DETA

distance education and teachers' training in africa
CONFERENCE 2013

PROCEEDINGS
30 July – 1 August 2013
University of Nairobi, Nairobi, Kenya

Editor: Dr Ruth Aluko
Assistant Editor: Dr Omondi Bowa

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TEACHER EDUCATION AND DEVELOPMENT IN AFRICA: THE NEED FOR ACCESS, EQUITY, SUSTAINABILITY, QUALITY & RELEVANCE WITHIN THE CONTEXT OF GLOBALISATION

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Published in 2015
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Editor: Dr Ruth Aluko

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TEACHER EDUCATION AND DEVELOPMENT IN AFRICA: THE NEED FOR ACCESS, EQUITY, SUSTAINABILITY, QUALITY & RELEVANCE WITHIN THE CONTEXT OF GLOBALISATION

Proceedings of the 5th biennial International Conference on Distance Education and Teachers' Training in Africa (DETA) held at the University of Nairobi, Nairobi, Kenya

August 2013

The Distance Education and Teachers' Training in Africa (DETA) Conference strives to provide a platform for educationists in Africa to meet and deliberate on educational issues in Africa.

This document is also available online at www.deta.up.ac.za

DETA CONFERENCE 2013 PROCEEDINGS

Foreword

The fifth Distance Education and Teachers' Training in Africa (DETA) Conference in 2013 was hosted by the University of Nairobi, Nairobi, Kenya, from 30 July to 1 August. The biennial conference was borne out of the necessity to create a unique platform for all faculties of education to share knowledge and deliberate on educational issues as they affect Africa. We now understand our contextual landscape as it affects education far better. Expanding education and improving its quality is central to the continent's development. African scholars always meet at international conferences, but at the inception of the DETA Conference in 2005, there were few conferences to bring them all together. DETA's major objectives are to contribute to the debate on teacher training in Africa and to build capacity for the delivery of teacher-training programmes in Africa. These objectives represent ways in which the conference can support NEPAD, various protocols on education and training in Africa, the Millennium Development Goals, and some of the recommendations of the All-Africa Education Ministers' Conference on Open Learning and Distance Education.

The conferences are co-hosted by the organisers and other educational institutions and organisations.

The theme of the 2013 conference was **"Teacher education and development in Africa: the need for access, equity, sustainability, quality and relevance within the context of globalisation"**. Sub-themes included the following:

- The role of collaboration and partnerships in teacher education and development in Africa
- Equipping African teachers to develop their learners as critical citizens in a digital world
- (ICTs in teacher education)
- Standards and quality assurance in teacher education and development in Africa
- Models, practices and experiences in the use of distance education for teacher education and development in Africa
- Leadership and management development for African schooling in the 21st century

More than 200 delegates from 18 African countries (Botswana, DRC, Ghana, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Nigeria, Rwanda, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia and Zimbabwe) and four other countries (Belgium, Canada, Scotland, and the UK) attended the conference. A total of 87 papers were read.

Participants were requested to submit papers for possible inclusion in the second conference proceedings to be published, if they so wished, and they were given guidelines for submission. In total, 20 drafts were submitted, which covered the conference sub-themes. The drafts were subjected to double blind reviews. Of these 20 drafts, 16 were provisionally accepted and returned to the authors for improvements. Ten contributions were finally accepted for inclusion in the proceedings.

The editors and the reviewers are of the opinion that though several of the papers that were not included have the potential for publication, many colleagues still need to sharpen their writing skills. This has prompted the organisers this year to include, in the pre-conference workshop, a session on **enhancing academic communication skills**. DETA has a developmental dimension, and it hopes to present even better and more extensive proceedings for its readership in future.

We appreciate the hard work and input of the authors, the editorial team (Dr Ruth Aluko and Dr Omondi Bowa), and the reviewers of the manuscripts, the speakers, the sponsors and the secretariats of the institutions that co-hosted the conference.

We wish you interesting reading and look forward to having your paper included in the next volume if you are a participant at the 2015 conference in Mauritius.

Johan Hendrikz   Henry Mutoro
University of Pretoria   University of Nairobi
South Africa   Kenya

Co-chairpersons
DETA 2013

CONTENTS OF THE PROCEEDINGS

This volume consists of ten contributions from the papers presented at the DETA 2013 Conference.

The first article, by **Dr Bipath Keshni and Dr Bongi Nkabinde,** examined the challenges facing Foundation Phase Heads of Departments (HoDs) regarding their roles and responsibilities, based on the conceptual framework of instructional leadership in the Personnel Administrative Measures (PAM) document. The authors used a quantitative research approach to assess perceptions of 274 Foundation Phase HoDs in Mpumalanga. The study found that HoDs perceived that they were overworked, while in reality they spent less time in school than is suggested in the PAM document. It concluded that HoDs should conform to the requirements of the PAM document, and recommended that training or mentoring should be undertaken by the Department of Education, in collaboration with universities, to ensure that HoDs are capable and competent. Distance education is recommended as the appropriate mode of training to balance time expended with the completion of required tasks.

In their work, **Prof Emmanuel Kofi Gyimah and Dr Mark Owusu Amponsah** explored the perception generally held that children's success in grappling effectively with emotional and social challenges in later years largely depends on their childhood experiences. Using a mixed-methods approach, they found, among other things, that the ability of a child to cope with emotional and social challenges in later years depends on teachers' attitudes in terms of their commitment, sensitivity to the child's needs, and ability to structure the teaching and learning environment. Recommendations were made regarding placement decisions in primary schools.

Even though Kenya aspires to harness science, technology and innovations in order to be competitive both regionally and globally, in her paper **Dr Kisirkoi Florence Kanorio** argues that an innovation in education that is not backed by the teacher is bound to fail. She investigated the extent of primary school teachers' preparation during their pre-service training for the use of ICT as a teaching and learning tool. She found that the primary teacher education (PTE) syllabus and the teachers' guide were not designed to develop trainees' skills in this area, and that the computer literacy skills of the tutors and the trainees involved in the study were low. She recommends, among other things, that the PTE syllabus should be revised and ICT be treated as a teaching and learning resource.

The fourth article, by **Dr Fred Gennings Wanyavinkhumbo Msiska,** analysed delivery models in Malawi in terms of the technologies they employ in order to establish the nature and efficacy of distance education in the country. The study used an audit methodology involving seven distance education institutions in Malawi. The findings revealed that the mode of delivery has allowed access to education and training for people who would otherwise have been denied the opportunity because of the restrictive nature of the face-to-face delivery mode. However, distance education institutions in Malawi continue to face challenges pertaining to the use of basic, rudimentary and often obsolete technologies, which make the delivery mode cumbersome for both tutors and learners. The study recommends that Malawi should invest in the requisite infrastructure and appropriate technologies to enhance the efficacy of distance education and e-learning in the country.

Through their study, **Dr Caroline Waruguru Ndirangu and Dr Grace Nyagah** questioned the assumption that once an innovation has been adopted and the initial training has been completed, the intended users will put it into practice. To examine this, they used the Stages of Concern Questionnaire (SoCQ) to investigate the level of implementation of the Strengthening of Mathematics and Sciences in Secondary Education (SMASSE) in-service training programme adopted by Kenya. Findings showed that the majority of the teachers were only partial implementers of the innovation. The majority of the teachers had concerns regarding self that affected the level of implementation and innovation; while few had task and impact concerns. The authors recommend that appropriate support be given to teachers, which may well lead to interventions that will hopefully resolve their individual concerns and hence raise the level of implementation of the innovation.

In their work, **Sylvia Ocansey and Prof Emmanuel Kofi Gyimah** showed serious concerns about test anxiety in students because of educators' over-dependence on tests in recent times. Through a mixed-methods approach, they attempted to understand the phenomenon. Though they admit that causes of test anxiety are diverse, their findings show that fear of examination failure, poor preparation for tests and the rigid grading system in the unit of study are typical causes of test anxiety among students. They recommend that counsellors at the university teach students good study habits and encourage them to commence serious studies immediately when school reopens.

The seventh article by **Dr Margaret Funke Omidire** reports on experiences drawn from an online research writing project using open educational resources (OER). The purpose of the project was to design and build a multi-disciplinary

online course on academic research writing for undergraduate and postgraduate students of a Nigerian university using OER. The project provided an opportunity for collaboration among lecturers and IT specialists in order to broaden the user base for OER resources. However, challenges were also encountered, which included inadequate access to the internet, possible lack of commitment to the project by some participants due to the pressures of their workloads, unrealistic timelines and lack of familiarity with OER. The paper concludes with reflections on the reasons for the challenges and makes recommendations for those planning similar projects.

Hoping to generate debate about Science education in Africa, as well as expose issues for cross-border research on teachers and the teaching of Science, **Dr Samuel Oyoo,** citing Kenya school Science as a case study, calls for more research on teachers and teaching in schools. He also argued that Science teacher efficacy is a key issue and a major factor in the successful implementation of effective Science education in Africa. In his study, he explained the current status of Science education in Kenya, and presented a blueprint for how to enhance and sustain effective teaching of school Science, likely relevant to any country in Africa. He argued that teachers' use of contextual and practical approaches would enhance the efficacy of school Science teaching.

The ninth article by **Prof. I. Olatunde Salawu** analysed the challenges of open distance learning in offering teacher education programmes. The study used a historical-cum-descriptive approach to provide an overview of various attempts at using distance education in offering teacher education in Nigeria. Attention was focused on important aspects of teacher education such as pedagogy, teaching practice, and curricular and programme administration. The paper concluded that teacher education in Nigeria has improved from its rudimentary approach and now employs modern methods in the training of teachers at all levels. Nonetheless the paper noted that there are challenges that need to be addressed so as to make distance education a reliable instrument for producing quality teachers in Nigeria.

The tenth article by **Prof. Daniel N. Sifuna** discussed the efforts to introduce universal primary education (UPE) and the need for an adequate supply of primary school teachers in Africa. Using Kenya as a specific example, the paper showed that the poor quality of teachers in most African countries, following the introduction of UPE, can be attributed more to the ad hoc manner in which UPE programmes were introduced, structural adjustment programmes (SAPs) and the teachers' wage bill, among other factors, than to the inadequacy of inherited systems of teacher education from the colonial period.

THE REVIEW PROCESS

After the DETA 2013 Conference held in Kenya in July/August 2013, the conference sent out a call for papers to presenters who would like their work to be published in the conference proceedings document. The 20 paper proposals that were received were subjected to a double blind review before ten papers were finally selected for inclusion in this document. Editorial guidelines were provided to the conference speakers.

Academic rigour was the primary criterion used in selecting contributions, but DETA also proudly espouses a developmental dimension in the African research and publication context. We are confident that the proceedings will comply with the standards of academically acceptable conference proceedings worldwide.

The editorial team wishes to thank the following peer reviewers for reviewing the drafts and providing the authors with valuable comments:

Adeyemo, Dr S.	Joubert, Dr I.	Oyoo, Dr S.
Aguti, Dr J.	Joubert, Prof. R.	Reed, Prof. Y.
Blignaut, Prof. S.	Kamper, Prof. G.	Sam-Tagoe, Prof. J.
Chakwera, Dr E.	Kirkup, Dr G.	Schulze, Prof. S.
De Villiers, Prof. R.	Letseka, Mr M.	Shava, Dr S.
Dwomoh-Tweneboah, Prof. M.	Lumadi, Dr T.	Shonubi, Dr O.
Fraser, Prof. W.	Mays, Mr T.	Stols, Dr G.
Fresen, Dr J.	Mhlanga, Dr E.	Sutherland, Dr D.
Gatsha, Dr G.	Mohangi, Prof. K.	Van Niekerk, Prof. L.
Gyimah, Dr K.	Nieuwenhuis, Prof. J.	Venter, Prof. E.
Ivala, Dr E.	Nomlomo, Prof. V.	Welch, Ms T.
Januario, Dr F.	Ogina, Dr T.	Wolfenden, Ms F.
Jordaan, Mr D.	Omidire, Dr M.	

ACKNOWLEDGEMENTS

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DISTANCE EDUCATION TRAINING PROGRAMMES FOR FOUNDATION PHASE HEADS OF DEPARTMENTS COULD BE THE ANSWER TO BALANCING TIME AND TASKS

Dr Bipath Keshni[1]
Dr Bongi Nkabinde[2]

ABSTRACT

When striving to balance their dual role as leaders and teachers, Foundation Phase Heads of Departments (HoDs) have found themselves challenged and under stress. The Personnel Administrative Measures (PAM) document was used to examine challenges with regard to their roles and responsibilities, based on the conceptual framework of instructional leadership. A quantitative research approach was used to assess perceptions of 274 Foundation Phase HoDs in Mpumalanga. Data was analysed using the SPSS 20.0 statistical package. It was found that HoDs perceived that they were overworked, whereas in reality, the amount of time they spent in school was less than that suggested in the PAM document. Most HoDs left school earlier than anticipated and had insufficient time for supervision and administration. This resulted in stress, as they could not fulfil their roles and responsibilities. It is concluded that HoDs should conform to the requirements of the PAM document. Training or mentoring should be undertaken by the Department of Education in collaboration with universities to make sure that HoDs are capable and competent. Distance education for HoDs could be the answer to balancing time and completing the tasks required of the Foundation Phase HoD.

Key words: Personnel Administrative Measures (PAM) document, instructional leadership, distance education, Foundation Phase Heads of Departments, Mpumalanga, South Africa

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INTRODUCTION

Internationally, teachers responsible for supervising Grade R to Grade 3 are called 'middle managers' (Phillips, 2009:31). In South Africa, middle managers are called 'Heads of Departments' (HoDs). In the Personnel Administrative Measures (PAM) document, the HoD is referred to as a Post Level 2 employee (Republic of South Africa [RSA], 2003). Sound and effective management at all levels in schools is fundamental to the core business of teaching and learning, and HoDs need to understand how to do this (Mkhize, 2007). Examining HoDs' understanding and experience of management provides insights into some of the problems and the challenges within Foundation Phase education.

This paper utilises instructional leadership as a conceptual framework and maps out the roles and responsibilities of the HoDs in the Foundation Phase, as outlined in the PAM document (RSA, 2003). The research focuses on the challenges that Foundation Phase HoDs face in fulfilling their roles and responsibilities. The paper proposes that distance education training could be the answer for HoDs, in order to implement the dual responsibilities of teaching and leading.

Dual responsibilities

In most primary schools, Foundation Phase HoDs are full-time teachers. They teach four subjects whilst simultaneously supervising other teachers and monitoring other duties as outlined in the PAM document. This dual role requires balancing teaching and management without compromising either role. Given that the HoDs are described as being stressed, it is evident that they face a dilemma in effectively executing the duties and competing demands of both roles (Blandford, 2000: 13). All educational activities between the top management of the school and the educators within a school are co-ordinated by HoDs. Goldring, Preston and Huff (2010: 1) describe the role of HoDs as the most exciting and probably the most influential position in a well-organised school. Ali and Botha (2006: 17) suggest that if teaching and learning are to improve significantly, 'HoDs will have to spend much more time in supervising teaching and learning activities that occur daily in their subject or learning area'.

There is a great deal of inequality among primary school HoDs in South Africa. For example, primary and secondary schools are differentiated into private schools and former model C schools (quintiles 4-5); township or rural schools (which normally

fall under quintiles 1-3) and farm schools (Spaull, 2012). Educators, especially in township and rural schools, experience multi-grade classes and overcrowding in their classrooms. It is challenging for HoDs to perform their roles of managing teaching, supervising educators, ensuring learners are co-operative, as well as being responsible for all the classes in a phase, due to time constraints (Spaull, 2012; Mkhize, 2007). Foundation Phase HoDs must perform their roles and responsibilities efficiently in order to ensure that learners can read and write at Grade 3 level. The PAM document (RSA, 2003) assists the HoD in this regard.

The core duties and responsibilities of an HoD as listed by the PAM document (RSA, 2003) are teaching, extra- and co-curricular activities (mostly relating to being in charge of a subject, learning area or phase, which involves co-ordination and guidance as well as control of educators and learners), sharing the responsibilities of organising and conducting of extra- and co-curricular activities, personnel management (the division of work and participation in educator appraisal processes), general administrative work (planning and management of text books, equipment, financial budget for the department and subject work schemes), and communication. With the exception of teaching, no indication of prescribed time for the above activities is provided.

What is the Public Administrative Measures (PAM) Document?

The PAM document is a schedule appended to the Employment of Educators Act 76 of 1998, as amended in 2003 (RSA, 2003). Chapter A contains the regulations pertaining to the workload, as well as the duties and responsibilities of educators (RSA, 2003). Both of these are directly related to the research question: What are the challenges experienced by Foundation Phase HoDs, their perceptions with regard to time management, and their understanding of their management functions?

Table 1 shows the allocation of teaching time and responsibilities between HoDs and educators. The comparison of the hours that educators (Post Level 1, in terms of PAM) and HoDs (Post Level 2, in terms of PAM) are expected to spend on their activities shows that there will be a gap between policy and practice.

