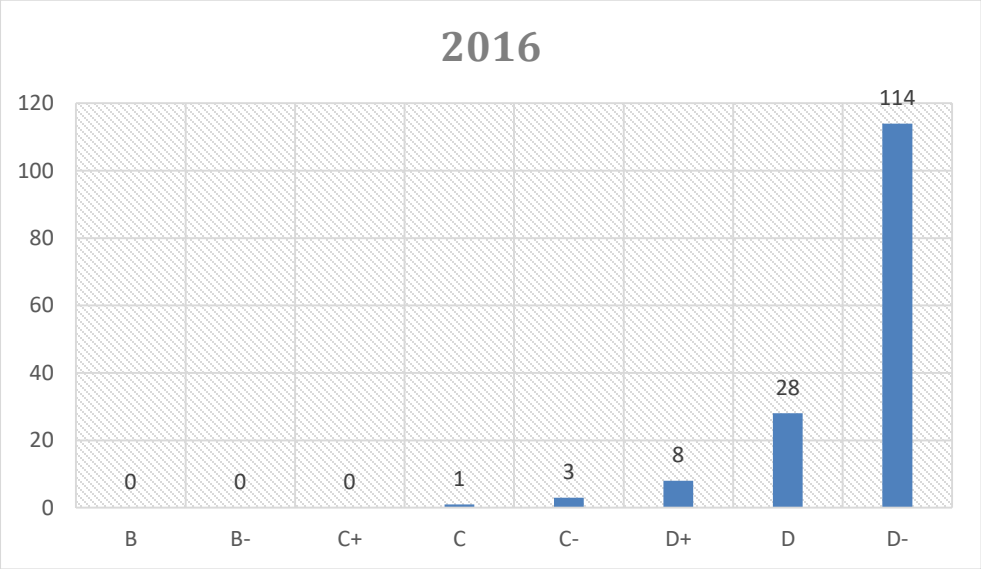



***Figure 13: Mean grades distribution for HI candidates in 2016 KCSE exam (Sample size 154)***

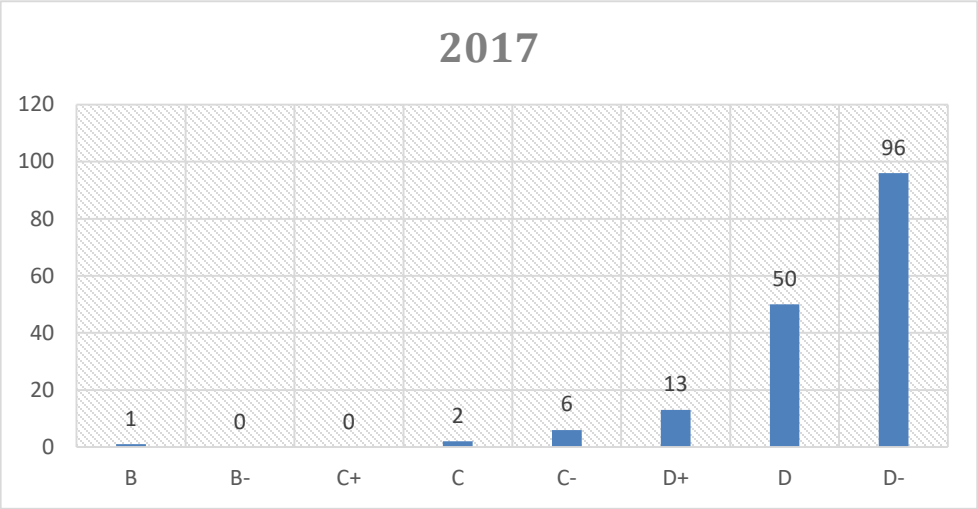



***Figure 14: Mean grades distribution for HI candidates in 2017 KCSE exam***

***(Sample size 168)***

Figures 12, 13 and 14 above show how low the overall performance of learners with HI has very few learners achieving grades that get them places in tertiary institutions. A very high number of these learners score an overall mean grade of either D plain or D- (Minus). For the three years sampled, only four candidates scored C+ and above.

**Qualitative Findings**

The study also established the following from stakeholders:

The syllabus for the Kenya Sign Language is smaller compared to the syllabi in other subjects;

Available teaching and learning materials for other subjects are written using Standard English instead of Signed English;

Assessment tests in the final examination are usually written in Standard English instead of Signed English;

The internal assessment tests also follow the trends of Standard English used by KNEC in the attempt to make internal tests appear similar to the final examination test;

The adaptation of the syllabus for HI learners is inadequate in that some concepts have not been adapted to enable learners understand easily.

Majority of teachers of HI learners are trained to teach Primary School (with P1 qualifications) and they only trained for a unit in Sign Language for communication purposes when they furthered their studies.

**Recommendations**

From the findings and discussions, this study recommends the strengthening of the use of the Kenya Sign Language in the teaching of all subjects; the adoption of Signed English in the assessment of learners with hearing impairment in both formative and summative assessments; and experts in Sign Language should engage with stakeholders in education to address the issues raised about syllabus size and adaptation. Further, some content in science subjects demand hearing ability such as those involving sound and abstract thinking and teachers should provide opportunities to the students with hearing impairment to learn scientific concepts through learning by doing.

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***Appendix 1***

***Sample Performance for HI candidates in the year 2017 KCSE Examination***

| MG | | AGP | SBJ1 | SBJ2 | SBJ3 | SBJ4 | SBJ5 | SBJ6 | SBJ7 |
|---|---|---|---|---|---|---|---|---|---|
| | D | 22 | 101 D- | 121 E | 231 E | 233 E | 311 D | 313 D- | 504 A |
| | D | 20 | 101 D- | 121 E | 231 E | 233 E | 311 D- | 313 E | 504 A |
| | D- | 16 | 101 E | 121 E | 231 E | 233 E | 311 E | 443 E | 504 B+ |
| | D- | 15 | 101 D- | 121 E | 231 E | 233 E | 311 E | 443 E | 504 B- |
| | D- | 14 | 101 D- | 121 E | 231 E | 233 E | 311 E | 443 E | 504 C+ |
| | D- | 17 | 101 D- | 121 E | 231 E | 233 E | 311 E | 314 E | 504 B+ |
| | D- | 14 | 101 E | 121 E | 231 E | 233 E | 311 E | 443 E | 504 B- |
| | D- | 15 | 101 D- | 121 E | 231 E | 233 E | 311 E | 443 E | 504 B- |
| | D- | 15 | 101 E | 121 E | 231 E | 233 E | 311 E | 443 E | 504 B |
| | D- | 14 | 101 D- | 121 E | 231 E | 233 E | 311 E | 313 E | 504 C+ |
| | D- | 13 | 101 E | 121 E | 231 E | 233 E | 311 E | 443 E | 504 C+ |
| | D- | 14 | 101 E | 121 E | 231 E | 233 E | 311 E | 443 E | 504 B- |
| | D- | 13 | 101 E | 121 E | 231 E | 233 E | 311 E | 313 E | 504 C+ |
| | C- | 34 | 101 D- | 121 C | 232 D+ | 233 D+ | 311 D- | 451 D+ | 504 A |
| | D+ | 25 | 101 D | 121 E | 232 E | 233 D- | 311 D | 441 D | 504 A |
| | D+ | 26 | 101 D | 121 D- | 232 D- | 233 D- | 311 D | 451 D | 504 A- |
| | D | 22 | 101 D- | 121 D- | 232 E | 233 D- | 311 E | 451 D | 504 A- |
| | D | 18 | 101 E | 121 E | 232 D- | 233 E | 311 E | 451 D | 504 B |
| | D | 19 | 101 D- | 121 E | 231 E | 233 E | 311 E | 451 D- | 504 A- |