Table 1:   Modified from PAM Section 3b, showing the comparison between teachers' and HoDs' activities (RSA, 2003)

Activity	HOD (post level 2)	Teacher (post level 1)
Scheduled teaching time	Between 85% and 90%	Between 85% and 92%
Actual teaching time in hours per week	Between 29.75 and 31.5 hours (or 5.95 and 6.30 hours per day)	Between 29.75 and 32.2 hours (or 5.95 and 6.44 hours per day)
Job title	Head of department – public school	Educator – public school
Aim of the job	Class teaching and organising relevant/related extra-curricular activities, so as to ensure that the phase and the education of the learners is effective	To engage in class teaching, including the academic, administrative, educational and disciplinary aspects, and to organise extra- and co-curricular activities so as to ensure that the education of the learners is effective
Core duties and responsibilities of the job	Teaching	Teaching
	Extra- & co-curricular	Extra- & co-curricular
	Personnel	Administrative
	General/administrative	Interaction with stakeholders
	Communication	Communication

Chisolm, Hoadley and Wa Kiwilu (2005: i) state that workload constitutes those activities or issues that add to the quantity or intensity of work. The job description and workload of the HoD is vastly different compared to that of a teacher, yet the minimum proportion spent teaching is the same (85%) according to the PAM document. The scheduled teaching proportion for the HoD is between 85% and 90% of the time spent at school, while that of the teacher is 85% to 92% (RSA, 2003). National policy on educator workload is interpreted as expecting educators to spend a maximum of 1720 hours on their various activities per annum. As Chisolm et al. explain:

This translates into a Monday to Friday week of 43 hours per week - an 8.6 hour working day, excluding weekends and school holidays. An additional 80 hours per annum is provided for professional development, and it is expected that this occurs outside school hours. The formal school day is expected to be 7 hours long, and the formal school week 35 hours long. This means that educators are expected to spend about 8 hours a week outside formal school hours, on their activities. (Chisholm et al., 2005: i)

Both HoDs and teachers are expected to spend a minimum of 85% of their time teaching, and the rest of their time on preparation and planning, assessment, extra-curricular activities, management and supervision, professional development, pastoral duties, guidance and counselling, and administration (See Table 1).

The PAM document, however, also states that the formal school day may not be less than 7 hours per day and that the following core duties must be performed:

- Scheduled teaching time
- Relief teaching
- Extra- and co-curricular duties
- Pastoral duties (ground supervision, detention, scholar patrol, etc.)
- Administration
- Supervisory and management functions
- Professional duties (meetings, workshops, seminars, conferences, etc.)
- Planning, preparation and evaluation

The work that needs to be done outside the formal school day is:

- Planning, preparation and evaluation
- Extra- and co-curricular duties
- Professional duties (meetings, workshops, seminars, conferences, etc.)
- Professional development

The gap between national policy and practice, as identified by Chisholm and her colleagues when they analysed the time diary filled in by a nationally representative sample of 3909 educators, reveals that educators spend less time overall on their activities than the total number of hours specified by policy, and they also spend less time on actual teaching or instruction than is specified by policy. Whereas policy expects educators to spend between 64% and 79% of the 35-hour week on teaching, the average time that teachers actually spend on teaching is 46% of the 35 hour week, or 41% of their total school-related time, translating to an average of 3.2 hours a day. On average, more than half of the teachers' working week is taken up in administration and non-teaching related activities.

Instructional school leadership

This study is based on the conceptual frameworks of Hallinger and Heck (1996) and Weber (1996), which highlight the five main functions of the instructional leadership role, namely: defining and communicating school goals; managing the curriculum and instruction; promoting a positive learning climate; observing and giving feedback to teachers; and assessing the instructional programme. These functions were adopted and adapted by the researcher in line with the roles and responsibilities outlined in the PAM document (PAM, 2003).

As an instructional leader, the HoD must ensure that there is alignment between the curriculum, instruction and assessment, at a standard that will ensure learner achievement. In order to realise this aim, Phillips (2009: 2) argues that the HoD must be a practising teacher. He further contends that instructional leaders need to know what is going on in the classroom; thus presenting an opportunity to 'walk the factory floor'.

Once HoDs are in touch with what happens in the classroom, they will be able to appreciate some of the problems encountered by teachers and learners, address instructional issues from a 'hands-on' perspective, establish a base from which to address issues and make curriculum decisions, and strengthen the belief that 'the sole purpose of the school is to serve the educational needs of students' (Harden, 1988:88).

Table 2: Conceptual framework for the roles and responsibilities of Foundation Phase HoDs (adapted from the PAM document, EEA, 1998)

Instructional leadership functions	Pam document roles: heads of department
Defining and communicating the school mission	**General/administrative:** Conducting meetings within the department and with the parent community Communicating the vision of the school
Managing the curriculum and instruction	**Teaching**: Attending curriculum improvement classes and spreading excellent classroom practices Assessing the learners and managing educators' learning programmes
Promoting a positive learning climate	**Communication**: Being a positive role model when supervising and monitoring learners' and educators' work
Observing and giving feedback to teachers	**Extra- & co-curricular**: Improving learning and teaching Ensuring that professional development needs are positive **Personnel**: Integrated Quality Management System (IQMS) must be implemented with integrity and consistency
Assessing the instructional programme	**Personnel:** Integrated Quality Management System (IQMS) must be implemented with integrity and consistency **Teaching**: Ensuring that the progress of learners is consistent with the curriculum policy Reporting on the progress and communicating with parents regarding the progress of the learner

MAIN OBJECTIVES

This study set out to obtain the perceptions of Foundation Phase HoDs regarding the time they spent on their tasks. Table 2 clearly depicts that 80% of instructional leadership dimensions relate directly to management tasks. Yet 85% of the HoD's time, according to the PAM document, should be spent on class teaching. The main research question of this paper is: "What are the challenges experienced by Foundation Phase HoDs and their perceptions with regard to time management and their understanding of their management functions?" The purpose of the paper is to highlight a possible gap in the training of the HoDs that can be filled by distance education programmes.

METHODOLOGY

This study applies quantitative statistical analysis data to gauge whether proper training of HoDs allows them to perform their tasks effectively. This data was obtained through completed questionnaires distributed to Foundation Phase HoDs (n=274) employed in public schools in four districts in the province of Mpumalanga, South Africa. According to Van der Merwe (1996), quantitative research aims to test theories, determine facts, demonstrate relationships between variables and formulate predictions. It uses methods from the natural sciences, which are designed to ensure objectivity, generalisability and reliability (Weinreich, 2009). Quantitative research is a systematic process of using numerical data, which is obtained from a selected sub-group of a population, in order to generalise the findings to the population that is being studied (Maree, 2007: 145).

SAMPLE AND SAMPLING PROCEDURES

The research included a total of 550 primary schools in Mpumalanga. All of the Foundation Phase HoDs in Mpumalanga were invited to a meeting and questionnaires were distributed. Of the sample, 274 Foundation Phase HoDs completed the questionnaire.

Questionnaire

The questionnaire consisted of Section A, which was made up of five questions on biographical data; and Section B, which was made up of 15 questions about

the demographics of the school and the tasks performed by Foundation Phase HoDs. The following categories were created to formulate items in Section B of the questionnaire:

- School management or leadership workshops attended
- Time spent by HoDs hourly on different activities, as outlined by the PAM document
- Familiarity with the PAM document
- Class teaching and supervision
- Time spent weekly performing HoD duties
- Additional tasks they perceived they performed, beyond HoD duties

These variables were used to gauge whether time, training or both were responsible for the challenges faced by the HoDs in performing their duties.

Administration of questionnaires

Circuit managers and district directors were given 'Request for research' letters and telephonically informed by the researcher about the completion of the questionnaires. The Foundation Phase co-ordinators in four districts were requested to administer the questionnaires at four different central venues after a Foundation Phase information session. The questionnaire was explained during the session. The ethical clearance certificate, together with a letter requesting permission from the participants, was included with the questionnaires.

Validity and reliability

Validity refers to whether the questionnaire measured what it was designed to measure (Field, 2009: 11). This questionnaire, which was validated by a literature review as well as the statistical department of the University of Pretoria, probed the perceptions of HoDs regarding the time that they spent on various activities associated with their roles and responsibilities, and the knowledge of their tasks. A more valid measure would have been to actually observe the time spent over a period of time on the various activities, but due to lack of manpower as well as

study time constraints, this method would have been unfeasible. The questionnaire also provided for a wide range of items regarding activities performed by HoDs during and outside formal school hours.

Reliability is the ability of a measure to produce the same results under the same conditions (Field, 2009: 12). To be valid the questionnaire must be reliable. A pilot study was carried out in 10 schools in Mpumalanga, and results were examined and tested in order to validate the reliability of the questionnaire. Leedy and Ormrod (2013: 199) state that conducting a pilot study for a questionnaire is one step towards determining whether a questionnaire has validity for its purpose.

Analysis of questionnaires

During the categorical analysis of the quantitative data, respondents' written words were converted into figures and symbols that were counted and added, and entered into tables, to allow the authors to draw conclusions (Basit, 2012: 169). The statistical package SPSS 20 (Arbuckle, 2007; Field, 2009) was used to analyse data.

Ethical considerations

Since most educational research deals with human beings, it is necessary to understand the ethical and legal responsibilities in conducting research (McMillan & Schumacher, 2007: 195). This study used voluntary participation and request for consent, and the construction of the questionnaire assured confidentiality and anonymity of the participants. The Ethics Committee of the University of Pretoria granted ethical permission to proceed with the research.

RESULTS

Demographics: Section A

Some of the demographic findings will be briefly described in Table 3. The responses to the questions directly related to the aim of the study will be discussed more comprehensively.

Table 3: The demographic data from questionnaires completed by primary phase HoDs (n= 274) from Mpumalanga primary schools in rural areas (n=550)

Gender	Frequency	Percent	Valid percent	Cumulative percent
Male	27	9.9	9.9	9.9
Female	247	90.1	90.1	100.0
Total	274	100.0	100.0	
Age				
<= 45	78	28.5		
46 - 49	65	23.7		
50 - 53	77	28.1		
54+	54	19.7		
Total	274	100.0		
Marital status				
Married	156	56.9	56.9	56.9
Other	118	43.1	43.1	100.0
Total	274	100.0	100.0	
Educational qualification				
Teacher's diploma	81	29.6	31.4	31.4
Bachelor's degree	40	14.6	15.5	46.9
BEd/BEd(Hons)	100	36.5	38.8	85.7
BA(Hons)/Masters	37	13.5	14.3	100.0
Total	258	94.2	100.0	
Missing data	16	5.8		
Total with missing data	274	100.0		
Number of years served as cs1 educator				
<= 9	75	27.4	27.5	27.5
10 - 11	62	22.6	22.7	50.2
12 - 18	76	27.7	27.8	78.0
19+	60	21.9	22.0	100.0
Total	273	99.6	100.0	
Missing data	1	0.4		
Total with missing data	274	100.0		

Number of years served as hod				
<= 5	97	35.4	35.7	35.7
6 - 8	47	17.2	17.3	52.9
9 - 13	63	23.0	23.2	76.1
14+	65	23.7	23.9	100.0
Total	272	99.3	100.0	
Missing data	2	0.7		
Total with missing data	274	100.0		
Type of primary school				
Public primary	188	68.6	68.6	68.6
Other primary	86	31.4	31.4	100.0
Total	274	100.0	100.0	
School situation				
Rural	223	81.4	81.4	81.4
Other	51	18.6	18.6	100.0
Total	274	100.0	100.0	
Learners coming from economically disadvantaged and affluent areas				
Economically disadvantaged	210	76.6	76.6	76.6
Affluent	64	23.4	23.4	100.0
Total	274	100.0	100.0	
Responses to management or leadership capacity				
Yes	90	32.8	32.8	32.8
No	184	67.2	67.2	100.0
Total	274	100.0	100.0	
Extent that leadership/management course benefitted you				
Greatly	56	20.4	62.2	62.2
Partially/not at all	34	12.4	37.8	100.0
Total	90	32.8	100.0	
Missing data	184	67.2		
Total with missing data	274	100.0		

Results and findings of the questionnaire: Section B

Section B contained questions that probed the perceptions of the respondents regarding time management and the roles and responsibilities of HoDs. The italicised headings consist of the questions as asked in the questionnaire. Tables will be shown and a discussion of the findings will follow.

What is the total management time you use for this phase in a typical day (in minutes)?

Table 4: Comparison of central tendencies (mean, median and mode) for total daily management time (hours) as perceived by HoD (n=274) during a typical school day at Foundation Phase

Parameter	Value (hours per day)
Mean	3.52
Median	3.25
Mode	2.50

The item asked for minutes, but was recoded to hours for data analysis. The mean management time per day was 3.52 hours. The mode, which reflects the time spent by the highest number of HoDs (21.9%), was 2.50 hours and the median was 3.25 hours. The difference between the three measures of central tendency (mean, median and mode) reflects the outliers, due to some HoDs having a much higher perceived administrative workload than most. The data is thus positively skewed as shown in Figure 1.
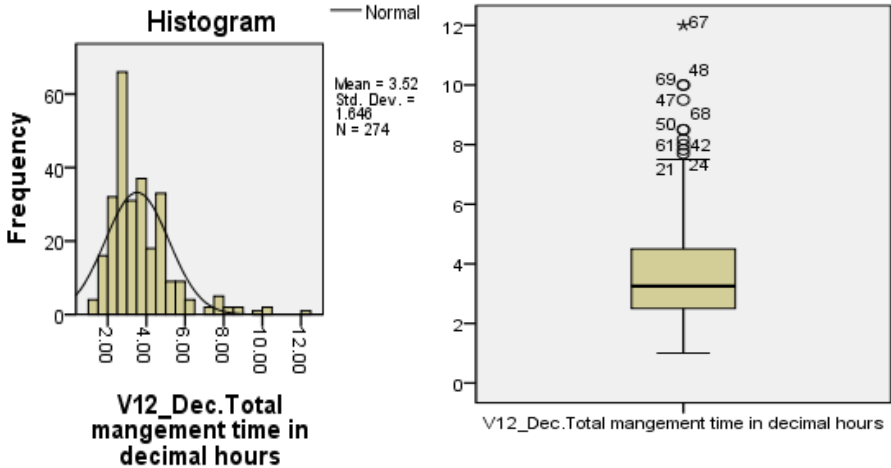
Figure 1: Histogram and box-plot showing the distribution of data in the item: Perceived total management time per day

The box plot in Figure 1 indicates that certain educators have the perception that they spend an inordinate amount of time on management. For example, educator 67 indicated 12 hours per day, which is extremely unlikely and skews the data. For skewed data the median (3.25) is a better representation of the distribution (Huysamen, 1998: 48; Field, 2009: 22). The mean of 3.52 hours per day appears excessive because these outliers probably influence it. In fact, the maximum expectation for teaching and other duties (as well as administration) is 8.64 hours per day. Use of the mode of 2.50 eliminates the effect of the outliers, leaving a more realistic 6.14 hours (or 71.1%) for performing teaching activities, which is more in line with the expected time parameters provided in Table 1.

If one makes the assumption that the HoDs teach 30 hours per week, then the mode is the only distribution that falls within the maximum of 43.2 hours that educators should spend on their activities. This would mean that only 21.9% teach for 30 hours per week (85% of 35 hours). In addition, the hours spent per week exceeds the 8.6 hours per week allowed for other activities. It thus appears as if HoDs in the Foundation Phase in this sample have the perception that they are spending too much time on management, with the result that their teaching time is likely to be compromised.

Item 13 asked the respondents to provide the percentage of their time that they spend per year on certain HoD activities. The data received is summarised in Table 5.

What percentage of time as HoD will you spend per year on the following activities?

Table 5: Percentage of time HoDs spend on various activities annually

	Administrative Duties (13.1)	Management Duties (13.2)	Supervision (13.3)	Teaching (13.4)	Public Relations (13.5)	Extramurals (13.6)
Mean	13.78	17.84	13.31	37.81	8.62	10.00
Median	10.00	20.00	10.00	40.00	10.00	10.00
Mode	10	20	10	50	10	10

The data in Table 5 indicates that the modal teaching perception is 50% compared to the 85% expectation. The respondents probably perceive that administrative and management duties, supervision and teaching are all part of their teaching task, as the combined modal percentage comes to 90% compared to the 85% to 90% as mandated. This perception is probably because in practice it would be difficult to separate administration, management and supervision from teaching duties.

Are you familiar with the HoD duties as outlined in the PAM document?

Table 6: Familiarity with HoD duties in the PAM document

		Frequency	Percent	Valid percent	Cumulative percent
Valid	**Yes**	215	78.5	78.5	78.5
	No	59	21.5	21.5	100.0
	Total	274	100.0	100.0	

Of the respondents, 21.5% indicated that they are not familiar with HoD duties as outlined in the PAM document. It thus appears as if they rely to a great extent on the management in the school regarding their duties and the allocation of appropriate times to these duties.

Do you have a class to teach as well as supervisory duties?

Table 7: HoDs with classes to teach as well as supervisory duties

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Yes**	271	98.9	98.9	98.9
	No	3	1.1	1.1	100.0
	Total	274	100.0	100.0	

One would expect all HoDs to have teaching as well as supervisory duties, yet it is surprising that the data in Table 7 shows that 1.1% of the respondents do not have classes to teach.

How much time on average do you spend in a week performing the following duties during formal school time?

Item 20 asked respondents to provide the time spent per week in minutes on certain duties that fall within the formal school day (35 hours per week). As HoDs are required to spend 85% of the 35 hours per week in actual teaching duties (30 hours) it leaves them with 5 hours to perform their formal HoD duties. The mean, median and modes obtained are provided for items 20.1 to 20.7 (in hours) below.

Table 8: Time spent on average each week performing various duties during formal school time (from item 20 of the questionnaire)

Time spent in hours			
	Mean	Median	Mode
20.1 Class visits	0.82	0.58	0.50
20.2 Monitoring practices to align with district goals	0.68	0.50	0.50
20.3 Working with learners on academic tasks	1.14	0.58	0.50
20.4 Administrative work	0.81	0.54	1.00
20.5 Observing teachers for Performance Development (PD) instead of evaluation	0.72	0.50	0.50
20.6 Supervising teachers, monitoring learners and uplifting department while teacher is teaching a class	0.97	0.50	0.50
20.7 Meeting with district officials who support you in your management duties	0.91	0.75	1

Adding the mean scores for item 20 of the questionnaire results in a mean of 6.05 hours of administrative duties per week (Table 8). One could assume that item 20.6 does not involve the HoDs' scheduled teaching time or timetable allocation of time, and is spent observing teachers in their departments (ELRC Report, 2004: 7). The 6.05 hours per week (perceived time) is thus greater than the 5 hours per

week (expected time) for formal HoD duties as required by the PAM document (RSA, 2003). The average used here, however, masks the actual differences between the 274 respondents, as some will work less than 6.05 hours per week, while others indicate that they work more than the average. The mode of 4.50 hours, which is the time that most of the sampled educators spend per week on the activities listed in item 20, is less than the 5 hours per week. It is thus assumed that the respondents interpreted this question in terms of their HoD duties outside of the formal school day and their answers do not reflect their teaching time.