| MG | | AGP | SBJ1 | SBJ2 | SBJ3 | SBJ4 | SBJ5 | SBJ6 | SBJ7 |
|---|---|---|---|---|---|---|---|---|---|
| | D | 18 | 101 E | 121 D- | 232 D- | 233 E | 311 E | 451 D- | 504 B |
| | D- | 16 | 101 E | 121 E | 232 E | 233 E | 311 E | 441 E | 504 B+ |
| | D- | 13 | 101 E | 121 E | 231 E | 233 E | 311 E | 441 E | 504 C+ |
| | D | 23 | 101 D- | 121 E | 231 E | 233 E | 311 D | 441 D | 504 A |
| | D- | 15 | 101 E | 121 E | 231 E | 233 E | 313 E | 441 D- | 504 B- |
| | D | 18 | 101 D- | 121 E | 231 E | 233 E | 311 E | 441 D- | 504 B+ |
| | D- | 17 | 101 D- | 121 E | 231 E | 233 E | 311 E | 444 D+ | 504 C+ |
| | D | 20 | 101 D- | 121 E | 231 E | 233 E | 311 E | 441 D- | 504 A |
| | D | 22 | 101 D- | 121 E | 231 E | 233 E | 311 D- | 441 D | 504 A |
| | D | 24 | 101 D | 121 E | 231 E | 233 E | 313 D | 441 D | 504 A |
| | D | 19 | 101 D- | 121 E | 231 E | 233 E | 311 E | 441 D- | 504 A- |
| | D- | 14 | 101 E | 121 E | 231 E | 233 E | 311 E | 441 E | 504 B- |
| | D | 22 | 101 D- | 121 E | 231 E | 233 E | 311 D- | 441 D | 504 A |
| | D | 19 | 101 D- | 121 E | 231 E | 233 E | 311 E | 441 D- | 504 A- |
| | D- | 16 | 101 E | 121 E | 231 E | 233 E | 311 E | 441 D- | 504 B |
| | D | 18 | 101 D- | 121 E | 231 E | 233 E | 313 E | 441 D- | 504 B+ |
| | D- | 14 | 101 E | 121 E | 231 E | 233 E | 311 E | 441 E | 504 B- |
| | D- | 16 | 101 E | 121 E | 231 E | 233 E | 311 E | 451 D- | 504 B |
| | D | 18 | 101 D- | 121 E | 231 E | 233 E | 313 E | 441 D- | 504 B+ |
| | D | 19 | 101 D- | 102 D- | 121 D- | 231 E | 233 D- | 313 D- | 504 B- |
| | C | 39 | 101 C | 102 C- | 121 D | 231 D | 233 D | 313 C+ | 504 A |
| | C | 41 | 101 D | 102 D | 121 D+ | 232 B- | 233 C- | 313 C+ | 504 A- |
| | C- | 38 | 101 C+ | 102 C | 121 D- | 231 D | 233 D | 311 C- | 504 A |
| | C- | 32 | 101 D | 102 D | 121 D | 232 D | 233 D- | 311 C+ | 504 A- |
| | C- | 32 | 101 D | 102 D | 121 D- | 231 D- | 233 D | 313 C+ | 504 A |
| | D+ | 27 | 101 D | 102 D | 121 D | 232 D | 233 D- | 311 D | 504 B+ |
| | D+ | 30 | 101 D | 102 D | 121 D | 232 C- | 233 D | 313 D+ | 504 B |
| | D+ | 29 | 101 D | 102 D | 121 E | 232 D- | 233 D- | 313 C | 504 A |
| | D | 23 | 101 D | 102 D- | 121 E | 231 E | 233 D- | 311 D- | 504 A |
| | B | 61 | 101 C- | 102 D | 121 A- | 232 A | 233 A- | 313 C+ | 504 A |
| | C- | 33 | 101 C- | 102 C- | 121 D- | 231 D- | 233 D- | 313 C- | 504 A |
| | D- | 15 | 101 D- | 122 E | 237 E | 311 E | 313 E | 443 E | 504 B- |
| | D- | 14 | 101 E | 122 E | 237 E | 311 E | 312 E | 443 E | 504 B- |
| | D- | 13 | 101 E | 122 E | 237 E | 311 E | 312 E | 443 E | 504 C+ |
| | D- | 15 | 101 E | 122 E | 237 E | 311 E | 313 E | 441 D- | 504 B- |
| | D | 20 | 101 D- | 121 E | 231 E | 233 E | 311 E | 313 D- | 504 A |
| | D- | 17 | 101 E | 121 E | 231 E | 233 E | 312 E | 313 E | 504 A- |
| | D- | 13 | 101 E | 121 E | 231 E | 233 E | 311 E | 313 E | 504 C+ |
| | D- | 14 | 101 E | 121 E | 231 E | 233 E | 312 E | 313 E | 504 B- |
| | D- | 13 | 101 E | 121 E | 231 E | 233 E | 311 E | 312 E | 504 C+ |