Item 21 asked respondents to fill in the hours spent per month on additional HoD tasks. The results are shown in Table 9.

What additional tasks, beyond your HoD duties, make up your time? (Please write the number of hours per month spent on these tasks.)

Table 9: Additional tasks, beyond HoD duties, which take up time

		V21.1 Time spent on IQMS per month	V21.2 Time spent on sport per month	V21.3 Time spent on entertainment per month	V21.4 Time spent on meetings (SMT) per month	V21.5 Time spent on workshops per month
N	**Valid**	272	273	273	262	249
	Missing	2	1	1	12	25
Mean		8.68	8.06	7.31	5.86	4.52
Median		4.00	4.00	4.00	3.00	1.00
Mode		2	2	2	0	0

The interpretation of the data in Table 9 assumed that educators work for 20 days per month. The additional tasks were interpreted as those activities outside the formal school day and include activities such as planning, preparation, evaluation, extra- and co-curricular duties, professional duties and professional development (Chrisholm, Hoadley, wa Kivula, Brookes, Prinsloo, Kgobe, Mosia, Narsee and Rule:2005). According to this document educators must spend 8.64 hours per week (1.72 hours per day) on tasks outside of formal activities. Adding the 1.72 hours of additional duties to the 6.05 hours of item 20 calculated in Table 7 (formal duties) gives a total of 7.77 hours per day (perceived time) which is still less than the 8.64 hours per day (expected time) required by National Policy (ibid.). A gap is thus present between the expected time and the perceived time (8.64 -7.77 = 0.87 hours per day). Taking 199 working days as the maximum working days

(HSRC, 2004) then the gap is 173.13 hours per annum. However, if one assumes that the educators have an expectation of a 35-hour work week, or 7 hours per day, then they have the perception that they work 0.77 hours per day more than is expected of them (7-7.77). This translates to 153.23 hours per annum. Thus the time spent by HoDs on their work depends on which norm one uses, namely, a PAM expectation of 8.64 hours per day or HoD perception of 7 hours per day. Thus HoDs perceive that they are working 0.77 extra hours, when they are actually working 0.87 hours less than is prescribed by PAM. These perceptions result in work that is allocated a particular number of hours per annum not being completed by the HoD. The gap between legislated and perceived working hours leads to stress, as HoDs are unable to fulfil their expected roles and responsibilities.

CONCLUSION

It is concluded from Tables 8 and 9 that there is a significant cognitive gap between what is required of HoDs and their perception of what is required. Analysis of the results indicated that HoDs have the perception that they are involved with instructional leadership duties to a greater extent than required (0.77 hours per day more). Yet, in fact, they are involved for less time (0.87 hours per day less) than suggested in the PAM document. Over a month, this gap adds up, so that HoDs consistently feel that they are not coping with the instructional leadership functions allocated to them. As a result, it appears as if the HoDs are experiencing stress and believe that they are being overworked. They also have the perception that they are spending too much of their time on management and administrative duties and hence their teaching time is likely to be compromised. The teaching time of HoDs in the PAM document should be reduced in order for them to perform efficiently and complete their allocated leadership and management tasks.

The HoDs in this sample did not seem to see a relationship between the time spent on activities that fall within the formal school day and the time spent on those activities that fall outside the school day. All of these findings probably link to the finding that 21.5% (n=59) respondents were unaware of HoD duties as outlined in the PAM document (Table 6). The analysis of data indicates that this lack of familiarity may, in fact, be a great deal higher.

RECOMMENDATIONS

The findings of this study have highlighted a lack in capacity-building programmes for Foundation Phase HoDs. Due to the lack of awareness of their duties as outlined by the PAM document, it is recommended that the Department of Education (DoE) prioritises training of Foundation Phase HoDs. Distance education is a suitable vehicle for such a training programme. Since distance education contact sessions are held within holidays, they provide a stress-free environment conducive to learning, for HoDs to be empowered by understanding their tasks and improving their time management skills. HoDs need to be aware of time and task management, as this has an impact on instructional leadership. Distance education training is the key to effective task and time management.

Furthermore, it is recommended that the DoE revise the PAM document to include time spent per leadership and management activity, and to reduce teaching hours to accommodate supervisory tasks.

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TEACHERS' PERCEPTIONS ABOUT THE EFFECTS OF CHILDREN'S EXPERIENCES OF LEARNING ON THEIR LATER EMOTIONAL AND SOCIAL DEVELOPMENT

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ABSTRACT

It is generally believed that children's success in grappling effectively with emotional and social challenges in later years largely depends on their childhood experiences. Using a mixed-methods approach, this study explored the perceptions that teachers in a primary school in Ghana held about this belief. Data was collected using a questionnaire and interviews. Sixty teachers voluntarily participated in the study. The study found, among other things, that the ability of a child to cope with emotional and social challenges in later years depends on teachers' attitudes in terms of their commitment, sensitivity to the child's needs, and ability to structure the teaching and learning environment. Based on the findings, the study recommends that in making placement decisions in primary schools, educational departments should place emphasis on teachers' commitment to children's development.

Key words: childhood, primary education, social, emotional, development, teachers

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INTRODUCTION

The significance of social and emotional development is seen in every area of a child's life. A child may have a strong foundation for later development if he or she can manage personal feelings, understand others' feelings and needs, and interact positively with others. Bronfenbrenner and Morris (1998) suggest that childhood development takes place through processes of progressively more complex interaction between a child and other persons, objects and symbols in his or her immediate environment. They suggest that one's environment influences others, and that these bi-directional influences occur at all levels of the environment (Berk, 2000). Bronfenbrenner's (1979) ecological systems theory, or human ecology theory, upholds that human beings develop in relation to the family and home, school, community, and society; and these environments are conceptualised as nested systems (Bronfenbrenner, 2005). The child might not function directly in these ecological environments, but these environments do affect his or her development (Paquette & Ryan, 2001). These environments incorporate, inter alia, the attitudes and ideologies of a child's cultural values, social customs, and laws (Berk, 2000). The researchers will therefore concentrate on the school's environment, especially the teachers' influence on the children's social and emotional development.

Importance of childhood development

Research on childhood education shows that high-quality child-care experiences support the development of social and academic skills that facilitate children's later success in school. There is also mounting evidence that close relationships between primary school teachers and children are an important part of creating high-quality care environments and positive child outcomes (Johnson, Christie & Wardle, 2005). Though children have growing abilities, they sometimes find it difficult to regulate their thoughts and emotions in ways that allow them to succeed at new tasks. At these times, close relationships with meaningful adults, including teachers, can help children learn to regulate their own behaviour (Blair, 2002). According to Howes, Matheson and Hamilton (1994), pre-schoolers with close teacher relationships have been shown to be more engaged in classroom activities, have better attitudes about school, and demonstrate better academic performance. Therefore, teacher-child relationships appear to be an important part of children's social and academic success in school (Birch & Ladd, 1997).

Classrooms are inherently social places, wherein teachers and children negotiate the curriculum together. Guided participation in the activities of children is the primary role of the teacher; play and the expression of ideas through interactions with adults, peers, and the environment are the primary business of children (Fu, Stremmel & Hill, 2002).

In order to allow children to learn in an environment that encourages learning through social relationships, schools need to engage in activities that are real and meaningful to children, and activities that encourage the development of skills, knowledge, ways of thinking and learning, and a disposition for learning. The UNESCO Policy Briefs on Childhood (2002) emphasise the need for childhood development to encompass a series of learning processes, during which the children learn about the environment and themselves. The subsequent paragraphs discuss pupils' emotional and social development.

Pupils' emotional development

Emotional development is the emergence of a child's experiences, expression, understanding, and regulation of emotions from birth through late adolescence. It also comprises how growth and changes in these processes concerning emotions occur. Emotional development in children and adolescents encompasses how children recognise, label, and control the expression of their emotions in ways that are generally consistent with cultural expectations. By about age 7 to 11 years, children are better able to regulate their emotions and to use a variety of self-regulation skills. According to Trentacosts and Izard (2006), children may develop expectations concerning the outcome that expressing a particular emotion to others might produce, and develop a menu of behavioural skills to control how they express their emotions. Emotional development does not occur in isolation; neural, cognitive, and behavioural development interact with emotional development and social and cultural influences, and context also plays a role (Moissinac, 2003). Dworetzky (1996) points out that emotions perform valuable functions, such as motivating and helping individuals to communicate their desires and wishes to others.

Birch and Ladd (1998) examined relations between kindergartners' (N = 199; M age = 5 years 6 months) behavioural orientations and features of their first-grade teacher-child relationships (i.e. conflict, closeness, dependency). Results indicated that early behavioural orientations predicted teacher-child relationship quality in

that (a) unique associations emerged between children's early antisocial behaviour and features of their first-grade teacher-child relationships (i.e. negative relation with closeness, positive relation with conflict and dependency) and between social behaviour and teacher-child dependency; and (b) prosocial behaviour was correlated with, but not uniquely related to, any feature of children's first-grade teacher-child relationships. In addition, specific features of the teacher-child relationship (e.g. conflict) predicted changes in children's behavioural adjustment (e.g. decreasing prosocial behaviour). Learning in an interpersonal style helps students not only to initiate, but also maintain and manage positive social relationships with a diverse range of people in a range of contexts (Victorian Curriculum and Assessment Authority, 2007).

Pupils' social development

Vygotsky, a social-constructivist, proposed that social interaction profoundly influences cognitive development and emphasised that biological and cultural developments do not occur in isolation (in Driscoll, 1994). Vygotsky believed that this lifelong process of development was dependent on social interaction and that social learning actually leads to cognitive development. This phenomenon is called the Zone of Proximal Development (ZPD). Vygotsky (1978) described ZPD as the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. This therefore means that if children can be expected to develop emotionally and socially, then the caregivers must encourage social interaction.

During the last two decades, a convincing body of evidence has accumulated to indicate that unless children achieve a minimum of social competence by about the age of six years, they have a high probability of being at risk for retarded development (Ladd, 2000). It is therefore obligatory for childhood educators to give high priority to enhancing young children's social development (Hartup, 1992). Hartup (1992) suggests that peer relationships contribute a great deal to both social and cognitive development and to the effectiveness with which we function as adults. Hence, the single best childhood predictor of adult adaptation is NOT IQ, NOT school grades, and NOT classroom behaviour; but rather the level at which the child gets along with other children. Children who are generally disliked, who are aggressive and disruptive, who are unable to sustain close relationships

with other children, and who cannot establish a place for themselves in the peer culture, are seriously 'at risk' (Hartup, 1992). Therefore, when teachers learn to understand children's earliest peer conflicts, they will be in a better position to help them overcome their problems. Research reviewed by Jones (1996) indicates that teachers rank children who have serious or persistent behavioural problems as their chief cause of stress. Jones, however, suggested that teachers take direct action towards minimising classroom conflicts by socialising children in a classroom environment that is conducive to learning.

Key elements of successful child socialisation include modelling and instruction of prosocial behaviour; communicating positive expectations, attributes, and social labels; and reinforcing desired behaviour (Dix, 1993; Good & Brophy, 1994). Successful socialisation further depends on a teacher's ability to adopt diverse teaching styles for classroom management, and to employ effective counselling skills (learned in teacher training colleges and universities) when seeking to develop positive relationships with individual children.

STATEMENT OF THE PROBLEM

In Ghana and every other country in the world, children constitute the future leadership and workforce of the nation, and therefore require serious commitment from the adult population, particularly teachers, who have the responsibility to educate them. In Ghana, this is given credence and is manifested in the various constitutional provisions and parliamentary acts and legislative instruments. For example, the 1992 Constitution provides the broad policy goal, which is to promote the survival, growth and development of all children. In 2003 the government of Ghana developed a strategic plan to improve educational quality by building upon already proven initiatives, through: (a) *improving and augmenting the supply of human and physical resources available to the system;* and (b) *making them more effective (including the improvement of teaching practices, learning conditions and support facilities).* Key to this are the efforts of government to ensure an improved standard of living and enhanced quality of life for families in Ghana, as envisaged by the Millennium Development Goals (MGDs) of 2015.

In western literature, empirical evidence exists to support the fact that childhood experiences have an effect on emotional and social development in later years (Dworetzky, 1996; Katz, 1995). In Ghana, however, there is no research to support this evidence, since literature pertaining to this has yet to be published.

PURPOSE OF THE STUDY

The purpose of this study was to examine the perceptions that teachers at the University Primary School of Cape Coast, in the Central Region of Ghana, held about the effects of childhood experiences on children's later emotional and social development. The primary school was established for the children of the University of Cape Coast employees. The study further explored the activities the school engaged in that promoted pupils' emotional and social development, as well as the measures the school adopted to enhance the children's development.

RESEARCH QUESTIONS

In order to find answers to the problem, the following research questions were formulated to guide the study:

- R.Q. 1. What perception do teachers of the University Primary School of Cape Coast hold about the emotional impact of childhood experiences on later emotional and social development?
- R.Q. 2. What perception do teachers of the University Primary School of Cape Coast hold about the social impact of childhood experiences on later emotional and social development?
- R.Q. 3. What school activities do teachers at the University Primary School of Cape Coast engage in to promote pupils' emotional and social development?
- R.Q.4. What measures do teachers of the University Primary School of Cape Coast suggest be adopted to enhance children's emotional and social development?

METHODOLOGY

Research design

Even though other research designs, such as descriptive survey and ex-post facto approaches, could have been appropriate for a study of this nature, since we were interested in reporting on a single case (that is, a Primary School in Ghana) we adopted a mixed-methods approach for the study design. According to Creswell (2012) a mixed-methods research design is a procedure for collecting, analysing, and 'mixing' both quantitative and qualitative research and methods in a single study to understand a research problem better.

DATA COLLECTION

Research participants

The total population of the teachers in the University Primary School at the time of gathering research data for the study was 60. There were 42 male and 18 female teachers and their ages ranged between 21 and 59. In terms of their qualifications, all were professionally qualified. About two thirds (2/3) of the teachers had taught for more than five years.

Sampling techniques

We were interested in exploring what teachers perceived to be the importance of childhood development in terms of its effect on later emotional and social development; hence, we used the purposive sampling technique to select all the teachers, including the head teacher of the school and her two deputies. The purposive technique is a non-probability sampling method. In using this technique, the researchers deliberately handpicked cases or subjects (which, in our study, involved the teachers of the primary school in question) to be included in the sample on the basis of the judgement 'of their typicality or possession of the particular characteristics being sought' (Cohen, Manion & Morrison 2007: 115). We selected five of the academic staff, including the head and her two deputies, and two other teachers for interviews, using the purposive technique.

INSTRUMENTS AND METHODS FOR DATA COLLECTION

Questionnaire

Questionnaires and interview guides were adopted in this study. The questionnaire, which was self-developed, was used to determine teachers' perceptions of the importance of childhood development, and comprised school activities that promoted children's emotional and social development and suggestions to enhance their development. It consisted mainly of close-ended items and had five sections. Section A of the instrument sought information on the demographic characteristics of participants. This section comprised four items, namely: gender, age, academic qualifications, and number of years of teaching in the current school. Section B examined the perceptions of teachers as to the importance of academic and emotional and social development during the early years. There were twenty-four items that research participants were expected to respond to on a Likert

scale of 'Strongly Disagree' (SD), 'Disagree' (D), 'Agree' (A) and 'Strongly Agree' (SA). Section C elicited information on the school activities that promoted pupils' emotional and social development. It was presented on a Likert scale of 'Rarely' (R), 'Occasionally' (O), 'Often' (Of) and 'Very Often (VF)'. Section D sought to identify availability of guidance and counselling services, mentorship, sporting activities and entertainment in the school. Section E sought suggestions that could enhance childhood development, and was also presented on a Likert scale ranging from 'Strongly Disagree' (SD), to 'Disagree' (D), to' Agree' (A), to 'Strongly Agree' (SA).

In order to ascertain the reliability of the questionnaire instrument, and more importantly to eliminate ambiguities, the questionnaire was pilot tested at Flower Gay Primary School in the Cape Coast Metropolis. The school was chosen because it had similar characteristics to the University Primary School, such as professional teachers, playgrounds and a Parent Teacher Association (PTA). The Statistical Product and Service Solution (SPSS) version 16 was used for the analysis of the data, and the Cronbach alpha was used to determine the coefficient alpha. This was found to be .70, which we considered appropriate for the study (Field, 2005) since it was close to 1 (Cook & Beckman, 2006).

Interviews

The semi-structured interview format was used and the data solicited from the interviews aimed to build around the data gathered in the questionnaire instrument. The interviews revolved around the central themes (social and emotional development of pupils) and how these are fostered by teachers (teacher-pupil interaction, pupil-pupil interaction). This was in order to help us gather information on what could not have been provided by the questionnaire, and to give us a deeper understanding of the phenomenon under study.

Procedure

We used two days for the data collection. The questionnaire instrument was administered on the first day and took thirty minutes to complete. Subsequently, we had interviews with five of the teachers for fifteen minutes each on the second day.

Ethical considerations

Prior to the data collection, we visited the school to familiarise ourselves with the environment. We obtained a letter of introduction from the Head of the Department of Educational Foundations, in order for the school authorities to allow us to collect the data. Written requests for the study to be conducted in the school were also sent to the Vice Chancellor of the University of the Cape Coast and the Headmistress of the University Primary School.