| MG | | AGP | SBJ1 | SBJ2 | SBJ3 | SBJ4 | SBJ5 | SBJ6 | SBJ7 |
|---|---|---|---|---|---|---|---|---|---|
| | D- | 13 | 101 E | 121 E | 231 E | 233 E | 311 E | 312 E | 504 C+ |
| | D+ | 30 | 101 D | 121 E | 231 D | 233 D- | 311 C | 443 D | 504 A |
| | D | 18 | 101 D- | 121 E | 231 E | 233 E | 311 D- | 443 E | 504 B+ |
| | D- | 14 | 101 D- | 121 E | 231 E | 233 E | 311 E | 443 E | 504 C+ |
| | D- | 17 | 101 D- | 121 E | 231 E | 233 E | 311 E | 443 E | 504 B+ |
| | D- | 14 | 101 E | 122 E | 237 E | 311 E | 313 E | 443 E | 504 B- |
| | D | 18 | 101 D- | 122 E | 237 E | 311 D- | 313 E | 443 D- | 504 B |
| | D- | 15 | 101 D- | 102 X | 122 E | 237 E | 311 E | 313 E | 504 B- |
| | D | 23 | 101 D | 102 D- | 122 E | 237 E | 311 D | 313 D | 504 B+ |
| | D | 22 | 101 D- | 121 E | 231 E | 233 E | 311 E | 313 D | 504 A |
| | D | 21 | 101 D- | 121 E | 231 E | 233 E | 311 D- | 312 D- | 504 A |
| | D- | 16 | 101 D- | 121 E | 231 E | 233 E | 311 E | 313 E | 504 B |
| | D | 18 | 101 D- | 121 E | 231 E | 233 E | 311 E | 313 E | 504 A- |
| | D- | 17 | 101 D- | 121 E | 231 E | 233 E | 311 E | 312 D- | 504 B |
| | D- | 16 | 101 D- | 121 E | 231 E | 233 E | 311 E | 312 E | 504 B |
| | D- | 15 | 101 E | 121 E | 231 E | 233 E | 311 E | 313 E | 504 B |
| | D+ | 31 | 101 D+ | 121 D- | 231 D- | 233 D- | 311 D | 313 C | 504 A |
| | D- | 17 | 101 D- | 121 D- | 231 E | 233 E | 312 D- | 443 E | 504 B- |
| | D | 18 | 101 D- | 121 E | 231 E | 233 D- | 312 E | 313 E | 504 B+ |
| | D- | 15 | 101 E | 121 E | 231 E | 233 E | 312 E | 313 E | 504 B |
| | D- | 16 | 101 D- | 121 E | 232 E | 233 E | 312 E | 313 E | 504 B |
| | D- | 17 | 101 E | 121 E | 231 E | 233 E | 312 E | 313 E | 504 A- |
| | D- | 13 | 101 E | 121 E | 231 E | 233 E | 312 E | 313 E | 504 C+ |
| | D- | 14 | 101 E | 121 E | 231 E | 233 E | 311 E | 313 E | 504 B- |
| | D | 20 | 101 E | 121 E | 231 E | 233 E | 312 D- | 313 E | 504 A |
| | D | 21 | 101 D- | 121 E | 231 E | 233 D- | 311 D | 313 D- | 504 B+ |
| | D- | 15 | 101 E | 121 E | 231 E | 233 E | 311 D | 313 E | 504 C+ |
| | D- | 16 | 101 E | 121 E | 231 E | 233 E | 311 D | 313 E | 504 C+ |
| | D- | 16 | 101 D- | 121 E | 231 E | 233 E | 311 E | 313 E | 504 B |
| | D+ | 27 | 101 D | 122 D- | 237 D- | 311 D | 313 D | 443 D- | 504 A |
| | D+ | 25 | 101 D- | 122 E | 237 D- | 311 C | 312 D- | 443 D- | 504 B+ |
| | D+ | 25 | 101 D- | 122 E | 237 D- | 311 C- | 313 D | 443 D- | 504 B+ |
| | D | 23 | 101 D- | 122 D- | 237 E | 311 D | 313 D- | 443 E | 504 A |
| | D | 22 | 101 D- | 122 D- | 237 E | 311 D | 312 D- | 443 D- | 504 B+ |
| | D | 20 | 101 D- | 122 D- | 237 E | 311 D- | 312 D- | 443 E | 504 B+ |
| | D | 22 | 101 D- | 122 D- | 237 D- | 311 D | 312 D- | 443 D- | 504 B |
| | D- | 17 | 101 D- | 122 D- | 237 E | 311 D- | 312 D- | 443 E | 504 C+ |
| | D- | 15 | 101 D- | 122 E | 237 E | 311 D- | 312 E | 443 E | 504 C+ |
| | D- | 16 | 101 D- | 122 E | 237 E | 311 E | 313 E | 443 E | 504 B |
| | D | 24 | 101 D- | 122 D- | 237 E | 311 D | 312 D- | 443 D- | 504 A |

| MG | AGP | SBJ1 | SBJ2 | SBJ3 | SBJ4 | SBJ5 | SBJ6 | SBJ7 |
|---|---|---|---|---|---|---|---|---|
| D | 21 | 101 D- | 122 D- | 237 E | 311 D- | 312 D- | 443 D- | 504 B+ |
| D | 19 | 101 D- | 122 E | 237 E | 311 D- | 312 D- | 443 D- | 504 B |
| D | 19 | 101 D- | 122 E | 237 E | 311 D- | 312 D- | 443 D- | 504 B |
| D- | 16 | 101 D- | 122 E | 237 E | 311 D- | 312 D- | 443 E | 504 C+ |
| D+ | 27 | 101 D | 121 D- | 231 D- | 233 D- | 311 D | 313 D | 504 A |
| C- | 34 | 101 D | 121 B | 231 E | 233 D | 311 D | 312 D | 504 A |
| D | 23 | 101 D | 121 E | 231 E | 232 E | 311 D | 313 D- | 504 A |
| D+ | 26 | 101 D | 121 D- | 231 E | 232 D- | 311 D | 312 D | 504 A |
| D | 20 | 101 D- | 121 E | 231 E | 232 E | 311 D- | 313 D- | 504 A- |
| D | 19 | 101 D- | 121 E | 231 E | 233 E | 311 D- | 313 E | 504 A- |
| D | 21 | 101 D- | 121 D- | 231 E | 232 D- | 311 E | 312 D- | 504 A- |
| D | 22 | 101 D | 121 E | 231 E | 232 E | 311 D- | 313 D | 504 A- |
| D | 21 | 101 D- | 121 E | 231 E | 232 E | 311 D- | 313 D- | 504 A |
| D | 20 | 101 D- | 121 D- | 231 E | 232 E | 311 D- | 312 D- | 504 B+ |
| D | 18 | 101 D- | 121 E | 231 E | 232 E | 311 E | 313 D- | 504 B+ |
| D | 18 | 101 D- | 121 E | 231 E | 233 E | 311 E | 312 D- | 504 B+ |
| D | 20 | 101 D- | 121 E | 231 E | 232 E | 311 D- | 312 D- | 504 A- |
| D | 22 | 101 D | 121 E | 231 E | 233 E | 311 D- | 313 D- | 504 A |
| D- | 15 | 101 E | 121 E | 231 E | 233 E | 311 E | 313 E | 504 B |
| D- | 17 | 101 D- | 121 E | 231 E | 233 E | 311 E | 312 E | 504 B+ |
| D | 19 | 101 D- | 121 E | 231 E | 233 E | 311 D- | 312 D- | 504 B+ |
| D- | 17 | 101 D- | 121 E | 231 E | 232 E | 311 E | 313 E | 504 B+ |
| D- | 14 | 101 E | 121 E | 231 E | 232 E | 311 E | 312 E | 504 B- |
| D- | 14 | 101 E | 121 E | 231 E | 233 E | 311 E | 312 E | 504 B- |
| D- | 13 | 101 E | 121 E | 231 E | 232 E | 311 E | 313 E | 504 C+ |
| D+ | 30 | 101 D+ | 121 D- | 231 D- | 232 D- | 311 D+ | 313 D+ | 504 A |
| D | 22 | 101 D | 121 E | 231 E | 232 E | 311 D | 313 D | 504 B+ |
| D | 22 | 101 D | 121 E | 231 E | 233 E | 311 D | 314 D+ | 504 B |
| D- | 14 | 101 E | 121 E | 231 E | 233 E | 311 D- | 314 E | 504 C+ |
| D- | 17 | 101 D- | 121 E | 231 D- | 233 E | 311 D- | 314 E | 504 B- |
| D- | 17 | 101 D- | 121 E | 231 E | 233 E | 312 D- | 314 E | 504 B |
| D- | 15 | 101 E | 121 E | 231 E | 233 E | 311 D- | 314 E | 504 B- |
| D- | 13 | 101 E | 121 E | 231 E | 233 E | 311 E | 314 E | 504 C+ |

# Investigating writing practices of candidates with hearing impairment in Lesotho Junior Certificate examinations

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## Abstract

*The Lesotho Ministry of Education implemented the Education for All policy in 2010 and made it compulsory for schools to admit all learners regardless of their special educational needs. However, analysis of Junior Examination (JC) results of centres with candidates with hearing disability reflects a lower performance of these candidates compared to their peers without any form of disability. This study examines writing practices of candidates with deafness and hard-of-hearing in relation to mainstream JC examination. Data was collected by way of archived scripts whose qualitative analysis revealed two issues. Firstly, the candidates' way of writing was similar, and it reflected a common acquired language. Secondly, the candidates constantly used this variety of language as their resource for responding to examination questions. However, varieties of Sesotho and English were used by these candidates as their written linguistic resource did not reach standards of the JC national examination. This indicates that the reading and writing practices of the candidates with hearing impairment in this context neither fully enabled them to access assessment items nor meet the marking criteria. We, therefore, argue that the candidates' eccentric writing practices limit them from executing within ordinary standard and this denies them a fair participation in mainstream examinations. We recommend that candidates with hearing impairment should be made to sit modified question papers and that their variety of language should be acknowledged not only in support of multilingualism but also as a language practice for persons with hearing impairment.*

***Key words**: Hearing impairment; Inclusive Education; Writing practices; Linguistic resources; multilingualism*

## Introduction

In this paper, we discuss how ways of writing of candidates with hearing impairment affect their performance in mainstream examinations. The candidates under study learned in the same classroom with their hearing counterparts whereby languages of learning and teaching were Sesotho, English as well as sign language. However, assessment was carried out in written Sesotho and English as Curriculum and Assessment Policy emphasizes that assessment should be done through pen and pencil (MoET, 2008). While these candidates learned by way of visual pedagogy, the two groups were expected to grasp concepts at the same time and deliver responses which meet examinations standards for there were no special examinations to meet the linguistic needs of candidates with hearing impairment. As a result, deaf and hard-of-hearing learners did not perform to their best capacity because there was a huge disparity between how instruction and assessment were delivered. For Padden (1990), writing is based on speech and for the reason that deaf learners cannot hear spoken language, they have difficulties in learning to read. This has potential to affect their writing skill. Our research draws on Castellotti and Moore's theory of Social Representation to build a case with which to inform policy makers, examination setters as well as markers on the argument that ways of writing of candidates with hearing impairment is socially constructed and it differs from that of their assessment. We argue that candidates with hearing impairment have a distinct way of written expression, which should be acknowledged and recognized not only in Junior examinations but also in senior levels of education.

## Background: Inclusive Education

The Lesotho Ministry of Education and Training has recently developed the Inclusive Education Policy which will provide guidance to facilitate the inclusion of learners with special educational needs into regular school system at all levels (MoET, 2018). Inclusive Education, according to UNESCO (2008), pertains to approaches in teaching and assessment which respond to diverse needs of all learners ensuring equal educational gains. Inclusion implies that deaf or hard-of-hearing learner is a full-time member of the regular classroom where a classroom teacher, in partnership with a special education educator, accommodates the classroom environment and the curriculum to the learner's needs (Stinson & Antia, 1999). In the Lesotho context, Mount Royal High School is one centre which enrolls both hearing and deaf learners from Grade 8 to 12. The documented experiences of teachers at this centre show that the inclusion of deaf learners in the mainstream is advantageous in that the two types of learners have their distinctive cultures. They indicate that inclusion enables deaf learners to adjust to the culture of hearing learners. Hearing learners also learn to live with people with hearing disability. Although inclusive learning creates a spirit of collaboration, inclusive assessment poses challenges to learners with hearing disability such that, examinations for candidates of different abilities and circumstances must be availed (MoET, 2008:20). This is done by providing relevant types of assistance to avoid any form of disadvantage to the candidates. For instance, in an inclusive examination hall, there is the presence of sign language interpreters who form part of the invigilation team. The

candidates' marked scripts are also moderated by a sign language interpreter, although this is under scrutiny. According to Matlosa (2009), many deaf children in Lesotho develop competence and acquire proficiency in Lesotho Sign Language (LSL) through their attendance at schools for the deaf in this language outside the parent-child relationship. For Matlosa, LSL has not yet been considered as a fully-fledged language capable of functioning effectively as both a language of instruction for its users and a subject in the schools for the deaf. Nonetheless, English and Sesotho can be argued to be foreign languages to these learners. As much as Sesotho is a national language, it is spoken, written and taught as a subject in schools but cannot be accessed by persons with hearing disability. English is a second official language in Lesotho and is not mastered by majority of learners at this level (Lemphane, 2017:113). As much as the Inclusive Education Policy encourages all schools countrywide to incorporate learners with special educational needs into classrooms to curb any form of discrimination, assessment still works to the advantage of hearing candidates in this context. Assessment of deaf learners should therefore be re-thought to bring balance between the way they learn and how they express their capabilities.

**Research Problem**

Deaf learners' language of learning is sign language. Most of these candidates were born deaf and have never heard spoken language. Their schooling takes place in an inclusive environment dominated by practices of hearing people. Their limited access to spoken Sesotho and English can be argued to negatively affect their ability to respond effectively to written communication (Mitchell, 2016). In our experience, the learners with hearing impairment sit the same question papers with their hearing peers in the final examinations but score lower marks than the hearing learners. The aim of the study is therefore to examine the deaf learners' writing practices in the Lesotho Junior Certificate examinations.

**Objectives**

The objectives of the study were:

1. To establish the ways of reading and writing of candidates with hearing impairment that lead to their underperformance and suggest a reformed type of assessment for these learners.
2. To analyze the candidates' ways of writing in relation to the demands of the national examinations.

**Research Questions**

The following research questions guided the study:

1. Are deaf candidates able to understand the demands of examination questions?
2. Are deaf candidates able to answer questions adequately to obtain full marks?
3. Are there examination questions which deaf candidates cannot access?

**Significance of the study**

The findings of the study are aimed at informing the curriculum and assessment developers to establish link between content delivery and its assessment as to accommodate learners with hearing impairment by acknowledging sign language as a part of curriculum just like English and Sesotho.

**Theoretical Framework: Language as social representation**

A social representation is a form of socially developed and shared knowledge, with

practical implications which contributes to construction of a common reality for a social group (Castellotti & Moore, 2002). Byram and Zarate (1996) also affirm that teaching learners what makes them members of a given community thus describing them through social representations circulating in that community. This means that people experience language in a natural environment and reconstruct it by making mistakes and making new meanings. Learners become aware of the new socially constructed meanings by using them in interactions with members of their linguistic group. Representations of one's mother tongue, the language being learned and the differences between them, are associated with particular learning strategies adopted by learners who construct a representation of the interlinguistic distance between their own language system and that of the language being learned. Byram and Zarate found that some learners think directly in the foreign language, while other learners' competence in foreign language depends on how well they master their first language. The researchers advocate for language of teaching, for it helps learners to achieve a shift in focus by exposing them to various languages and to prepare them for better language learning by providing them with techniques and methods for understanding linguistic phenomena.

**Literature Review**

For the reason that we ask questions about deaf learners' access to examinations, we refer to studies which explore a similar phenomenon to support our argument. ECoL and Burdett (2012) discourage a general type of assessment for it does not only hinder learners with disability from demonstrating what they can actually achieve but may also lead them to discontinuing their education. For instance, assessing deaf learners by way of writing is quite unjust to them. Writing, according to Schirmer (2000), is a challenging task for all students as expressing thoughts in words requires the accurate spelling of words, the correct use of syntax, semantic and pragmatic skills and accurate use of punctuation. Besides, deaf children generally have a hard time learning to read and write (Padden, 1990). ECoL and Burdett further show rightly that special considerations must be facilitated to make assessment accessible to learners with specific disabilities and that attainment targets should also be adjusted to suit these kinds of learners.