DATA ANALYSIS

Analysis of questionnaire data

The data was analysed using SPSS version 16 software. The four research questions were analysed using the means and standard deviation scores, to ascertain whether the data were close to the average; since low standard deviation indicates that the data points tend to be very close to the mean, whereas high standard deviation indicates that the data is spread out over a large range of values. In analysing our 4-point Likert scale of Rarely (1), Occasionally (2), Often (3), and Very Often (4), the mean score was set at 2.5. Hence, a score below 2.5 was interpreted as a school activity that respondents did not consider as a childhood experience contributing to later emotional and social development. However, a score of 2.5 or above was regarded as a childhood activity that contributed to later emotional and social development.

Results of the analysis of Research Question 1 are indicated in Table 1.

Research Question 1: What perception do teachers of the University Primary School of Cape Coast hold about the emotional impact of childhood experiences on later emotional and social development?

Table 1: Teachers' perception of the emotional impact of childhood experiences on later emotional and social development

Statement	Mean	SD
In order to help pupils develop high self-esteem in later life, schools should help pupils to develop their self-identity (i.e. know who they are).	3.48	.62
If pupils are trained to be sensitive to others' emotional reactions, they become sympathetic to the plight of others in later life.	3.33	.68
The quality of pupils' relationships with adults should have significant impact on their emotional development.	3.25	.63
The competencies and skills fostered though childhood programmes should have positive effects on emotional development.	3.20	.51
If pupils develop close attachments with parents and other caregivers in childhood, they forge closer relationships with others in later years.	3.13	.95
Knowledge of the child's personality should be influenced greatly by childhood experiences.	3.12	.78
Pupils should experience a wide range of emotions in childhood in order to handle emotional problems in later life.	2.90	1.00
In order to handle emotional problems effectively in adult life, in childhood years, pupils should express and act on their emotions.	2.32	.83

The results in Table 1 show that all the items had means above the average (2.5) which may imply that the teachers generally recognise the importance of childhood emotional experiences in relation to their later emotional development. Table 2 summarises the social impact of childhood experiences.

Research Question 2: What perception do teachers of the University Primary School of Cape Coast hold about the social impact of childhood experiences on later social development?

Table 2: Teachers' perception of the social impact of childhood experiences on later social development

Statement	Mean	SD
If society wants to have responsible adults, then discipline should be an integral part of childhood development programmes.	3.72	.49
Childhood care and education should promote safe and supportive environments for pupils' development.	3.58	.64
For a child to trust the people around him or her, the social environment should be trustworthy.	3.57	.56
The quality of care in childhood years should have significant impact on pupils' social development.	3.45	.65
If in childhood years pupils have an opportunity to contribute to ongoing activities, they grow to become useful members of their community.	3.35	.66
If in childhood years pupils assert their own rights and needs appropriately, they grow up to respect the rights of others in later years.	3.35	.78
The competencies and skills fostered though childhood development programmes should have positive effects on social gains.	3.08	.59
If pupils are to grow up to be independent in later years, then they should be provided an opportunity to become autonomous in childhood years.	2.87	.98

Results shown in Table 2 demonstrate that all the items had means that were far above the average (2.5). This may also give credence to the importance of childhood social experiences on later social development.

Table 3 provides results regarding the school activities that teachers of the University Primary School of Cape Coast engaged in to promote pupils' emotional and social development.

Research Question 3: What school activities do teachers at the University Primary School of Cape Coast engage in to promote pupils' emotional and social development?

Table 3: Activities in school that promote pupils' emotional and social development

Statement	Mean	SD
Teachers meet to discuss new instructional ideas.	4.75	12.4
Teachers are regularly in attendance at school.	3.92	.28
Teachers give homework every day to pupils to reinforce their learning.	3.78	.56
Teachers are punctual at school.	3.78	.45
Pupils are encouraged to love one another as themselves.	3.68	.60
Pupils are discouraged from using abusive words like 'stupid', 'foolish', 'idiot', etc.	3.65	.73
Teachers serve as role models.	3.65	.69
Pupils are encouraged to report to teachers when others are fighting.	3.62	.72
Pupils are involved in school activities.	3.58	.70
Teachers ensure that lesson plans meet pupils' unique needs.	3.50	.77
Teachers allow pupils to retell their story in their own words.	3.4	.65
Pupils are encouraged to report to teachers when someone is crying.	3.43	.72
Teachers celebrate the success every child attains.	3.37	.78
Pupils are highly motivated.	3.25	.73
Teachers teach pupils about how nice it feels to be part of a group.	3.20	.82
Pupils are given training on interpersonal skills.	3.05	.81
Staff meeting to review teaching skills.	3.03	.92
Teachers explain to pupils how sad it feels to be excluded.	2.90	.88
Teachers monitor pupils during break and recreation.	2.87	.83
Teachers encourage children to discuss personal experiences and highlight them.	2.83	.92
Teachers teach pupils to handle emotional problems.	2.82	.83
Teachers allow pupils to reflect on/discuss their feelings when something is broken, like a favourite toy.	2.65	.90
Teachers use 'circle time' to brainstorm a list of possible ways of looking out for and protecting pupils' belongings.	2.62	.92
Teachers monitor pupils until parents and guardians pick them up after school hours.	2.48	1.03
Teachers receive in-service training on child care.	2.47	.96

The results as portrayed in Table 3 may imply that if children are to be equipped adequately to meet the emotional and social challenges of life, then the activities schools put in place for their children should be given careful attention. Table 4 features measures considered to enhance childhood development.

Research Question 4: What measures do teachers of the University Primary School of Cape Coast suggest be adopted to enhance children's emotional and social development?

Table 4: Measures to adopt to enhance childhood development

Statement	Mean	SD
We should invest in children now; not when they become adults/reach school age.	3.73	.58
Research and training for parents and professionals involved in young children's care and education should be paramount.	3.63	.52
Provision should be made for the development of young children.	3.60	.59
There is the need to invest in the very young and improve basic learning and specialisation skills.	3.57	.53
In the classroom, nursery rhymes should be used to promote healthy child development through a series of engaging activities.	3.52	.65
Epigenetic effects during childhood development should be prevented through good nutrition and correct stimulation.	3.52	.62
A wide range of policies should be directed toward early care and education.	3.48	.08
The environment in which children live and learn should have a significant impact on their psycho-social development.	3.45	.09
Social and emotional development is crucial in helping children to develop a positive sense of themselves and others.	3.42	.67
Public investment in human capital should be directed towards the very young.	3.28	.64
Investment in children should be policy driven.	3.28	.78
The competencies and skills fostered through childhood development programmes should be directed to cognitive gains.	2.75	.10
Childhood development should start in school.	2.17	.14

The findings in Table 4 reveal the important role schools play in developing emotional and social capacities. If schools are willing to invest in the development of their children, then they can expect them to develop emotionally and socially in a manner that is appropriate and healthy.

RESULTS AND FINDINGS OF INTERVIEW DATA

In our analysis of the interview data, we categorised the data into commonly recurring themes (Braun & Wilkinson, 2003) bearing in mind the importance of childhood emotional and social development and its influence on later development.

With regard to the dimension of emotional development, the respondents were in agreement that children's correct emotional development has a positive impact on their later development. One of the respondents (with the pseudonym 'B') said that 'if a child is not supported to mature emotionally, he or she will grow to be wayward and become a social misfit'. Another (with the pseudonym 'G') was of the view that 'it is only when adult members of a community help a child to grow emotionally that the child can be tolerant to others'.

From the social perspective, the interviewees underscored the positive impact a child's social environment can have on his or her later development. One interviewee (with the pseudonym 'A') opined that 'when a child's social environment is defective, it impacts negatively on the child's later years' social interaction'. Another (with the pseudonym 'M') indicated that 'proper guidance and positive teacher-child relationships help children to grow to respect their elders and interact cordially with others'.

DISCUSSION

The empirical study examined the perceptions that teachers at the University Primary School of Cape Coast in the Central Region of Ghana hold about the importance of childhood experiences on later emotional and social development. It further explored the activities the school engaged in that promoted pupils' emotional and social development, as well as the measures the school adopted to enhance childhood development.
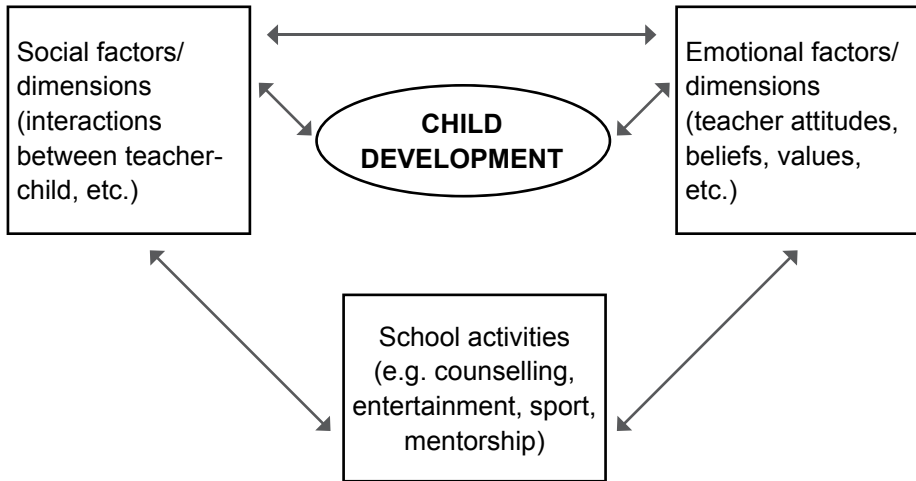
Figure 1: Factors influencing childhood development and later development

In discussing the findings of the study, we only took into account the main variables identified for investigation (see Figure 1). The study revealed that for a child to develop positively in later years, his or her emotional development (i.e. attitudes, beliefs, values), social development (interactions), and environment, coupled with the activities (e.g. counselling, entertainment, sport, mentorship) the school provides for, are important.

Teachers' perception of emotional and social childhood development and resulting later emotional and social development

In this study, we identified certain emotional and social factors, with which the respondents agreed strongly, and which supported the importance of childhood emotional and social development when one considers future outcomes. The emotional aspect of childhood development, though underrated, is probably one of the most important aspects of learning how to function within society. Emotional development plays a part in neural, cognitive, and behavioural development; and social and cultural influences shape the development of the child (Moissinac, 2003). Emotional development of children is seen in their growing ability to identify and understand their own feelings, accurately read and understand the feelings of others, manage the way they feel, shape the way they behave, develop empathy

for others, and build and keep good relationships with friends, family and others. Hauck (1974) posits that no matter how excellent intellectual, physical and linguistic development may be, a person is doomed to live a life of frustration and difficulty if he or she has not gained satisfactory emotional development.

The current study has underscored how crucial childhood experiences are to the individual's future social and emotional development. The findings revealed that the teachers who were surveyed recognised the importance of helping children to establish self-identity, training pupils to be sensitive to others' emotional reactions, and promoting the quality of pupils' relationships with adults (among others). These findings give credence to Hartup's (1992) argument that the single best childhood predictor of adult adaptation is the adequacy with which the child gets along with other children. Therefore children who are generally disliked, and who are unable to sustain close relationships with other children, may not fit well into their peer group or culture.

Raver's (2002) research has established a strong link between social/emotional development and behaviour and school success, particularly in the first few years of schooling. He indicates, among other things, that if a child fails to control negative emotions, the child will have trouble learning to read or stay on task in other educational activities. This was corroborated in the interviews on the impact of emotional development (Table 1). The respondents were in agreement that children's correct emotional development can have a positive impact on their development in later years. Research on childhood education shows that high-quality child-care experiences support the development of social and academic skills, which facilitate children's later success in school. There is also mounting evidence that close relationships between teachers and children are an important part of creating high-quality care environments and positive child outcomes (Johnson et al., 2005; Blair, 2002). The assertions by Johnson et al. (2005) and Blair (2002) were given credence in this study, since the teachers who were surveyed agreed that the quality of care in childhood years has a significant impact on pupils' social development.

It is therefore important for caregivers to pay particular attention to the childhood years, which underscores Ladd (2000). It is important to note that unless children achieve minimal social competence, they have a high probability of being at risk during adulthood in several ways. Again, this empirical study supports Ladd's caution, by emphasising that one should provide children with the opportunity to become

autonomous in childhood years, in order to be independent, fully-functioning and contributing members of society in later years.

Activities schools engage in that promoted pupils' emotional and social development

Learning and living in an environment that encourages healthy social relationships does not occur by chance. The school has to put into place certain activities and programmes as part of its curriculum requirements to shape the future development of the child. This study found some essential teacher activities that promoted pupils' emotional and social development. Among the teacher-based activities were: teachers meeting to discuss important and new instructional ideas; being regular and punctual at school, serving as role models, ensuring that lesson plans meet pupils' needs, and giving homework every day to pupils.

Teachers play a pivotal role in childhood development. Dworetzky's (1996) investigations showed that children in a particular elementary school who had achieved the highest grade and who in their later years of development demonstrated superior status as adults, all had one thing in common: namely, their first-grade teacher. As implementers of educational policies, teachers are expected to behave appropriately and to live above reproach. If the child is to grow up without exhibiting any antisocial or delinquent behaviour, then the teacher's attitude, in terms of his or her commitment, sensitivity to the child's needs and ability to structure the teaching and learning environment, becomes critical. This empirical study supports Dworetzky's results: the teachers who participated in the survey agreed that lesson plans ought to meet pupils' unique needs. Therefore teachers are not only expected to impart knowledge and skills, but also to encourage their pupils to do their best, have confidence in themselves, set high standards for themselves, and maintain them.

The pupil-based activities which were dealt with in the study had to do with the need for pupils to love one another, not using abusive words such as 'stupid', 'foolish', or 'idiot'; and to participate in school activities. In this regard, guiding participation during the activities of children as the primary role of the teacher (Fu, Stremmel & Hill, 2002) becomes paramount. The aforementioned corroborates Blair's (2002) position: close relationships with meaningful adults, including teachers, regulate children's own behaviour. Furthermore, positive peer relationships, both in and out of school, are important.

The study further revealed some services that the school under discussion made provision for, so as to enhance the emotional and social development of the pupils. The study found that the school engaged the pupils in various forms of activities, including sports, entertainment and cultural shows, educational field trips, and guidance and counselling services. It must be pointed out that all these activities have a role to play in children's emotional and social development. Educational or field trips, for example, expose children to a variety of events that shape their thoughts and emotional well-being and build their self-esteem and confidence. It must also be stressed that guidance and counselling services, if taken seriously, enable schools to help pupils (and for that matter adults) make well-informed life choices. According to a UNESCO Report cited in Guez and Allen (2000), through the services rendered by guidance co-ordinators, pupils' social and emotional needs are addressed. The UNESCO report emphasised Good and Brophy's (1994) suggestion: key elements of successful child socialisation include modelling, communication of positive expectations, and reinforcing desired behaviour.

Measures suggested to enhance child development

This study brought to the fore some suggestions from teachers that could be considered in order to enhance childhood development. These included the need to invest in children now (not when they become adults or reach school age) and also to develop training programmes for parents and professionals. The early years of life are a period of considerable opportunity for growth – but also, on the other end of the spectrum, a period of great vulnerability to harmful influences (Laurie et al., 2003). This implies that children's development should not be taken for granted. The empirical results in this study again support The UNESCO Policy Briefs on Childhood (2002) which emphasise the need for childhood development to involve a series of learning processes about the environment and themselves.

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

The findings of this study have confirmed earlier findings: later social and emotional development is predicated by childhood experiences. This study has revealed the important role that teachers play in fostering the positive emotional and social development of children. It has also revealed that schools have to consciously put in place certain measures to promote the development of children. It has further underscored the importance of teachers' attitudes. Indeed, as teachers develop a keen interest in and affection for their pupils, guiding them in their play, comforting

them when they feel hurt, and drawing them closer when they feel isolated, they help their pupils emotionally and socially. Children's development must not be left to chance. They must be properly guided to grow into responsible adults. This implies that schools should be well equipped with qualified teachers to handle pupils' emotional and social needs.

It is therefore imperative for schools to have policies on childhood development. The policies should cover teacher-child relationships, health and safety, and strategies for conflict management. Schools should display these policies on their bulletin boards and ensure that every teacher abides by them. Activities (e.g. sports, entertainment and mentorship) that promote the child's social welfare and emotional development must be given priority in all primary schools, both public and private.

The basic school curriculum should place emphasis on childhood development. The curricula of educational institutions, such as colleges of education and universities, should also emphasise childhood development in their courses. Issues related to emotional and social skills should form the basis of courses in teacher preparation. Also, prior to placement, prospective teachers should be encouraged to pay regular visits to pre-schoolers and primary schools so as to familiarise themselves with school activities that promote childhood development. This will help them identify practices that work, in order to strengthen their training. Schools' co-curricular activities must promote social and emotional development, allowing pupils the opportunity to practice adult roles through role play, dramatisation and simulation.

The Ministry of Education should enforce the Code of Ethics. Teachers who are less inclined to heed children's welfare should be sanctioned. There should be regular checks on teacher criminal records. Teachers who have any records of child abuse, such as child neglect and/or abandonment, as well as insensitivity, should not be permitted to teach at the early years. Teachers' lifestyles should be exemplary in order for them to be effective role models.

Lastly, pupils should be encouraged to behave properly. A reward system can be implemented, whereby pupils who exhibit exemplary behaviour are recognised. This will motivate others who want to be the recipients of such awards to behave well in class and school. If children are to be expected to grow up socially competent and emotionally well balanced, then what schools do during the early years of childhood development is crucial.

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INTEGRATION OF INFORMATION AND COMMUNICATIONS TECHNOLOGY AS A TEACHING AND LEARNING RESOURCE IN PRIMARY TEACHER EDUCATION IN KENYA

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ABSTRACT

Kenya aspires to harness science, technology and innovations in order to be competitive both regionally and globally. This can be achieved more effectively if learners in teacher education training institutions are developed into critical citizens of the digital world. Teachers should be prepared to use information and communication technology (ICT) as a teaching and learning resource. An innovation in education that is not backed by the teacher is bound to fail. Therefore, the main concern of this paper was to investigate whether primary school teachers in Kenya were prepared during pre-service training to use ICT as a teaching and learning tool. Case study and content analysis methodologies were adopted. Data were gathered using questionnaires. It was found that the primary teacher education (PTE) syllabus and the teachers' guide were not designed to develop trainees' skills in the use of ICT as a teaching and learning resource, and that the computer literacy skills of the tutors and the trainees were low. It is recommended that the PTE syllabus should be revised, and ICT be treated as a teaching and learning resource. Both tutors and students should be equipped with computer literacy skills, and the skills to use the computer as a teaching and learning resource.