A study conducted in Zambia, which aimed at finding out assessment related factors that contributed to poor examinations performance among candidates with visual impairment after 12 years of schooling (Moonga & Joachim, 2014), discovered that candidates with hearing impairment especially the pre-lingual impaired have difficulties with grammar and syntax. Nonetheless, scripts of candidates with hearing impairment were marked at the same time as those of ordinary candidates with the same standards of marking that are fixed across the candidates. The authors argue that this kind of marking is detrimental when markers are also not experts in the language of candidates with hearing impairment. As a result, these candidates remain below standard due to the mode of assessment used for them. Moonga and Joachim advocate for establishment of a special standard of marking scripts for candidates with hearing impairment which is characterized by short answers, a few and short essays and more emphasis on practical elements.

Another study conducted by Frederic et al. (2014) in Zimbabwe reveals the importance of understanding the language of candidates with hearing impairment. The authors state that as a response to grievances over poor performance of candidates with hearing impairment, Zimbabwe School Examinations Council employed teachers of the deaf to mark the examinations scripts for the deaf. It is reported that this improved the situation with a reasonable magnitude for the reason that the teachers understood the language of the candidates.

As a quality assurer for the curriculum and assessments in South Africa, Umalusi has recently conducted a study to understand how South African Sign Language (SASL) Home Language SBA and examinations are carried out in schools (Umalusi, 2018). Findings of this study indicate that the learners' signing skills are assessed by way of recording; observing and signing; and visual reading and viewing. Moreover, all assessments are reported to be recorded and rubrics are used for marking. The report further shows that the learners' SBA portfolios are kept on memory sticks and on computer hard drives; and the memory sticks are also retained by the school for security reasons. Equally important, the teachers' and learners' files are said to be kept as hard copies and digital copies. It is recommended that the SASL markers should be fluent signers and should include deaf persons (Umalusi, 2018). A Kenyan study (Masayi, 2018), compared ways of assessing Deaf candidates in Kenyan Sign Language (KSL) to assessment of other subjects written in Standard English. The author found out that learners with hearing impairment attain good results in KSL but score very low in other subjects. This suggests that these candidates can access sign language better than Standard written English.

In the light of the findings reported above, it is evident that deaf candidates can access examination questions better if they sit a modified question paper that suit their needs; if a specialized marking of deaf candidates is established and if markers understand the deaf candidates' language used in their responses.

**Methodology**

The study employed a qualitative approach in order to understand a consequential relationship between the learners' ways of writing and the outcome. This method enables researchers to ask theoretical questions about why things happened and how they can be explained (Maxwell, 1996). Data collection was by way of archive scripts of Junior Certificate (JC) learners with hearing impairment. All the eight scripts of candidates, who took part in the examination, were requested for the purpose of this study. The focus on the three subjects: English, Religion and Sesotho, as they involve written expression. The candidates' responses were analyzed by way of pattern finding. However, the limitation of the study was that it was not possible to categorize the candidates' scripts according to their level of deafness such as congenital; pre-lingual; post lingual deafness and hard-of-hearing. We were also neither able to identify candidates who could use oral communication nor those who used sign language exclusively for communication.

**Data analysis**

**Research question 1: Are deaf candidates able to understand the demands of examination questions?**

A close look at the responses of candidates with hearing impairment to examination questions shows a good understanding of the questions.

This is indicated by the relevance of their responses to the demands of the questions in the three subjects under study mentioned above. Types of responses conform to the types of questions, for instance, one-word responses, full sentences and essay questions. However, we observed that these candidates display considerable subject knowledge by using required technical language. This enables a reader to make out the intended meaning which in many cases is relevant to the demands of a question.

**Research question 2: Are deaf candidates able to answer questions adequately to obtain full marks?**

Analysis of responses of the candidates with hearing impairment to examination questions displayed a huge effort towards achieving intended marks. Firstly, they respect instructions across the three subjects. For instance below is a narration of the parable of the good Samaritan:

> The parable of a good Samaritan
>
> The teachers of law was traped Jesus, he asked him what did I received eternat life? Jesus answered him, How do scriptured say that you interpreted. He replied love with all your heart, with all your soul and with all your neighbour.

The candidate is able to write the response in an essay form. The level of coherence can be argued to be good for JC learners but this is detected with discernment. This essay question is responded with substantial amount of content. Although the candidate does not respect the English grammar rules, he/she is able to display knowledge in this question. While some words are misused or misspelled, such as *traped* and *eternat* they do not distort the meaning in that the reader understands that the first word means 'stop' while the latter means 'eternal'. This inverted way of spelling words is also observed in English. For example, such words as, *sprit for spring; winding for windy; meed for need*were used.

The candidates write full English sentences where they are required to do so. Although their sentences show no subject-verb agreement, number accord, punctuation and use of conjunctions, they often respond to questions. For example:

> *Question: In your opinion, how do you think making others happy will return to you?*
>
> Candidate 1 response: I think making other happy to return to give happy with them
>
> Candidate 2 response: To return happy by do not fine

The candidates lack vocabulary to express their opinions. This suggests that the candidates lose marks not on ignorance but due to lack of linguistic resources. For the reason that the JC

examination is marked with a certain standard, these candidates do not attain full marks because of their incapacity to write English and Sesotho like hearing candidates.

**Research question 3: Are there examination questions which deaf candidates cannot access?**

In English Language composition and letter, candidates are tested on their ability to use language to express ideas on given topics. They are expected to use appropriate vocabulary and figurative language such as the use of rhetorical devices among others. In the example below the candidate wrote a speech about the school talent show:

> I humbly you to plea to board member to principal about my classmates wanted to be great decide to talents show to raise how to dance and music everything on november. let's hope so principal permit. Thank you

Clearly, the candidate understood the task of writing a speech. But he/she uses limited linguistic resources to respond to this question. It is evident that this candidate lacks the ability to manipulate English phrases to construct figures of speech and idioms. While JC candidates are expected to master the standard of English grammar at this level, deaf candidates cannot because in sign language grammar, most English grammar elements are not visible.

Of the three subjects, Sesotho is one subject which the candidates under the study cannot read and write meaningfully. Most candidates write non-pragmatic sentences which make their work very difficult to score. This shows that they neither understand written texts nor can write a sensible text in Sesotho. This language seems to be completely a foreign language to these candidates and can be argued to be highly disadvantageous to them as it lowers their number of subjects required to pass JC level.

**Discussion of Findings**

The study established that deaf candidates' way of writing is similar and this reflects a common acquired language. This is an indication that deaf school learners in Lesotho acquire a particular variety of language which they use as a resource for communication and to express themselves in examinations. Their written sentences are constructed in a way that reflects influence of their natural language which has complex and complete structure of its own which does not conform to either English or Sesotho structures. Another observation made was that the learners' responses read more visual than phonological. These candidates do not utilize sign language in their examinations, yet it is their main language of learning. They, therefore, fail to make use of the grammar and vocabulary which they possess in sign language. One of the challenges faced by these candidates is that assessment tools are developed for hearing candidates and it has been argued that deaf learners understanding of speech must be different from those of hearing candidates which may play a role in how they read and write (Padden, 1990). Despite the challenges, the deaf learners still stretch themselves by sitting a similar exam to that of

hearing peers. However, they put on paper what they learnt visually. Although their writing neither adheres to English nor Sesotho, it partly respects sign language grammar. This suggests that the deaf learners should not be forced to master written English.

**Conclusion**

In this paper, we discussed ways of writing of candidates with hearing disability in order to find out why they do not attain high marks in national examinations. We indicate through findings that deaf candidates do not have the linguistic skills in both English and Sesotho expected to be displayed at JC level. Instead, these candidates have acquired a variety of language which is recognized by sign language interpreters to be a meaningful communicative resource. We argue that the language used by the candidates with hearing impairment in the national examinations is socially acquired and should be recognized and standardized as their linguistic resource. Finally, we have demonstrated that appreciation of this language will open up career opportunities for this type of candidates. We further recommend that this variety of language should be given an exclusive marking in the mainstream examinations.

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## SUB-THEME E: THE IMPACT OF ASSESSMENT INNOVATIONS ON RESOURCES

# Impact of e-Registration on the Quality of Assessment Resources in Uganda

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***Abstract***

*This study assessed the impact of e-registration on the quality of assessment resources at the Ugandan National Examinations Board examination centres. It further investigated the challenges affecting the e-registration process. Research Advisors Table (2006), based on Krejcie and Morgan's (1970) Table of Sample Selection, was used for sample size determination in a quantitative survey. The study employed the explanatory sequential mixed methods approach, in which quantitative data was first collected and analysed, followed by qualitative data collection and analysis. The participants for the quantitative strand were selected through stratified, proportionate and simple random sampling techniques, while those for the qualitative approach were purposefully chosen. The 5866 examination centres yielded a stratification of 785 centres out of which 289 centres were sampled for the study. A questionnaire and interview guides were used for data collection. The questionnaire was composed of two sections: Demographic section on the characteristics of the examination centres and a five-point Likert scale, 1 (low quality) to 3 (high quality), which was used for measuring the quality of Assessment Resources before and after the introduction of e-registration. The impact of e-registration was analysed using Paired Samples T-Test. The challenges were analysed using thematic content analysis. Findings revealed that there was a positive impact of e-registration on the overall quality of assessment resources ($t = 9.259$, $df = 109$, $p < .05$). The challenges of e-registration included poor physical infrastructures such as internet, power failure, computer viruses, and hardware and software breakdown; ill-trained personnel to handle the process; and financial constraints. Recommendations to minimise the challenges included the need for the government to invest in ICT and electricity development as well as training of the personnel handling e-registration in order to enhance the e-registration efficiency.*

***Keywords:*** *impact evaluation; e-registration; quality of assessment resources; challenges*

## Introduction

Education has been acknowledged worldwide as a critical pillar of human socioeconomic transformation; the reason many nations invest in it as a key aspect of national business (Jibril, 2004; Odero & Oloko; 2014). Following the ratification of the Jomtien Declaration of 1990, the Government of Uganda took to providing Universal Primary Education (UPE) as well as Universal Secondary Education (USE), and Universal Post-Primary Level Education and Training (UPPOLET) to its citizens. This has resulted in a large influx of learners at these levels. This increase in numbers has reciprocally imparted the need for structural and functional adjustments in schools and government departments responsible for handling the teaching and assessment of learners. Uganda National Examinations Board (UNEB) – the principal assessment body at primary and secondary school levels – has not been spared in the hurdles. It should be noted that the education process is not complete without standard assessment of the teaching and learning processes (Atibuni & Olema, 2018); and this is what UNEB is mandated to do. Candidates who qualify for the summative assessment by UNEB have to be registered with detailed biometric and subject information so that UNEB can offer the right assessment to them.

Before the introduction of electronic registration – commonly known as e-registration- UNEB was capturing candidates' biometric and subject information mainly through entry forms, which were supplied to examination centres from UNEB offices, filled and returned to UNEB for scanning using the Optical Mark Reader (OMR). The forms were imported at a hefty cost and had to be handled with extra care to avoid losing quality. These processes used to place UNEB in a much-compromised situation in case the experts for the unique handling of the registration process were not available. Besides, the importation of the forms was very expensive and time consuming.

Whereas manual registration of candidates was tenable before the heavy rise in candidate numbers brought about by UPE, USE, and UPPOLET, it became much more expensive in terms of labour costs and time taken to accomplish the process after the introduction of "free" education. In addition, the process was often vitiated with serious inefficiencies such as multiple registration of a single candidate and fraudulent extortion of money from the candidates by some centre managers to the dismay of clients and UNEB. To circumvent these inefficiencies, UNEB introduced e-registration of candidates in 2015. This was aimed at easing the pressure and improving the quality of work at both the examination centres and at UNEB secretariat.

E-registration is the process through which UNEB examination centres register the candidates electronically. In this case, computer applications are developed that permit schools to register candidates electronically using either online entry or desktop applications with the capability to send the registered candidates' entries via email as an attachment or by submission through a web portal. This is done with the hope of saving UNEB the costs and processes of procuring entry forms, and saving the schools the tedious process of collecting and returning entry forms. E-registration is also used to enable schools to have easily managed electronic records. Depending on the

environment of the school, the system can use online registration, desktop registration, and bulk registration through the web portal. The "new" registration has been in place since 2015, and it is now imperative to establish its impact on the quality of assessment resources at UNEB examination centres and the challenges it presents to the registration process. This study intended to accomplish this goal in order to proffer tenable solutions to mitigate the challenges facing e-registration and hence, handle more efficiently the registration of the ever increasing number of UNEB candidates.

**Research Problem**

UNEB adopted electronic online registration of examination candidates in 2015 with the perceived benefit of not only improving the efficiency of the registration process and eliminating unnecessary paperwork, but also enabling clients to register at their convenience. This meant that there would be reciprocal positive impact on the quality of assessment resources at the UNEB examination centres. However, studies (e.g., Odero & Oloko, 2013; Omambia, Ndiege, Wakoli, Nyamboga, & Nyansiaboka, 2014) indicate that despite the positive impact of e-registration, certain aspects of it – especially with regard to the quality of physical, human, and financial resources – compromise the perceived benefits. The impact and challenges of the e-registration initiative by UNEB have not been investigated with a focus on the assessment resources at the examination centres. This leaves a gap, which, if not closed, may sustain longstanding challenges for clients and the examination body. This study was therefore conducted to assess the impact of e-registration of candidates for UNEB examinations, on the quality of assessment resources at the examination centres, and the challenges faced in using e-registration of candidates by UNEB.

**Objectives of the Study**

The study set out to achieve the following two main objectives:

To assess the impact of e-registration on the quality of assessment resources at UNEB examination centres.

To find out the challenges being faced in using e-registration by UNEB.

**Literature Review**

The review of related literature was in the areas of impact of e-registration on the quality of assessment resources and challenges of using e-registration by UNEB.

**Impact of e-Registration on the Quality of Assessment Resources**

DeLone and McLean's (2003) Model of Information Systems Success states that e-registration should lead to improved convenience at individual candidate level, and this in turn should result in positive heightened productivity. As suggested by Harindranath, Dyerson, and Barnes (2008), e-registration should ease the pressure of cost and efficiency. A study by Omambia et al. (2014) found out that there is a significant positive impact of use of electronic means of client handling on the quality of investment and hence quality of resources.

In a study on the effect of e-registration on candidates' performance, Odero and Oloko (2013) posit that e-registration can conveniently manage the input, transfer, modification, and maintenance of student

information. They proffer e-registration as a solution to paperwork and security in the registration process. Lakos (2004) cited in Odero and Oloko (2013) assert that the e-registration platform should impart value addition and enable personal preferences and be easy to manage.