Key words: information and communications technology (ICT), primary teacher education (PTE), integration, technology, education, digital world, teaching, learning, knowledge, skills, knowledge construction, curriculum

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INTRODUCTION

Kenya aspires to scale up its economy and provide a high quality of life for all citizens, as spelt out in the Kenya Vision 2030, which is the country's blueprint for the next decade. The country, according to the Kenya Vision 2030, intends to harness science, technology and innovations for regional and global competitiveness (Republic of Kenya, 2007). The vision also emphasises a Knowledge-Based Economy (KBE) and advocates for the application of science, technology, innovation (STI), and knowledge-based skills that call for the development of expertise in the construction of knowledge, creativity and innovation. The jubilee government proposed to initiate a project to introduce the use of laptops in learning, right from primary school class one, as of January 2014. The success of any educational innovation depends on teachers' readiness to implement the reform (Desimone, 2009). A critical stage in any innovation should be teacher preparation, in order to equip the teacher with the knowledge and skills required for improved instructional and learning outcomes (Kenya Institute of Education [KIE], 2002; Darling-Hammond, 1999).

There have been initiatives in Kenya such as the digitisation of school syllabi by the Kenya Institute of Curriculum Development (KICD). In 2009 the KICD launched the first phase of a curriculum digitisation project aimed at enabling both public primary and secondary schools to start offering e-learning (Okuttah, 2013). A teacher preparation programme that would have run parallel with both e-learning and laptop initiatives would have been ideal. Teachers should also have been prepared for these initiatives during their pre-service training. The KICD also developed information and communications technology (ICT) curricula for primary teacher education in 2004 (Ministry of Education, Science and Technology [MOEST], 2004) and a teachers' guide in 2005.

This study sought to establish whether the curricula developed for primary teacher education in 2004 and the teachers' guide developed in 2005 were organised in a manner that was suitable to prepare the student teachers in primary teacher training colleges to use ICT as a teaching and learning resource. There were reports of poor learning outcomes at primary level (Kenya National Examinations Council [KNEC], 2010) wherein the student teachers were to work after graguation. There were also allegations that the use of teaching and learning resources at primary schools was poor (Kisirkoi, 2012). There were many claims that ICT can and should provide rich, interactive teaching and learning resources that improve instructional and learning outcomes (Bitner & Bitner, 2002), which would serve well in the innovations.

Primary teacher education in Kenya and information and communications technology

The majority of primary school teachers in Kenya are trained in primary teacher training colleges, where they take a two-year residential certificate course. They are trained by teachers who are Bachelor of Education recipients, and who are trained to teach in secondary schools, with no preparation for teacher training. The Kenyan vision to harness science, technology and innovations for regional and global competitiveness would be achieved more effectively if trainees in teacher education institutions were developed into critical citizens of the digital world, wherein an understanding of technology is crucial. All teachers should be prepared to use ICT as a teaching and learning resource in learner-centered teaching and learning approaches, in order to enhance learners' innovativeness and knowledge construction when they practice teaching.

Constructivists contend that learning experiences should be authentic and should produce real-world learning environments that allow the learners to construct their own knowledge (Duffy & Jonassen, 1992), rather than make learners mere knowledge recipients. Construction of knowledge is an approach possible with the use of ICT. The student teachers at pre-service level would need to be equipped with ICT skills to be used in classroom teaching, presented as a teaching and learning resource. The student teahers would use the ICT integration skills they acquired in college when they start teaching, and also in their daily activities, integrated seamlessly. Training of teachers to use ICT as a teaching and learning tool is critical for teacher training at all levels.

Integration of information and communications technology in curricula

Integration of ICT in curricula entails the use of ICT to facilitate classroom instruction, where the basic requirements include computer literacy and the ability to use the computer and other ICTs to enhance classroom teaching and learning. The teacher requires a thorough understanding of the content to be able to break it down and design ICT-supported teaching and learning resources. Use of ICT as a teaching and learning resource to support learners' learning has been found to increase learning outcomes significantly (Bitner & Bitner, 2002). Among its many other benefits, ICT caters for varied learning styles and individual learning differences. It addresses different learners' senses, allows knowledge construction, engages the learner, makes learning learner-centred and eases the heavy teaching and learning data management

load. Technology supports the learning of all categories of learners, including those with special needs and those who are gifted or especially talented.

Kenya recognises the great role ICT plays in enhancing learning. However, the problem is that Kenya claims to have digitised primary and secondary curricula despite the fact that teachers in most schools have shown signs of ignorance regarding the use of ICT as a teaching and learning resource. Others have been reported to lack computer skills, face challenges of technophobia, lack electricity, and also face computer shortages and insufficient troubleshooting skills (KIE, 2005). These allegations threaten the proposed projects for the use of laptops and e-learning, and called for investigation.

Modern technologies, such as the computer and the internet, present some of the richest teaching and learning resources available. The current trend in education has made the Kenya Ministry of Education advocate for the seamless integration of technology into education for effective instruction and management of learning. ICT in education is useful for several purposes, such as enhanced classroom instruction and effective management of students' records. Modern technology, such as the computer, could be used by teachers to process their students' assessment results. For example, a computer would allow a teacher to work out (from raw data) the percentages, ranking, grading and Z-scores for a test quickly and effortlessly. Computers can also be used to create instructional materials or to locate ready-made educational resources on the internet for use in instruction. Technology also allows the development and enhancement of learner creativity and innovation by making learning interactive. This makes the educational process learner friendly, and enhances problem posing, problem solving and the development of critical thinking skills.

Technology supports the constructivists' view that learning experiences should be authentic and produce real-world learning environments that allow learners to construct their own knowledge (Duffy & Jonassen, 1992). The internet allows interconnectivity and eases communication through the use of lists on servers to send bulk emails; it facilitates discussions, conferences and chats on topical educational issues and in e-learning. It increases learner achievement, raises creativity, innovation, motivation and enthusiasm. Students receive immediate feedback and also receive individualised instruction.

Technology can be used to show laboratory experiments in scientific subjects such as Chemistry, Biology and Physics. Computer-aided learning can be used to teach subjects such as Literature, Geography, History and Mathematics. Multimedia

software provides learners (especially in subjects such as English) a rich linguistic learning environment that accommodates their needs by providing animations, videos and graphics to demonstrate difficult concepts as well as clear audio to model pronunciation (Duffy & Jonassen, 1992). Computer simulations and animations can be used to explain and illustrate difficult concepts and to make abstract knowledge concrete in very many subject areas (Bitner & Bitner, 2002). In Biology, cross pollination and germination of different seeds can be demonstrated. Computer games could be designed to improve learners' knowledge in areas such as spelling, or to test knowledge in other subjects and disciplines, and also for learners' enjoyment (Duffy & Jonassen, 1992).

In e-learning programmes, networked computers can facilitate interaction between learners and the teacher. Learners can ask and answer questions instantly so as to participate effectively in the learning process. The teacher could download materials from the internet, print and give them to the learners to work on; or if an internet connection is permanently available, upload them for use by learners in electronic form. The learners could also interact with the teacher and with each other. E-learning provides more extensive international collaboration opportunities for learners and teachers through web chatting, posting of assignments, online learner-to-learner chats and discussion fora (Bitner & Bitner, 2002).

STATEMENT OF THE PROBLEM

Kenya had planned to introduce laptops to primary school class one pupils from January 2014. In the Kenya Vision 2030, the country aspired to harness science, technology and innovations for regional and global competitiveness by the year 2030. The major issue of concern was whether teachers would be prepared to use ICT as a teaching and learning resource during pre-service. Other greater concerns were reports about the limited computer literacy levels of college tutors and of teachers in schools. In the revised primary teacher education syllabus (MOEST, 2004) ICT was introduced as a subject, but the issue of concern was whether it was organised and presented to teacher trainees as a teaching and learning resource. This necessitated investigation.

One way in which teachers could be thoroughly prepared to use ICT as a teaching and learning resource is to integrate it in the primary teacher training curriculum, presenting ICT as a teaching and learning resource during pre-service, and then conducting continuous teacher professional development for ongoing support of the teacher. The Kenya Institute of Curriculum Development (KICD) had digitised school

curricula from early 2000 and the project was launched in 2009. The KICD conducted an initiative to introduce e-learning to both primary and secondary schools (Okuttah, 2013). These commendable initiatives raised awareness and led to a desire to find out whether the college tutors and trainees, as the curriculum implementers and determinants of success of the educational innovation, were targeted for preparation.

In the KICD curriculum development process, teacher preparation is a critical stage, and since the institute started curriculum digitisation, it was expected that teacher training curricula should have been an initial target. The KICD had reported that plans were underway to train teachers at the initial stage of the laptop project, using a cascade model (Okuttah, 2013). The concern of this study was whether teacher trainees were prepared to implement the innovations. More specifically, it was not clear whether ICT was integrated in the primary teacher training colleges' curricula and in the teachers' guides, and therefore this study set out to establish whether or not this was the case.

OBJECTIVES OF THE STUDY

The objectives of the study were to:

- Investigate whether the pre-service primary teacher training syllabus and the ICT tutors' guidelines presented ICT courses as a teaching and learning resource
- Establish the computer literacy levels of computer tutors and trainees and their perception of the integration of ICT in curriculum
- Establish whether the teacher trainees were prepared to develop teaching and learning resources using ICT

MATERIALS AND METHODS

The methodologies employed were case study and document analysis. Questionnaires were used to collect data. Some verbatim utterances of teachers were also recorded unprocessed. One teacher training college out of the total 17 public primary teacher training colleges was studied in depth, and the issues focused on were contemporary and dealt mainly with answering the question 'How?' (Yin,2009). The syllabus documents and the guides used in primary teacher training colleges in Kenya were analysed. Questionnaires were used to gather data from the trainees and the tutors on how the curriculum was presented. A case-study approach was found to be appropriate as it allowed for a detailed study of a selected case critical to investigating the phenomenon under scrutiny (Creswell, 2009).

Document analysis was also employed. The documents analysed were used in all primary teacher training colleges, and hence were standardised. Kenyan primary teacher training colleges and schools follow a standardised curriculum, developed by the Kenya Institute of Curriculum Development. The curriculum is examined uniformly by the Kenya National Examinations Council (KNEC). Teachers who implement the curriculum are employed by one employer, the Teachers' Service Commission of Kenya (TSC), and the minimum qualification of a primary school teacher is a Primary Teacher Education Certificate. The implementation of the curriculum is supervised and monitored by the Quality Assurance and Standard Officers from the Ministry of Education (MOE). Teachers trained to teach in secondary schools train primary school teacher trainees, having had no induction to teacher preparation. Due to the stated standardisation, one college could safely be used to represent all others.

In this study, one teacher training college was selected for in-depth study. Data were collected from the trainees and the tutors from the selected college, to find out whether ICT was presented as a teaching and learning resource. The study of one primary teacher training college was found to be representative of educational experiences in the 17 other primary teacher training colleges in the country. The document analysis was also appropriate, because the syllabus and the teachers' guide, which needed to be studied to establish whether ICT was presented in a manner that would be likely to guide teachers to use ICT as a teaching and learning tool, were standardised. Questionnaires were used to gather data from the college tutors and the teacher trainees. The 2004 Primary Teacher Education syllabus, volume one (MOEST, 2004), which contains the ICT syllabus, was studied in order to establish its components and whether these present ICT objectives and content to prepare teacher trainees to use ICT as a teaching and learning tool. The teachers' guide developed in 2005 by the KICD to support the teacher in teaching ICT was also studied in order to establish whether it guided the teacher in approaching the ICT course as a teaching and learning resource.

TARGET POPULATION

The target population of the study was a total population of 500 student teachers and 20 tutors in the selected primary teacher training college. A total of 300 student teachers were in their first year and 200 were in their second year. There were 20 tutors in total, including one principal and one deputy principal. The summary of the target population is presented in Table 1.

Table 1: Target population

Type	1st year	2nd year	Total
Students/trainees	300	200	500
Teachers			20

Study sample

The study sample was selected from the target population. Students in the second year of the study were purposively selected to be used in the study because they had been in the college long enough to provide reliable data regarding their ICT experience in the college. They had studied ICT in their first year, and furthermore in their second year they were learning ICT as a core subject; hence they were familiar with the subject. A total of 20 student teachers from the second year group were randomly selected using simple random sampling. The one tutor of the ICT subject participated in the study and another five who taught other subjects in the college were selected, also using simple random sampling, making a total of six tutors who participated in the study. Table 2 presents the summary.

Table 2: Study sample

Type	1st year	2nd year	Total
Students/trainees	0	20	20
Teachers			6

The tutors and the teacher trainees filled in the questionnaires. The data were analysed and used to establish whether there was integration of ICT in teaching and learning. The findings were also used to establish whether ICT was used as a teaching and learning tool, and to investigate the tutors' and the trainees' computer literacy levels. In addition, the data were used to establish whether the teacher trainees facilitated the enhancement of teaching and learning resources using their acquired computer skills; a skill which, once acquired, they would in turn apply in their own teaching.

FINDINGS AND DISCUSSION

The findings of the study are presented as themes drawn from the study objectives.

Presentation of ICT course in PTE syllabus and teachers' guide

The ICT course was introduced in the latest revised primary teacher education syllabus in 2004 (MOEST, 2004). The topics for study are as follows:

First year: introduction to computers, computer systems, operating systems, maintaining and upgrading a computer, application systems and communication technology, application packages and word processing

Second year: spreadsheets, databases, graphics and presentation software, desktop publishing, the internet, data security and control

Each of the above is further broken down into sub-categories. The sub-categories under the topic 'the internet' are: definition of the internet; development of the internet; importance of the internet; internet connectivity; internet services; accessing the internet; electronic mail; moral, social and spiritual issues emerging from the internet; practical task.

There are no topics or subtopics presenting content and skills pertaining to preparation of the trainee to use ICT as a teaching and learning resource.

Specific objectives in a syllabus are expected to guide the college tutor regarding the scope and sequence of the content to be covered. The objectives also determine the strategies, methods and the teaching and learning resources the implementer will use. In a standardised curriculum, such as the one used in Kenyan primary teacher training colleges, the tutor cannot deviate from the standard. The specific objectives also determine the evaluation procedures. The specific objectives of the pre-service ICT teacher training course are listed below.

At the end of the topic the learner should be able to:

1. Define the term 'internet'
2. Explain the development of the internet
3. Explain the importance of the internet
4. Describe internet connectivity
5. Identify internet services
6. Access the internet
7. Use email facilities
8. State the moral, social and spiritual issues that may emerge due to the internet

The action words to guide the tutor and trainee are: define, explain, describe, identify, access, use, state. But the verbs do not guide either the trainee or the tutor in using ICT practically as a teaching and learning tool. It is only 'use' and 'access' that imply action but do not indicate 'how' ICT as a course is presented not as skill application but as knowledge acquisition. It has not been presented as a teaching and learning tool, and even the statements in which the outcomes are outlined are not clear. Clearly the objectives do not prepare student teachers to construct knowledge and use the computer practically as a teaching learning resource to enhance classroom teaching upon leaving college.

Syllabus content

The content of the syllabus that is intended to support the specific objectives is presented as follows:

1. Definition of the internet
2. Development of the internet
3. Importance of the internet
4. Internet connectivity
5. Telecommunication facilities – modems, internet providers, internet software
6. Internet services – email, world wide web, electronic commerce, electronic learning
7. Accessing the internet – log in, surf/browse, download information
8. Electronic mail – meaning of email, email software, requirements for connectivity

The content is only presented at knowledge acquisition level, rather than in a manner that prepares the trainees to use ICT as a teaching and learning tool. Trainees are required to absorb knowledge for examination purposes: they need to be able to name the parts of a computer and define concepts like the internet without necessarily being able to use or apply this knowledge.

The teachers' guide that was developed to support the ICT syllabus was also analysed to establish whether it guides the trainee to use ICT as a teaching and learning resource, and to develop teaching and learning resources using ICT. In the guide, the topics found in the syllabus have been re-organised according to sense and necessity. For example, the subject of the internet is brought to first-year level, because it is a resource that can be used for reference purposes, but the guide does not explain or illustrate how the internet can be used as a teaching and learning resource. The rest is a repetition of the syllabus, with some explanation of how to meet the objectives,

but these do not focus on guiding the teacher in the use of the internet as a teaching and learning resource.

The ICT guide treats integration as a topic on its own, but it does not clarify how to implement use of ICT as a teaching and learning resource. For example, the introduction to the guide reads as follows:

> Integration of ICT in education should help the teacher trainees adapt best practices in teaching and learning procedures and in daily lives. This topic gives insight into the perspective of ICT as a skill that should be applied in the teaching and meeting [of] learning objectives in other subjects in the curriculum. The teacher trainee should be guided to discover and understand the importance as well as the process of integrating ICT across the school curriculum. The student teachers should be clear about that *ICT integration in curriculum*. ICT integration in teaching of other subjects will ensure that that teaching and learning are more effective, efficient and interactive (KIE ICT Teachers' Guide, 2005: 12).