Odero and Oloko's (2013) findings showed that online registration had reduced impersonation. This implies that generally, e-registration had the benefit of ultimately improving the quality of assessment by reduced impersonation. Adeyegbe's (2007) study on the West African Examinations Council (WAEC) intimates several benefits of e-registration to both the council and the clientele. These include among others; the ability to register candidates from any location without visiting the examination offices, the enhanced efficiency of data capture and shortened processing time, minimized errors because of the self-validating design of the platform, and possibility of longer periods of registration. Another benefit the author notes is the elimination of the cumbersome tasks of manual processing and physical transfer of data as well as elimination of storage space. It is appreciated that e-registration offers a faster means to register students online as opposed to manual registration.

Very few published studies exist in the Ugandan context on the impact of e-registration on quality of resources in general and assessment resources in particular. One such study by Matovu (2009) investigated the availability, accessibility and use of ICT in management of students' academic affairs in Makerere University, in which it was found that e-registration enhanced tracking of students' registration and academic progress by administrators and other stakeholders. Our literature search did not uncover any study done specifically to underscore the impact of e-registration on the quality of assessment resources in Uganda. Such a gap implies that the system risks accommodating and maintaining gaps that would compromise its usefulness. The notable inefficiencies characterized by mismanagement of candidates' academic records, mismanagement of courses registered for, wear and tear during retrieval and handling, difficulty in data sharing and re-production, and loss of data would recur on top of the high costs of such inefficiencies. This study and other similar ones are most significant.

**Challenges of E-Registration of Examination Candidates**

A plethora of studies indicate that though many institutions are stepping up their technological advancement of records management because of the potential benefits of such systems, there are several challenges associated with the systems. In a study by Omambia *et al.* (2014), notable challenges of using advanced technology in information management include poor technology and management competencies, in addition to poor implementation strategies because of poor managerial skills. Other challenges of electronic data handling include the tendency to stick to the traditional manual processes which seem to be more trusted in sub-Saharan Africa.

According to Adeyegbe (2007), there are various challenges associated with e-registration of candidates in WAEC arising from the quality of the physical and human resources involved in the process. Some of these challenges include poor quality of data

entry, unguaranteed security, unreliable physical transfer of data, untimely release of results with errors, ineffective communication of assessment information to major stakeholders, logistics problems, and escalation of costs. Odero and Oloko (2013) note that challenges of shifting to e-registration were mainly two-fold: The main challenge is adequate maintenance of the IT infrastructure in order to minimize down times. The second challenge was ensuring the success of the 100% migration to e-registration, given the concerns raised, that the low level of computer literacy in the country did not augur well for such an initiative (p. 120). This confirms that there are likely to be challenges with human, physical, as well as financial challenges associated with e-registration. In the absence of an empirical investigation on the challenges of e-registration in Uganda in general and UNEB in particular, this study was imperative.

**Methodology**

The study employed an explanatory sequential mixed methods approach. In this method, quantitative data on assessment resources in PLE, UCE, and UACE UNEB centres were first collected from administrators of UNEB centres in a cross-sectional survey. The unit of analysis was the UNEB centres for PLE, UCE, and UACE. The PLE centres were categorized as *Primary* level while the UCE and UACE centres were categorized as *Post-primary* level. The Research Advisors Table (2006) based on Krejcie and Morgan's (1970) *Table of Sample Selection* was used for sample size determination in the quantitative survey. The participants were selected by stratified, proportionate and simple random sampling techniques. A sample of 289 examination centres was selected for the study out of 785 centres in the accessible population.

A questionnaire was used for data collection from participants in the quantitative survey. The questionnaire was composed of two sections. The first section solicited demographic information or characteristics of the examination centres. These included the location of the centre (rural, semi-urban, or urban), level of the centre (primary or post-primary), and how long the centre had existed. The second section was composed of items that measured the quality of physical, human, and financial assessment resources at the examination centres before and after the introduction of e-registration. The items were scored on a 3-point Likert scale, 1 (*low quality*) to 3 (*high quality*). Items that gauged the quality of the assessment resources before the introduction of e-registration had a Cronbach alpha reliability coefficient of .765 while those for the quality of the resources after the introduction of e-registration had a Cronbach alpha reliability coefficient of .701. Qualitative information on challenges and strategies for managing the challenges was later sought from key informants. An interview guide was used for the qualitative data collection. Participants were asked to explain the quantitative findings, what challenges were being experienced at the centres, and what solutions they proffered for the challenges.

Data analysis was based on objectives of the study. The impact of e-registration on the quality of assessment resources at the UNEB centres was determined using Paired Samples T-Test analysis. The qualitative data were subjected to thematic content analysis; the

content that fitted the explanation was either synthesised or quoted verbatim.

**Results and Discussion**

The results obtained are presented and interpreted according to the objectives of the study. First, the impact of e-registration on the quality of assessment resources is presented followed by the challenges being faced in using e-registration by UNEB.

Impact of E-Registration on the Quality of Assessment Resources at UNEB Centres

The impact of e-registration on the quality of assessment resources at UNEB centres was assessed by conducting a *Paired Samples T-Test* analysis. The results are presented in Table 1.

**Table 1:** ***Paired Samples T-Test to Compare the Quality of Assessment Resources at UNEB Centres Before and After the Introduction of E-Registration***

| Resources | After | | Before | | Difference | | 95% *CI* | | *t* | *df* |
|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | Lower | Upper | | |
| Physical | 14.79 | 4.06 | 10.88 | 2.86 | 3.91 | 4.17 | 3.23 | 4.59 | 11.292 | 144** |
| Human | 17.22 | 4.46 | 13.25 | 3.78 | 3.97 | 5.51 | 3.12 | 4.82 | 9.220 | 163** |
| Financial | 11.57 | 2.81 | 9.48 | 3.11 | 2.09 | 4.24 | 1.40 | 2.77 | 6.031 | 149** |
| Overall | 43.44 | 9.13 | 33.17 | 8.04 | 10.26 | 11.63 | 8.07 | 12.46 | 9.259 | 109** |

*Note.* ** = result is significant at $p = .01$ (two-tailed).

Results in Table 1 indicate that the estimate for the mean difference in overall quality of resources before and after the introduction of e-registration is 10.26 (SD = 11.63). The overall mean difference at 95% confidence level is between 8.07 and 12.46. This positive mean difference implies that the quality of the resources was generally higher after than before the introduction of e-registration. The results show that the difference between the overall quality of the assessment resources before and after the introduction of e-registration is statistically significant ($t = 9.259$, $df = 109$, $p < .05$). Analysis of the mean difference in the quality of the specific resources – physical, human, and financial – before and after the introduction of e-registration similarly revealed a positive impact of e-registration on quality. All the resources varied significantly before and after the introduction of e-registration: physical ($t = 11.292$, $df = 144$, $p < .05$, CI = 3.23 – 4.59); human ($t = 9.220$, $df = 163$, $p < .05$, CI = 3.12 – 4.82); and financial ($t = 6.031$, $df = 149$, $p < .05$, CI = 1.40 – 2.77).

The null hypothesis that the mean difference in the quality of assessment resources before and after the introduction of e-registration is zero is therefore rejected. The alternative hypothesis that there is a statistically significant difference between the overall quality of the assessment resources before and after the introduction of e-registration is accepted. This implies that there was a positive impact of e-registration on the quality of assessment resources at the UNEB centres. These results are in agreement with the results of previous studies such as that of Adeyegbe (2007), Odero and Oloko (2013), and Omambia *et al*. (2014). According to these results, e-registration imparts a positive effect on resources development at examination centres.