The specific objectives also do not guide the teacher in the use ICT as a teaching and learning resource. Examples follow below:

1. The objective that the learner should be able to 'use ICT as a tool for teaching' is too broad and unclear. The specific requirements to enable one to use ICT as a tool for teaching and learning need to be elucidated.
2. The objective that the learner should be able to 'select and install appropriate software packages' could be useful in ICT integration if it were practical and not theoretical. It is not clear how this will be achieved without provision of computers for the tutors and the student teachers. The expectation appears to be that it can be achieved theoretically.
3. The objective that the learner should be able to 'identify and use the right ICT tool and appropriate pedagogy in teaching different subjects' requires practice and, therefore, calls for ICT tools, knowledge and skills, and the right attitude. Teachers should first be made to appreciate the need to integrate ICT in education. They need wide exposure to ICT in its practical form. Teachers need to be enabled to change their attitudes and belief systems for the successful use of ICT in teaching to occur.

Practical tasks

The following practical tasks are provided for tutors, without guidance on their practical application:

1. Using a word-processing package to create templates that will help students to undertake a specified writing task
2. Setting up spreadsheets to help students explore relationships and patterns

The objectives in both the PTE syllabus and the teachers' guide are not aimed at preparing the learners to use ICT as a teaching and learning tool. The guide uses verbs in the statement of the objectives (i.e. define, explain, describe, identify, access, use, state) but offers no explanation. Instead, the guide prepares the student teacher only at the fundamental level: naming and defining the parts and functions of a computer. There is little material on how to actually use a computer and access the internet. Furthermore, teachers are not guided on the use of the teachers' guide itself in interpreting and implementing the syllabus as is expected.

Data were also collected to establish whether the syllabus and the teachers' guide have helped in using ICT as a teaching and learning resource. Tutors were asked whether the PTE syllabus and the ICT Guide cover ICT content and presents this as a teaching and learning resource. Table 3 provides a summary.

Table 3: Syllabus and ICT guide coverage of ICT content as a teaching and learning resource

Document	Very well covered	Well covered	Fairly well covered	Poorly covered	Not covered	Total
Syllabus	0%	0%	50%	3.3	46.7%	100
ICT Guide	0%	0%	2.7%	15%	82.3%	100

A large number (46.7%) of the tutors reported that the syllabus does not guide them in the use of ICT as a teaching and learning resource. The vast majority (82.3%) of the tutors believed that the ICT guide does not facilitate the use of ICT as a teaching and learning resource. It can be concluded that the syllabus and the guide are not preparing teachers to integrate ICT in teaching and learning.

Computer literacy levels of tutors and teacher trainees and their perception of ICT integration in the curriculum

Questionnaires were used to establish the computer literacy levels of the tutors and the teachers. One tutor's response is presented verbatim below (it was recorded for triangulation of findings):

> There used to be 15 computers, but there was poor maintenance and most of the times they were not working. In the course of time, they all disappeared. Two more were purchased. One is used by the ICT tutor and the teachers and the students use the other one.

There is only one ICT tutor in the college, and neither he nor the other tutors understand the concept of the integration of ICT in teaching and learning. Therefore, implementation and effective guidance of the trainees to use ICT in teaching and learning cannot be possible.

Table 4 presents a summary of computer literacy levels of the trainees and the tutors according to their own assessment of themselves.

Table 4: Computer literacy levels of tutors and trainees

Computer literacy	Literate	Moderately literate	Illiterate	Total
Tutors	10%	15%	75%	100
Trainees	5%	0%	95%	100

Most (75%) of the tutors reported that they are computer illiterate and could not assist the ICT tutor in use of ICT as a teaching and learning tool. The ICT tutor also cannot guide the tutors of other subject areas in the integration of ICT, as is required. The majority (95%) of the student teachers have no computer skills and imparting computer literacy skills to them would take a great deal of time and effort. The majority of the tutors and trainees are computer illiterate, making the possibility of ICT integration in instruction a challenge.

Tutors and students were asked the source of their computer skills and Table 5 presents their responses.

Table 5: Source of computer skills reported by the tutors and the students

Source of computer skills	Secondary school	Commercial college	Own tutorage	Total
Tutors	0%	50%	50%	100%
Students	13%	87%	0%	100%

Tutors were asked where they had learnt their computer skills and 50% reported that they had learnt in commercial computer colleges. An equal number had learnt on their own.

This shows that none of the tutors had learnt how to work with computers in school. A total of 87% of student teachers also reported that they learnt how to operate a computer in commercial places. Only 13% reported that they learnt to use the computer in secondary school. This information raises questions regarding the teaching of computer skills in schools, regardless of the fact that computer studies is offered as a subject in secondary schools. This scenario is in line with the 2013 report by Okuttah, as published in *The Daily Nation*. He reported that current statistics from the Ministry of Education indicate that less than 4% of public primary school learners have access to basic computer studies, and that only few public secondary schools have computers. This is a further indicator that the success hoped for by the KICD, in developing online courses for primary teacher orientation in curriculum interpretation and implementation, will be a great challenge.

Teacher trainees' preparation to develop teaching and learning resources using ICT

In most (90%) of the cases the student teachers had not grasped the concept of integration. The tutors did not use teaching and learning resources when teaching. One tutor reported to the researcher:

> We never manage to use teaching and learning resources in the course of teaching but we tell the student teachers how to prepare and use them. We find most of them using teaching and learning resources only during teaching practice.

The student teachers used teaching and learning resources mostly for teaching practice. Tutors did not generally use resources in teaching and hence they did not see the need to use ICT as a teaching and learning resource. They also argued that time was too short. The real reason for not taking ICT very seriously, as was reported by another tutor, was that the subject is not examined by the Kenya National

Examinations Council (KNEC). Therefore students were not motivated to excel and they argued that, after all, ICT is not taught in primary schools. One tutor confirmed this as follows:

> You see Madam, to tell you the truth, as long as ICT is not examinable by the Kenya National Examinations council, nobody will be serious with it.

Examinations tend to control teaching and the examination grade is seen as more important than the skill acquired.

CONCLUSION

The initiative to introduce ICT in primary teacher training colleges in Kenya is commendable, but it needs to be refocused if it is to develop the student teachers so that they are able to integrate ICT in instruction to enhance teaching and learning. The course as it is in the curriculum concentrates on development of ICT literacy skills and not the use of ICT as a tool to enhance teaching and learning. The course does not prepare teacher trainees for integrating ICT in the curriculum.

RECOMMENDATIONS

- The 2004 primary teacher education syllabus needs to be revised to target development of skills for ICT integration in instruction. A focused tutors' guide should be developed, to guide tutors in ICT integration.
- Teacher training curricula for all levels of education need to include a component on integration of ICT in the curriculum and in classroom instruction.
- As a practice, teacher preparation needs to reflect the dynamism in society, and as the society turns digital, teachers should adapt: teaching and learning resources need to be computer based.
- The college tutors' and student teachers' beliefs regarding ICT as a teaching resource and the role of resources in the creation of friendly, exciting learning environments needs to be addressed. Awareness needs to be created around the fact that resources play a big role in enhancing learning outcomes.

- The tutors in teacher training colleges and the teacher trainees need to be trained to acquire computer literacy skills first. They will then need to be prepared to use ICT as a teaching and learning resource. The teacher trainers need to be assisted in acquiring computer literacy as a first step. They must then be familiarised with the use of ICT as a teaching and learning tool for themselves before they can be expected to integrate ICT into the curriculum effectively. Tutors should not be allowed to train others until they are completely ready and appropriately qualified to do so.

- Tutors' and students' attitudes and beliefs regarding ICT as a subject that is not externally examined should be addressed. The tutors require induction in the use of ICT as a teaching and learning resource. They should be required to understand that computer skills acquisition is a form of empowerment. Besides its uses in teaching, it can enable them to streamline and simplify activities such as record keeping and administration (e.g. tabulation of test scores, giving students assignments, preparing teaching aids, assisting students with special needs). ICT can also be made use of in the development of critical thinking, knowledge construction and problem-solving skills. Curriculum implementers need to appreciate the fact that the computer and other multimedia devices could help in addressing learners' individual differences and their different learning styles. They could use animation and simulation to raise learner enthusiasm and motivation in class, which are important variables in teaching and learning.

- Teacher trainees and tutors should be prepared to develop teaching and learning resources using ICT in real-life situations, and to use them consistently in class.

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USE OF DISTANCE EDUCATION FOR TEACHER TRAINING AND DEVELOPMENT IN MALAWI: MODELS, PRACTICES, AND SUCCESSES

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ABSTRACT

This article argues that the distance education (DE) delivery model has the potential to offer education and training to a greater majority of Malawians who, for one reason or another, cannot be accommodated in the traditional face-to-face delivery model. Motivated by the need to understand the delivery models employed by DE institutions in the country, the technologies they employ, and the need to gauge major successes of this model of provision, an audit study involving Mzuzu University, the Domasi College of Education, the Malawi College of Distance Education, the Department of Teacher Education and Development, Chancellor College, the Malawi Polytechnic, and Aggrey Memorial School was conducted in 2012. This was necessitated by the need to establish the nature and efficacy of distance education in Malawi. The major finding of the study is that, although this model of delivery has allowed access to education and training for people who otherwise would have been denied the opportunity because of the restrictive nature of the face-to-face delivery mode, DE institutions in Malawi continue to face challenges pertaining to the use of basic, rudimentary and often obsolete technologies, which make the delivery model cumbersome for both tutors and learners. The implication is that the full potential of this delivery model has been attenuated by the use of such instructional technologies. The paper recommends that Malawi must invest in the requisite infrastructure and appropriate technologies to enhance the efficacy of distance education and e-learning as a means of broadening and increasing access to education and training.

Key words: distance education, residential face-to-face, education and training, access, efficacy

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INTRODUCTION

According to UNESCO (2002: 22) distance education is any educational process in which all or most of the teaching is conducted by someone removed in space and/ or time from the learner, with the effect that all or most of the communication between teachers and learners is through an artificial medium, either electronic or print. UNESCO (2002) further contends that the rationale for distance education from its earliest days has been to create the opportunity for learners to study regardless of geographic, socio-economic or other constraints (i.e. openness). This is the sense in which the term 'open and distance learning' is understood and used in this paper.

Distance Education in Malawi started in 1965 with the establishment of the Malawi Correspondence College. In the same year, the Schools Broadcasting Unit was set up to augment printed instructional modules by airing instructional programmes for primary, secondary and teacher education. The college and the broadcasting unit merged to form the Malawi Correspondence College and Broadcasting Unit in 1973, and in 1987 this establishment changed its name to the Malawi College of Distance Education. The idea of establishing a Malawian correspondence college was first captured by the Nyasaland (Malawi today) Development Plan of 1962-1965, which aimed at addressing the challenge presented by only a tiny fraction of primary school leavers continuing with secondary education; the need to improve the quality of teachers in primary schools through in-service training (thereby improving the standard of primary education); meeting the need for continuing education of the rural people; and fostering agricultural development, health education, and extension studies as a means of ensuring rural development (Nankwenya, 1974). In 1977 Aggrey Memorial School, a private institution for distance education, was established to offer both academic primary and secondary school educational courses, as well as professional/vocational education and training to a variety of artisans in Malawi (Msiska, 2013). However, this paper is about the use of distance education for teacher training and development in Malawi. The three notable public teacher education institutions using the distance education delivery model in Malawi are the Domasi College of Education, the Department of Teacher Education and Development, and Mzuzu University.

The Domasi College of Education started offering a Diploma in Secondary Teacher Education in 2000 in response to the need for upgrading primary school teachers teaching in community day secondary schools (CDSSs), which were created in 1999.

Confronted with the urgent demand for 8 000 qualified primary school teachers in 2009, and the need to reduce the qualified teacher-to-pupil ratio of 1:90 in 2009 to 1:60 by 2013 and 1:40 by 2017; the Ministry of Education, Science and Technology mandated the Department of Teacher Education and Development to start training primary school teachers using the distance education delivery model in 2010, alongside the residential Initial Primary Teacher Education Programme run by teacher training colleges. Following the realisation that the distance education delivery model would be needed to complement the traditional face-to-face model of provision to increase and broaden access to higher education and training, Mzuzu University established the Centre for Open and Distance Learning in July 2006 to plan, design, and develop instructional materials and delivery systems; and co-ordinate and facilitate all other activities necessary for offering programmes through the distance education delivery model. Mzuzu University enrolled the first cohort of distance learners in the Bachelor of Arts (Education) and Bachelor of Science (Education) programmes in November 2011, the second cohort in November 2012, and the third cohort in November 2013.

What was not entirely clear to most people by 2012 was the model each of these institutions used to provide teacher education and training, specific practices and technologies employed to facilitate provision, and the major successes of each of the institutions in their endeavours to provide education and training by means of this model. Furthermore, many people were not sure of the major challenges these institutions faced in providing education and training through distance education. There was, therefore, a need to carry out an audit in order to establish the nature and efficacy of distance education delivery models in Malawi.

AIM OF THE STUDY

The aim of this study was to document the start and development of distance education delivery models in Malawi, with particular focus on the models employed, the technologies used, the successes achieved thus far, and the challenges created by this model of provision.

OBJECTIVES OF THE STUDY

Specifically, the objectives of the study were to:

• Document the beginning and evolution of distance education and e-learning in Malawi

- Explain the various models, if any, of distance education employed by different institutions included in this study
- Assess the impact of distance education and e-learning on broadening and increasing access to education and training in Malawi
- Assess the degree of use of technology in the provision of distance education
- Outline major successes in distance education for the various institutions involved in the audit
- Identify major challenges confronting distance education delivery models at the institutions involved in the study

METHODOLOGY

This survey was a descriptive census of all known institutions offering teacher education and training through distance education and e-learning delivery models at primary, secondary and tertiary education levels in Malawi. According to Borg and Gall (1983: 406), Fraenkel and Wallen (2000: 432), and Ary, Jacobs, Razavieh and Sorensen (2006: 402), surveys can be classified according to their focus and scope (census and sample surveys) or according to time frames for data collection (longitudinal and cross-sectional surveys). Clearly, this was a cross-sectional census survey of all known teacher education institutions using distance education delivery models. The survey instrument comprised 10 items, soliciting information on the background and origins of distance education delivery models at the institution; the aim and objectives of starting distance education at the institution; the organisation and delivery of distance education at the institution; the extent to which the institution uses technology to deliver programmes through the distance education model; enrolment trends and completion figures from the start to the present day; the major successes of distance education; the major challenges faced; suggestions for expanding and improving the distance education model; evidence for increasing and broadening access to education and training; and future plans for growth and development of this model of delivery.

Data collection

To ensure uniformity of approach and consistency of the presentation of findings, the lead researcher (author of this article) conducted briefing discussions via email with each of the institutional researchers regarding the purpose of the study and use of the research instrument prior to the beginning of the study. Each

institutional researcher was required to confirm understanding of what information the instrument sought to solicit for the report. The main method of data collection was desk study, utilising a documentary search/analysis technique. This technique was complemented by focus group discussion, in the form of a one-day meeting of the eight institutional researchers presenting their findings, followed by a critical discussion of each institutional researcher's report. This helped to bring several different perspectives together, enabling the lead researcher to gain insight into how the institutional researchers were thinking and why they were thinking as they did (Ary et al., 2006: 481). The study ended with a presentation of the draft research report to a select team of stakeholders at a national dissemination seminar for the purposes of isolating issues surrounding distance education and e-learning in Malawi, building consensus on major challenges, and suggesting possible strategies for addressing these challenges. This constituted part of the methodology, in that after the dissemination seminar, the lead researcher incorporated suggestions from plenary discussions, in particular those relating to recommendations for addressing the identified challenges.

Data analysis

The bulk of the information generated by this study was qualitative, and as such reducing and organising the data, synthesising, looking for commonalities and discovering the emerging picture formed the larger part of the analysis (Ary et al., 2006; Fraenkel & Wallen, 2000). Qualitative analysis enabled the researcher to identify trends, good practices, technologies used, successes, delivery gaps, challenges and future needs of distance education and e-learning in Malawi. It also enabled systematic searching, the arranging of information in order to increase understanding of the data, and presenting what had been learned to the reader, a process Ary et al. (2006: 489) refer to as making successive approximations towards the goal of describing and explaining the phenomenon under investigation.

LIMITATIONS OF THE STUDY

Accuracy of information generated and presented by institutional researchers remains difficult to ascertain because each researcher worked alone and independently of others, despite the one-day meeting of the researchers. The issue is that different individuals perceive and interpret information differently. The meeting of researchers could not guarantee resolution of this problem because it was too short (one day) and each researcher selected what to share during

presentations. Consequently, the findings of this study can at best be suggestive as opposed to definitive.

FINDINGS OF THE STUDY

In spite of the numerous objectives of the study and the many institutions studied, this paper only presents and discusses findings related to models, practices, major successes, and the challenges of distance education in respect of the Domasi College of Education, the Department of Teacher Education and Development, and Mzuzu University, being teacher education institutions using this delivery model.

Models of distance education

The study revealed that teacher education institutions offering distance education learning delivery have essentially employed one model: that of blending face-to-face instructions with independent home study during the distance learning period. Of course, there are slight modifications to this model as one goes from one institution to the next, in terms of duration of face-to-face tuition and use of electronic media such as radio during the independent home-study period.

Distance education model at the Domasi College of Education

Within its model, the Domasi College of Education has eight weeks of residential face-to-face orientation at the college and 40 weeks of independent study at home in each academic year. During the face-to-face sessions, learners are introduced to the instructional materials in all the courses for the whole academic year. Study materials such as instructional modules, textbooks, and pamphlets are given to learners during this period. It is during the same period that lecturers/tutors distribute continuous assessment assignments to learners. On average, a learner collects two continuous assessment tasks for each course, to be completed during the 40 weeks of independent home study (refer to Msiska, 2013 for the full study report).

The Domasi College of Education, during the home-study period, encourages learners to form study circles, hold monthly seminars and meetings, and keep professional portfolios to ensure successful learning. A study circle is a small group of learners pursuing similar subjects/courses. The members work together on a particular learning challenge. Study circles are either informally organised or timetabled to meet on specific days, for example, every Friday. In principle, study

circles are meant to encourage active learning through group problem solving, reading and discussions. They provide a chance to participate in and contribute to the group's learning, ensure variety in the learning styles, and offer an opportunity to monitor performance and progress of other participating members. Seminars and professional meetings are held monthly, usually at the cluster leading school, and are co-ordinated by Field Supervisors. The purpose of these seminars and professional meetings is to discuss issues pertaining to distance learning support, clarity of subject content, efficacy of teaching methods employed, community projects/school-based activities, and professional topics as identified by learners, among others (Msiska, 2013: 56).

A professional portfolio is a collection of documents, sample performances and any relevant materials that show the range and evolution in a learner's work. It records professional accomplishments in the life of a learner (Woodley, 2005). During the home-study period, learners compile a portfolio of their studies based on specific guidelines given by lecturers/tutors. During successive residential face-to-face sessions, learners submit their portfolios to lecturers for evaluation and grading. Other activities during the home-study period include writing continuous assessment exercises and teaching practice. There is no use of radio and television to facilitate teaching and learning during the home-study period.

Distance education model at the Department of Teacher Education and Development

The Department of Teacher Education and Development manages the Initial Primary Teacher Education Programme delivered through a distance education delivery model in collaboration with teacher training colleges and the Malawi College of Distance Education. This programme blends residential face-to-face tuition, independent home study, and radio programmes. The face-to-face tuition runs for three weeks in three different months (August, December and April) in the academic year, when residential primary school student teachers are on holiday. The newly recruited primary school student teachers attend an orientation session in August, making use of a manual prepared for this purpose. During this orientation, the student teachers are taught basic teaching and study skills for use during the following independent home-study period. They are also given two assignments in each learning area, one to be done in the first term and the other in the second term of the school session. The April face-to-face sessions are meant to prepare students for the end-of-year examinations, which are held in June/July every year.

It should be emphasised that the independent home study takes place soon after the face-to-face session, which is followed by primary school student teachers being attached to schools for the purpose of teaching practice throughout the home-study period. The Ministry of Education, Science and Technology prefers that the distance education learners practise teaching in Standards 3 and 4 so that they have adequate time for their independent studies. During this same period, the Malawi College of Distance Education, in a partnership arrangement, broadcasts radio programmes (known as Tikwere) on local radio stations once a week for 30 minutes. These radio programmes provide extra information on primary teacher education principles and techniques, as well as providing details for administrative arrangements concerning assignment submission dates and feedback on assignments.

Distance education model at Mzuzu University

The teacher education programme through distance education at Mzuzu University also uses blended learning. Learners start with a four-week face-to-face orientation in each semester, meant to introduce them to distance education learning techniques and explain to them how to work their way through the instructional modules, including how to tackle continuous assessment assignments, how to handle self-assessment exercises at the end of each unit and the module itself, and how to approach end-of-semester examination questions. During the face-to-face orientation period, learners are given instructional modules and have the opportunity to use the university library. All other complementary instructional materials are given to learners during the face-to-face orientation. Since the instructional modules are not exhaustive, learners are encouraged to photocopy as many reference materials as they will require during the independent home-study period. All such photocopying is at the expense of the Centre for Open and Distance Learning. The orientation is also meant to provide an opportunity for the lecturers and students to go through materials deemed difficult for students to tackle on their own. For students studying basic sciences, Mzuzu University organises a summer school in the middle of each semester for the purposes of conducting laboratory experiments. This is done at the university, because satellite learning centres have not yet been established, although this is in progress (as will be explained later).

All this is complemented with 20 weeks of independent home study throughout the semester. The main support provided to learners when studying from home

is regular communication by means of short messaging services (SMS) for the purposes of providing administrative information relating to assignment due dates, summer school dates, examination dates, and responding to learners' anxieties where applicable. To ensure that lecturers attend to learners' requests, the Centre for Open and Distance Learning gives each and every lecturer an amount money to cover incidental costs of postage, SMSs, internet usage, etc. per semester. As in the case of the Domasi College of Education, radio and television are not used to facilitate teaching and learning.

Practices: technologies used to deliver teacher education and training

The study revealed that all teacher education institutions using distance education in Malawi employ basic, rudimentary and sometimes obsolete technologies like typewriters, photocopiers, and ink duplicating machines to deliver their programmes, except for the Malawi College of Distance Education, which airs 30-minute radio programmes for the Initial Primary Teacher Education Programme managed by the Department of Teacher Education and Development.

Malawi College of Distance Education

The Malawi College of Distance Education uses print, radio and CD-ROMs as the main instructional technologies for delivering its programmes. The predominant medium for course delivery is print, in the form of self-instructional modules, based on the existing school curricula.

Domasi College of Education

The Domasi College of Education has used print as the main medium of instruction since its establishment in 2000. It is only recently that the college opened 11 internet centres throughout the country to enable learners to access additional learning materials from the web and interact with tutors via email. Otherwise, there is no use of a web-based learning management system.

Mzuzu University

Mzuzu University also relies predominantly on printed instructional modules as its main medium of instruction. The internet is used mainly for searching for reference materials to complement instructional modules and complete continuous assessment tasks during independent home study, but only for those learners who have access to internet facilities. A Moodle Learning Management System is in the process

of being developed and the hope is that, when fully developed and functional, it will facilitate online access to instructional modules, links to assignment tasks, short tests, and online reference materials; as well as offering the opportunity for frequent contact between learners and staff during the independent home-study period through discussion forums. The point is that, while the country has internet connectivity, the university is yet to build the requisite infrastructure for carrying instructions through web-based technologies.

The Department of Teacher Education and Development

The Department of Teacher Education and Development admitted that, while blended learning offers one of the strategies helpful for learning (Msiska, 2013; Sethy, 2008), the concept is only partially applied in the Initial Primary Teacher Education Programme (IPTEP). Tuition is predominantly conducted through short face-to-face sessions, which run for three weeks in August, December and April every academic year. During the face-to-face sessions, use is made of basic equipment such as LCD projectors, audio tapes, video cassette recorders and television sets to deliver instructions. During the home-study phase, mobile phones are used by teacher training colleges that support IPTEP, but only for sending mass messages to students. Otherwise, there is no use of computer-mediated learning in the Initial Primary Teacher Education Programme.

The emerging picture suggests that distance education in Malawi is predominantly driven by basic and rudimentary technologies: computers for word processing, printing and ink duplicating machines, CD-ROMs, LCD projectors, audio and video tapes, and mobile phones for sending mass messages to learners. The radio is only used by the Malawi College of Distance Education in the Initial Primary Teacher Education Programme of the Department of Teacher Education and Development. This state of affairs makes the distance education delivery model very cumbersome for both tutors and learners, leading to the strong negative impression of education and training through distance education as more challenging and requiring extra effort. Hence, it may appear less attractive to prospective students than the residential face-to-face delivery model. For their part, lecturers/tutors are not able to update instructional modules in a timely manner, provide timely feedback to learners, or give regular support as learners progress through the study programmes. This tendency risks giving the unfortunate impression that the content and resulting learning are dependent on very few and poor resources, which are not readily updated; hence, not comparable to content and learning in

the residential face-to-face delivery model. Learners find themselves isolated from their tutors for the greater part of their home-study periods, making it very difficult to get the necessary guidance and support during the course of study, leading to frustration and learners dropping out of the study programme. More serious is that reliance on such media deprives learners of the possibility of enriching learning with the wealth of resources available on the internet, while at the same time limiting flexibility of study (Msiska, 2013).

Major successes in distance education in Malawi

Institutions were asked to outline what they consider to be the major successes of their distance education delivery model. The findings suggest that most institutions cited very modest successes, a reflection of the infancy of the distance education delivery model in Malawi.

Malawi College of Distance Education

The Malawi College of Distance Education cited training a cadre of secondary school teachers in instructional module writing, who have written all instructional materials for the Malawi College of Distance Education; building staff capacity in distance education administration and student support services through local and international training; offering education and training to many more Malawians (1 424 learners enrolled in 1965, which grew to 34 966 by the 1991/92 school session and 47 998 in 2011); and opening a total of 400 open secondary schools by 2012, having started with only 44 in 1998 (Msiska, 2013: 43, 87). This large number of people educated through the distance education delivery model negates the widely held view that people do not like this model of delivery (Msiska, 2013: 115). The experiences of the Malawi College of Distance Education serve to illustrate that distance education is feasible and can be used to broaden and increase access to education and training where the face-to-face residential delivery model serves only a tiny proportion of the population.

Domasi College of Education

The Domasi College of Education highlighted four major successes, one of them being the enrolment of female teachers and lactating mothers. The college has registered more female learners in the distance education delivery model than in its residential face-to-face delivery model. Lactating mothers are allowed to bring nannies with them to take care of children while mothers attend tuition during

orientation and write assessments during examination periods. This experience vindicates the claim that distance education can be used to accommodate learners with special circumstances (thereby broadening access). The second success is the provision of mentorship to other tertiary institutions for distance education. The Domasi College of Education was the first tertiary institution to offer a Diploma in Education using the distance education model. Based on its experience, the College has provided mentorship to a number of institutions in Malawi, including the Department of Teacher Education and Development and Mzuzu University. Thirdly, the college has increased enrolment into teacher education programmes as a whole, as shown in Figure 1.
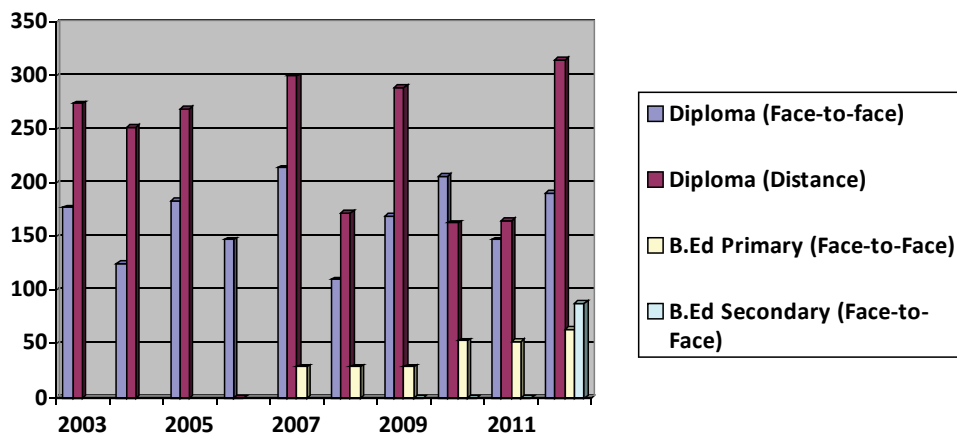

Figure 1: Domasi College of Education enrolment trends in open and distance learning and face-to-face delivery models (Msiska, 2013)

The fourth success is the creation of capacity through workshops, study tours and in-service training to deliver programmes through the distance education model. Consequently, the college is able to develop its own instructional materials for this model of delivery, manage programmes, and provide comprehensive support services to distance education learners.

Mzuzu University

The major successes of Mzuzu University include the establishment of the Centre for Open and Distance Learning, to plan, co-ordinate and oversee activities relating to distance education. The centre has facilitated training of staff in designing and

developing instructional materials for the open and distance learning delivery models. To date, instructional materials for the Diploma in Education have all been produced by its academic staff, and the University has enrolled three cohorts of learners (34 in November 2011, 150 in 2012, and 700 in 2013). By far, the major success has been the establishment of the UNESCO Commonwealth of Learning Chair for Open and Distance Learning. Both establishment of the Centre for Open and Distance Learning and Chair for Open and Distance Learning signify determination to institutionalise distance education models at the University.

Department of Teacher Education and Development

With regard to the Department of Teacher Education and Development, the introduction of distance education in the Initial Primary Teacher Education Programme has greatly contributed to the supply of primary school teachers, thereby reducing the teacher-to-pupil ratio. Since 2010, the delivery model has recruited 16 000 teacher trainees and attached them to selected primary schools in the country. As a consequence of this, the teacher to pupil ratio has been drastically reduced from 1:90 in 2010 to 1:60 in 2012. The target is a 1:40 teacher-to-pupil ratio by 2017 (Ministry of Education, Science and Technology, 2011).

Finally, the Initial Primary Teacher Education Programme has created 16 000 jobs for school leavers who otherwise could have been unemployed. This demonstrates that distance education has the potential for training the required personnel in a particular sector of the economy. The successes of the Department of Teacher Education and Development further underscore acceptability of the distance education learning model.

To sum up this section, the experiences of the Department of Teacher Education and Development, the Domasi College of Education, and Mzuzu University remind us of the need to harness this delivery model as a means of bringing education and training to the majority of our people; thereby broadening and increasing access to the education and training required for creating an open society necessary for the development of the nation and of individuals. The issue for Malawi, however, is that distance education seems not to have been given due prominence at policy level, and that budgetary allocation for this model of provision has been muted to say the least (Msiska, 2013: 116-119). It seems that these two tendencies have conspired to stifle the development of the distance education model of provision.

CONCLUSION AND RECOMMENDATIONS

Available evidence suggests that Malawi has used the distance education delivery model with relative success since 1965 at primary, secondary and tertiary levels of education and training, and that thousands of people have benefitted from this model of provision. Accordingly, this paper contends that it is a paradox to insist that the distance education delivery model is not popular with learners. Secondly, the study has revealed that a hybrid of face-to-face interaction and independent home study is the most commonly used model for provision through distance education. Within this design, institutions of distance education in Malawi continue to use basic, rudimentary and often obsolete technologies, which make the delivery model cumbersome for both tutors and learners, leading to the impression that education and training through a distance education model is more challenging than through the residential face-to-face model of provision. The implication is that the full potential of the distance education delivery model has been attenuated by use of such instructional technologies. This has denied thousands of deserving Malawians access to education and training. Given that only a very limited number of eligible school leavers access higher education and training in Malawi, the paper recommends that Malawi must invest in the requisite infrastructure and appropriate technologies to enhance the efficacy of distance education as a means of broadening and increasing access to education and training.

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TEACHERS' CONCERNS WHEN IMPLEMENTING INNOVATIONS: STRENGTHENING SECONDARY SCIENCE EDUCATION IN KENYA

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ABSTRACT

Change facilitators often presume that once an innovation has been adopted and the intial training has been completed, the intended users will put it into practice. However, implementation of an innovation is seldom simple without support. In 1998, Kenya adopted the Strengthening of Mathematics and Sciences in Secondary Education (SMASSE) in-service training programme, using a constructivist methodology to improve Science performance. The emphasis was on 'activity-focused methods, student-centred activities, experimenting and improvisation' (ASEI) through the 'plan, do, see, and improve' (PDSI) approach. The objective of this study was to establish the level of implementation of the ASEI/PDSI classroom practices innovation and the stages of concern of the implementers. The study also sought to establish how the teachers' concerns affect the implementation of the ASEI/PDSI classroom innovation. Concerns in innovations range from self, to task, and finally to impact levels. The survey design was used for a sample of 68 head teachers, 147 Science teachers and 10 trainers. The main instrument for the study was the Stages of Concern Questionnaire (SoCQ). The study established that the majority (75%) of the teachers, were partial implementers of the ASEI/PDSI innovation, and only 5% were full implementers. The majority of the teachers had concerns regarding self that affected the level of implementation and innovation; few had task and impact concerns. The study recommended that appropriate support be given to these teachers by the head teachers and Ministry of Education officials. This is likely to lead to interventions that will hopefully resolve their individual concerns and hence raise the level of implementation of the innovation.

Key words: implementation, teachers' concerns, in-servicing, science education, innovation

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INTRODUCTION

When organisations adopt innovations they do so with high expectations, anticipating an improvement in organisational productivity and performance (Klein, Conn & Sorra, 2001). One of the major innovations in Kenya's education system is the Strengthening of Mathematics and Sciences in Secondary Education (SMASSE) in-service training (INSET) programme, which started in 1998. It was an intervention in response to the declining quality of teaching and learning in Mathematics and Science education. The SMASSE intervention strategy was a pedagogical shift, and the phrase *activity-focused, student-centred, experimenting and improvisation (ASEI) through plan, do, see and improve (PDSI) approach* (SMASSE, 2008) was coined. The emphasis is on learner-centred pedagogy.

Despite the ASEI/PDSI classroom practice intervention, there was minimal change in students' performance in the sciences. The first cohort of teachers trained between 2003 and 2007 had been in the field for 10 years by the time of this study. Yet the Kenya National Examination Council (KNEC) results still indicated that the majority (over 60%) of the marks scored by the students at the end of national secondary school examinations were between D and D minus (KNEC, 2012).

The SMASSE Project was launched in 1998 as a pilot project in nine districts and expanded to the national level in July 2003. The INSET unit was then located at the Kenya Science Teachers College (KSTC). The project is under the care of the Directorate of Quality Control and Assuarance. The SMASSE project has had three main donors: the Japan International Co-operation Agency (JICA); the Ministry of Education (MOE); and the District Education Boards (DEBs), through levies provided by parents. JICA provided training of Kenyan counterparts in Japan, provided long-term and short-term experts for the programme, and supplied equipment and materials to the national and district level in-service training component.

The Ministry of Education provided salaries, travel, subsistence allowances and accommodation for national trainers. It also provided building to house the national and district level in service training. The District Education Boards gave allowances to the service trainers at district level (SMASSE, 2008. The District SMASSE in-service training cluster management also established resource centres where teachers could access information; obtain assistance; and use computer facilities, materials and various resources for teaching.

The Centre for Mathematics, Science and Education in Africa (CEMASTEA) acted as the national centre for in-service training for Mathematics and Science teachers. This was in order to improve their pedagogy and hence the performance in these critical subjects (SMASSE, 2008).

Science instruction has widely embraced support for 'hands-on', student-centred, inquiry-oriented programmes and constructivist classrooms (Brooks & Brooks, 1993). The constructivist approach to teaching and learning lays emphasis on critical thinking and problem-solving skills in students, by means of which they plan for, direct and create their own learning. Such a classroom demands a different role for the teacher. Brown and Adams (2001: 424) describe the changing nature of the teacher in constructivist learning environments: 'Teachers must shift their attention away from themselves as effective presenters of scientific information, towards a focus on student's developmental needs to learn science with understanding.'