These results point out that there must have been substantial investment in physical facilities – mainly ICT facilities including computers, printers, internet, computer accessories such as scanners and cameras to process candidates' records. This must have been coupled with investment in electricity and/or solar panels and batteries to power ICT gadgets. Other physical resources the centres could have invested in include adequate examination halls, furniture and equipment for examinations, and safety and security facilities such as lockers for keeping examination materials.

The results have also established that investment in the number and technical skills of staff involved in candidate registration must have increased substantially. Human resource quality must have improved as a result of recruitment and/or retooling of ICT professional staff to work in examinations handling. It further implies that parental/guardian auditing of candidate registration process was now possible and just a click away. Because the system is open to all stakeholders, the honesty of centre administrators and other personnel to follow rules of candidate registration might have been better adhered to as a result of e-registration. In addition, cases of examination malpractice (*e.g*., dual registration of candidates) were now better managed and minimised. Fewer mistakes in candidates' entries were expected as the system would reject submission of incomplete information or omissions.

The positive impact of e-registration on financial resources speaks of better value for money in the registration process. It implies high levels of minimisation of embezzlement/fraud of candidates' registration fees; fee defaulting by candidates and centre managers; and risks of loss, theft, and so on, during candidates' registration. Costly expenditures on per diem and transport by centre managers must have substantially decreased due to the introduction of e-registration. Generally, candidates' frequency of under-protest sitting of examinations and time spent in candidate the registration process were lessened.

However, migration to digital registration of candidates does not imply only a success story. The study revealed that a cohort of challenges marred the process. These challenges, as seen below, are likely to have compromised the positive impact of e-resources on the quality of the physical, human, and financial resources at the UNEB examination centres.

**Challenges of E-Registration at UNEB Examinations Centres**

Much as e-registration was well intentioned to overcome challenges of manual registration of candidates for UNEB examinations, the process introduced a cohort of other challenges. The challenges were similar but not the same as those in the study by Mbune (2014). Responses from participants indicate that the challenges can be broadly categorised as challenges of the examination centres and challenges of the board. However, the recurrent tones in the responses highlighted three themes in the challenges: human resource challenges, physical resource challenges, and financial resource challenges. These are separately described and discussed below.

**Physical Resource Challenges at UNEB Examination Centres**

The physical resource challenge prevalent in some primary and post-primary school centres was that of lack of computers. It was reported that at the primary school level, most of the schools do not possess computers. This was coupled with the limited supply of electricity to power the computers. Most of the schools were in the rural areas where there is lack of the national grid of electricity, so the centres were not connected to electricity. This is compounded by the challenge of frequent load shedding which not only interrupts the registration process but poses a big threat to the lifespan of the computers and computer accessories because such abrupt power cuts damage ICT gadgets. This supports the findings of Adeyegbe (2007) that cite various challenges associated with registration of candidates in WAEC arising from the quality of the physical and human resources involved in the process.

Another major challenge to e-registration was limited or no internet connection. The study found out that most rural areas in Uganda have poor or no networks of internet service providers. Even when the networks exist, the head teachers reported that the initial cost of installation is unbearable for most rural schools. Most schools grapple with reliability of the internet, which is often slow if not on and off.

The poor security of data and ICT equipment was discovered to pose another big threat to the examination centres. Almost all the centres (85%) were reported to be ill equipped; unable to avoid computer viruses through transfer of flash disks from one computer to another. This mainly arose because of poor internet connection, which necessitated computer application-based, rather than internet-based sharing of data. Many centres (76%) reported the challenge of not updating the antiviruses of their computers, which posed a yet bigger challenge to the efficiency and viability of the computers at the centres. Reports from the interviews with the head teachers indicate that sometimes data from the schools had to be taken to commercial internet cafés in order to be uploaded on the registration portal, which compromised the security of such data.

**Human Resource Challenges at UNEB Examination Centres**

A number of human resource challenges were reported by the participants as bedevilling the examination centres. The most conspicuous human resource challenge of UNEB centres that was reported by almost all the examination centres (90%) was the inadequacy or lack of computer literacy among the technical personnel, especially at primary school level. Most staff in primary schools were reported to have no knowledge of computer skills. This challenge was escalated by the questionable integrity of the District Inspectors of School (DIS) who turn the registration of candidates into a means of financial gain. They team with owners of internet cafés to levy hefty charges on the unsuspecting centre administrators to have their candidates registered. This ushers in and exacerbates the mixing up of information of candidates from different centres. In one case, a head teacher from one centre reported getting a longer list of candidates than he had prepared in his centre.

**Financial Resource Challenges at UNEB Examination Centres**

The financial resource challenges of UNEB centres that came out strongly were associated

with the generally low level of economic status. The high level of poverty was decried as a major hindrance to the success of e-registration. Students often paid examination fees late and consequently centres would remit the collections late to UNEB. Given that the e-registration portals are open for a given period of time, many would-be candidates end up not registering. In other words, the very nature of the e-registration process does not allow for bargains in time and money that are very scarce.

**Challenges at UNEB Secretariat**

It is noteworthy that challenges faced at the examination centres reciprocally ascend to the secretariat. The UNEB staff reported that most managers at the examination centres would often forget the e-registration access passwords. After failing to access for a number of times, their systems are automatically disabled. The staff at the secretariat therefore faced the resultant challenge of restoring the passwords for many centres with closed down systems at the same time.

It was also found out that work at the secretariat was seamless; there was a high level of perception of unclear demarcation of roles and hence role confusion among some UNEB staff dealing with the e-registration exercise. Questions of who does what and when often arose. Some officers such as Data/System Managers and Principal Finance Officers felt overloaded with e-registration issues.The challenge of forgotten passwords at some centres was reported to result in unnecessary telephone calls to the secretariat. This further overloaded the staff with giving untimely clarifications to the centre managers on top of their usual routines. Many staff felt this drained them of emotional energy. There was a report of poor or lack of coordination in some UNEB activities with the negative result of hindering the registration process. It was noted that centre validation exercise often laid off some centres in the middle of the e-registration exercise, leading to loss of precious time and energy.

The financial challenges rotated around the use or rather abuse of “time which is money.” For instance, it was reported that some centres would register their candidates twice and that they would give false candidate numbers to UNEB. This meant fraudulent double spending on the part of the centre stakeholders and time wastage on the part of UNEB to clean the data.

When the applicants made careless errors in the use of the portal, the output might generate wrong vouchers. This would result into more time wastage in the identification and correction of errors, thereby doing the same work twice.

The secretariat also faced a financial challenge of facilitating training of personnel from the centres to register candidates. If not properly done, the centres end up using staff who possess computer knowledge but are not adequately retooled in the use of the portal, causing many errors, which are costly for UNEB.

**Conclusion**

From the study findings, it can be concluded that the introduction of e-registration of UNEB candidates impacted positively on the quality of assessment resources at the examination centres. However, the e-registration platform is tainted with physical, human, and financial resource challenges.

## Recommendations

There is need for serious investment on the part of government to abate the physical, human, and financial resource challenges by supplying computers and internet facilities as well as electricity to schools to facilitate the online registration exercise. Personnel handling the e-registration of candidates should be well trained in ICT to help them handle the registration process efficiently and effectively. We recommend that the government capacitate both schools and personnel at the schools to enable efficient and effective implementation of e-registration.

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Journal Of Educational Assessment in Africa

(Vol.13, 2018)