One of the key objectives of the study was to determine the levels of concern of the science teachers during the implementation of ASEI/PDSI classroom practices. The study also sought to establish how the teachers' concerns affected the implementation of the ASEI/PDSI classroom innovation. ASEI/PDSI is a learner-centred teaching methodology in the sciences, which, if implemented effectively, should significantly improve the learners' performance in the Kenya Certificate of Secondary Education (KCSE) in Biology, Chemistry, and Physics. Ndirangu's 2006 study on the evaluation of SMASSE in-service training found that the implementation of ASEI/PDSI classroom practices had shortcomings and therefore the benefits of the innovation had not trickled down to the beneficiaries, namely the learners.

Concerns of implementers during implementation of innovations

Among the earliest research on teachers' concerns regarding the implementation of changes was carried out by the psychologist Fuller (1969), which presented a more clinical rather than a pedagogical point of view. The study established that the concerns of the teachers corresponded to their career stages: pre-teaching, the early teaching phase, and the late teaching phase. In the pre-teaching phase, the newly qualified teachers with no teaching experience seemed to exist in a place of unconcern. In the early teaching phase, the beginners expressed concerns about their ability to deal with class control and their preparedness to handle the content. In the late teaching phase, the senior teachers' concerns were about the pupils' learning.

As the body of concerns documentation grew, researchers hypothesised that there were definite categories of concerns among innovation adopters. Researchers have identified seven 'Stages of Concern' (SoC) about an innovation, through which individuals progress as they implement an innovation (Hall, Hord, George & Stiegelbauer, 2006). These have been summarised in Table 1.

Table 1: The stages of concern during the implementation of an innovation

Common effect	Stage	Name of stage	General characteristics of stage
Impact	6	Refocusing	The individual focuses on exploring ways to reap more universal benefits from the information, including the possibility of making major changes to it or replacing it.
Impact	5	Collaboration	The individual focuses on co-coordinating and co-operating with others regarding use of the innovation.
Impact	4	Consequence	The individual focuses on the innovations' impact on students in his or her immediate sphere of influence. Considerations include the relevance of the innovation for students, the evaluation of student outcomes, and the changes needed to improve the student outcome.
Task	3	Management	The individual focuses on the processes and tasks of using the innovation and the best use of information and resources. Issues relating to efficiency, organisation, management, and scheduling dominate.
Self	2	Personal	The individual is uncertain about the demands of the innovation, his or her adequacy to meet the demands, and his or her role within the innovation. The individual analyses his or her relationship with the reward structure of the organisation.
Self	1	Informational	The individual indicates a general awareness of the innovation and interest in learning more details about it. Any interest is impersonal.
Self	0	(Awareness) Unconcerned	The individual indicates little concern about or involvement with the innovation.

Source: Adapted from Hall, Hord, George & Stiegelbauer (2006: 8)

Teachers' concerns, identified through the profile interpretation method of analysis, are demonstrated in seven stages, which can be categorised into three major groups. These are: self-concerns stage at the lowest level, task concerns at the intermediate stage, and the final impact stage. The **self-concerns** stage includes unconcerned (0), informational (1), and personal (2). The **task concerns** stage

is management (3) and the **impact concerns** stage includes consequence (4), collaboration (5), and refocusing (6).

METHODOLOGY

Before establishing the level of concerns of the teachers, the study first established the extent to which ASEI/PDSI practices were implemented by the teachers. This was done using teachers' self-assessment and head teachers' assessment of the teachers' use of the ASEI/PDSI approach. .

The study used a survey design methodology. It adopted purposive, stratified random and simple random sampling procedures. To carry out the sampling process for the target population, the schools were categorised as high-performing, medium- and low-performing schools, with regard to the Kenya Certificate of Secondary Education national examinations mean Science scores. Stratified sampling based on this criterion identified 68 schools, whose head teachers participated in the study.

Purposive sampling of 147 teachers was carried out, targeting those who had attended the SMASSE in-service training. Simple random sampling was applied to select 16 key informants, namely the SMASSE Science district trainers. The data was collected using a published instrument, the Stages of Concern Questionnnaire (SoCQ), which comprised 35 Likert-scale questions. The questionnaire had a high internal reliability of 0.76 and therefore was appropriate for the study (Hord et al., 2006). The data was analysed using the Stages of Concern Profile Interpretation Analysis, which is one of the most frequently used methods of interpreting data from the SoCQ.

Further, to determine the level of implementation, the Science teachers were asked to indicate how they used the ASEI/PDSI classroom practice. The responses were categorised as: fully = 3, partially = 2, and not at all = 1. The same question was put to the head teachers in order to verify the teachers' level of implementation of ASEI/PDSI classroom practices. The categories used for the head teachers to assess the teachers were as follows: fully = 3, partially = 2, not at all =1, and undecided = 0. The results are presented in Table 2 below.

Table 2: Level of implementation of ASEI/PDSI by Science teachers

Assessment	Fully %	Partially %	Not at all %	Undecided %
Teachers	15	75	10	n/a
Head teachers	24	62	3	11

As can be seen in Table 2, self-assessment by the teachers indicated that only 15% of the teachers implemented the ASEI/PDSI classroom practices fully, while the majority of the teachers (75%) implemented it partially. These teachers implemented certain aspects selectively, hence partial use of the innovation. When the teachers were asked what they mainly implemented, the majority indicated aspects of improvisation with practical materials during 'some' of the practical lessons. They also used their newly acquired knowledge of difficult techniques in their subjects. One of the teachers who was observed during a Biology lesson was applying a technique (acquired during a SMASSE in-service training session) for a genetics lesson in Form 3, namely squashing of plant chromosomes in an onion root tip, with great success. Though the teacher had not prepared the ASEI lesson plan, the teacher had prepared a practical manual as required and the lesson that was observed was learner-centred.

With regard to the head teachers' assessment of the extent to which teachers implemented the ASEI/PDSI, the results indicated that 62% of the teachers implemented ASEI/PDSI classroom practices partially, 24% fully, and 3% did not implement at all. From Table 2, it is noteworthy that the head teachers were undecided regarding the use of ASEI/PDSI in 11% of cases. The results indicate that there is a slight difference between the head teachers' assessment and the teachers' self-assessment. However, the general consensus was that the implementation of the ASEI/PDSI classroom practices by the Science teachers was mainly partial. It was therefore important to establish why the teachers were not implementing the ASEI/PDSI innovation fully in their classrooms.

Teachers' stages of concern during implementation of ASEI/PDSI Classroom practices

The profile interpretation method of analysis groups teachers' concerns in seven stages. Each of the seven stages is represented by a percentile score. The higher the score, the more the individual is concerned about a particular stage.

The strength of the Stages of Concern Questionnaire, other than revealing concerns, is in determining how individuals make use of innovations. Inexperienced users will have high concerns at the informational and personal stages; experienced users will have high concerns at the consequences and collaborative stages; while non-users' concerns will be high in the early stages and low in the later stages. Figure 1 represents the summarised results of the stages of concern for all the Science teachers involved in this study.
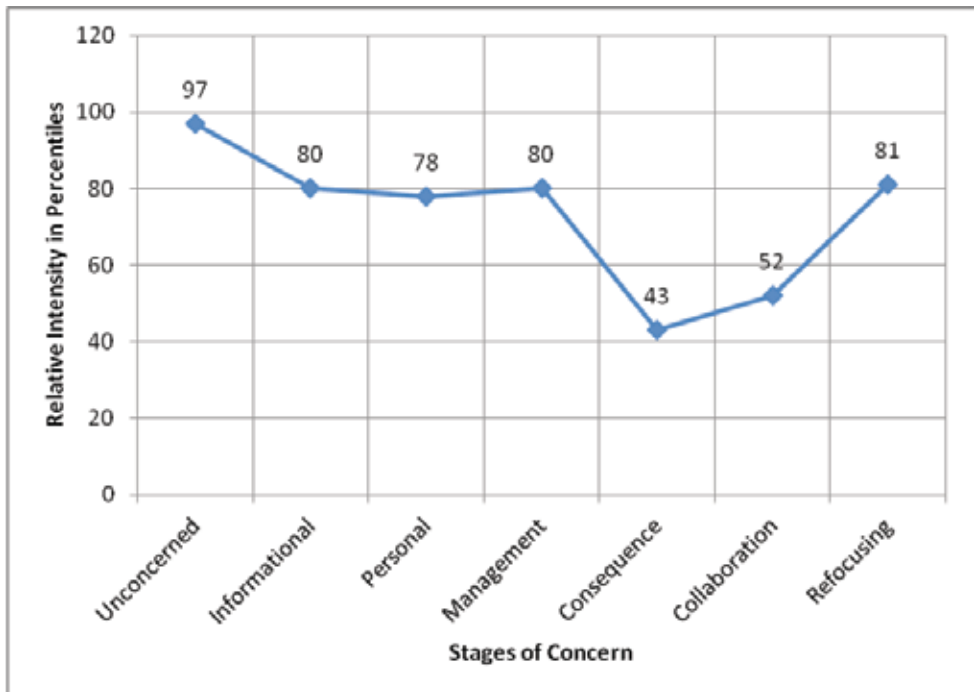

Figure 1: Summary of Stages of Concern Profile for all Science teachers in the study (N=147 teachers)

Figure 1 presents a summary of the stages of concern for all the Science teachers in the group. The data indicates that the highest percentile score is at stage 0 (unconcerned) while the second highest concerns are at stage 6 (refocusing). The percentile scores at informational (1), personal (2) and management (3) are also high.

The increase in concern at stages 5 and 6 of the Science teachers' profile provides additional information about the possible attitude of the teachers towards the ASEI/PDSI innovation. Moving up to the 81st percentile from the 52nd percentile is quite significant. This phenomenon is also a warning that the respondents might be resistant to the ASEI/PDSI innovation. This increase is drastic and should therefore be heeded as a warning when addressing resistance to the innovation.

Individual teachers' profiles in stages of concern

The following section presents individual profiles of stages of concern for teachers in Biology, Chemistry and Physics, operating at different levels of adoption of the ASEI/PDSI innovation. Below is an example of a Chemistry teacher's profile. This specific teacher is a partial user of the innovation.
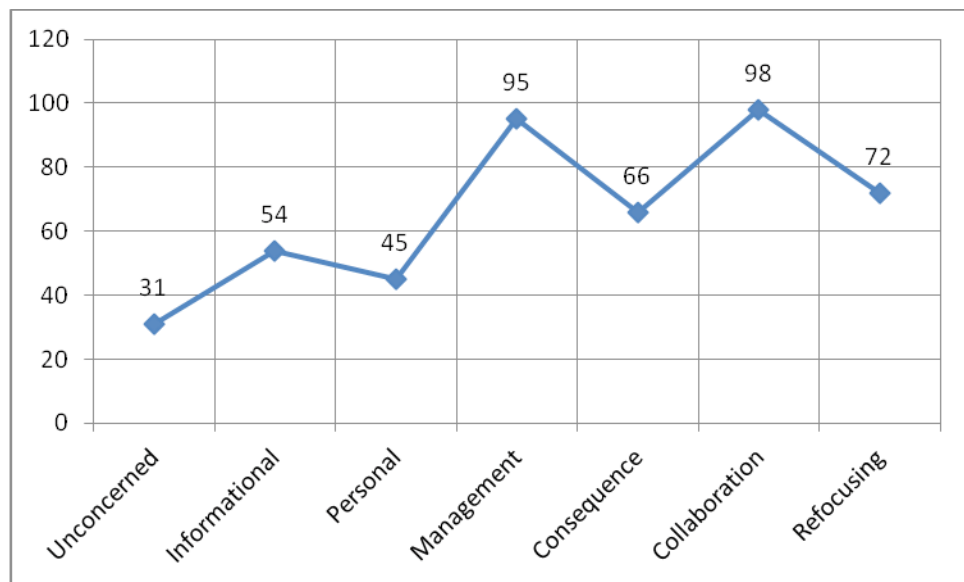

Figure 2: Stages of Concern Profile for a Biology teacher: partial user of ASEI/PDSI innovation

Figure 2 indicates that the Biology teacher had low concerns in the self-category, that is, stages 0, 1 and 2; and high concerns in the task stage (4) and impact stages (5 and 6). This implies the respondent is a partial or inexperienced user of the ASEI/PDSI classroom methods. The respondent's highest percentile score is at stage 5 (collaborative) followed by a high score at stage 3 (management), indicating that the respondent is a partial user who still has task concerns and yet also has impact concerns regarding the ASEI/PDSI innovation.

Below is a profile of a chemistry teacher who is a user of the ASEI/PDSI innovation.
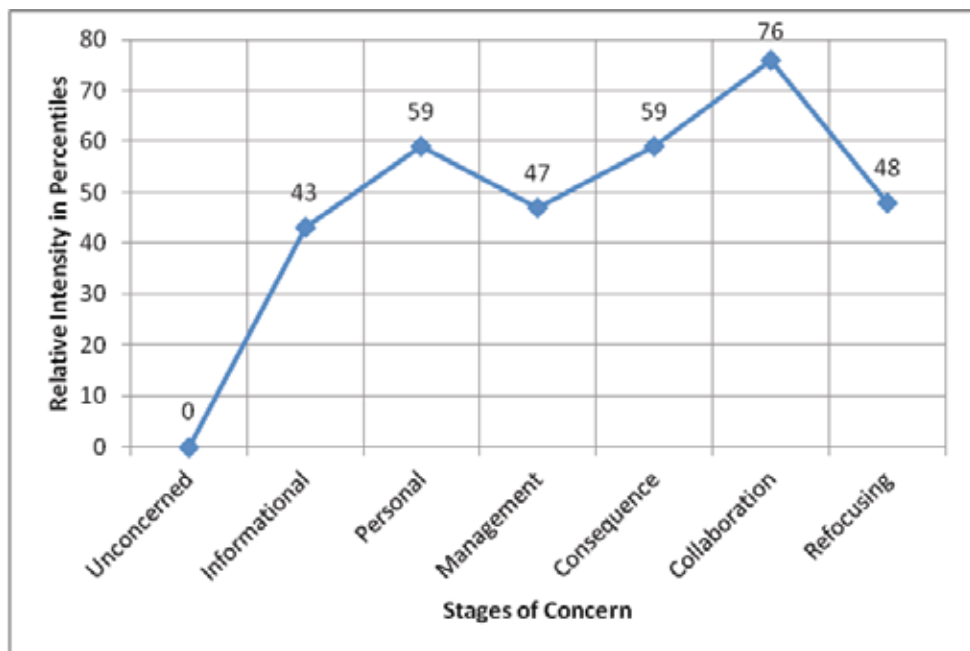

Figure 3: Stages of Concern Profile for a Chemistry teacher: user of ASEI/PDSI innovation

Figure 3 indicates the respondent is a holistic user of the ASEI/PDSI classroom practices. The respondent's profile peaks at stage 5 (collaboration) implying that the teacher is interested in working with colleagues and others in co-coordinating the use of the ASEI/PDSI innovation. However, the teacher still has management concerns. This respondent, a team leader at a training centre, spent much time

co-coordinating the SMASSE INSET activities throughout the year. The respondent explained that the centre remained open throughout the year for the teachers undergoing the SMASSE in-service training to borrow materials, and seek clarification on issues pertaining to the programme. This particular centre served 40 schools. The respondent reported that the majority of the teachers were implementing the ASEI/PDSI classroom practices partially, and there were some who did not use the innovation at all.

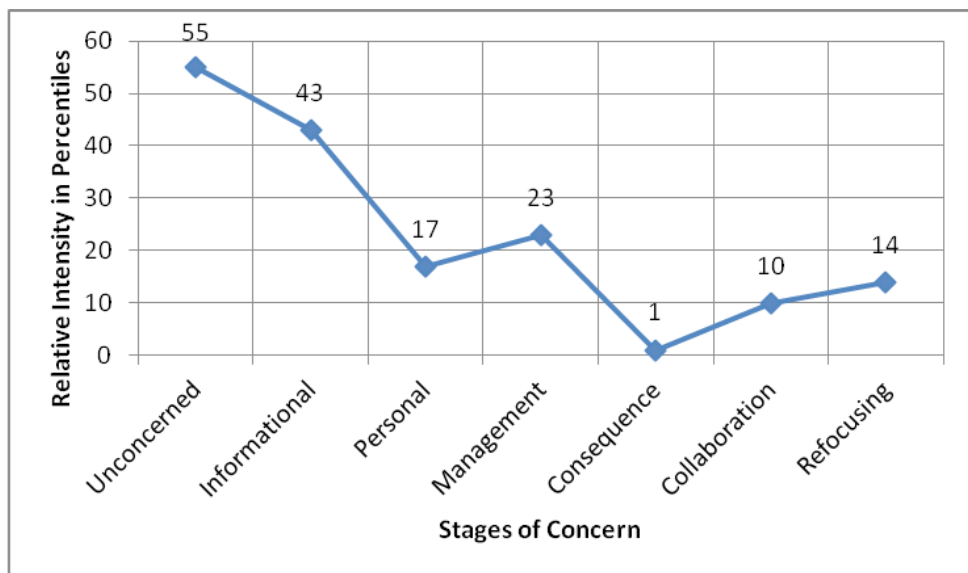Figure 4 depicts the profile of a non-user of the innovation.

Figure 4: Stages of Concern Profile for a Chemistry teacher: non-user of the ASEI/PDSI innovation

Figure 4 indicates that the Chemistry teacher's scores are highest at stages 0 (unconcerned) and stage 1 (informational), and lowest on stage 4 (consequences). This implies the respondent is a non-user of the innovation. The respondent's self -assessment confirmed that the teacher did not use the ASEI/PDSI innovation at all.

The profile of a Physics teacher who implemented ASEI/PDSI classroom practices fully and for an extended period is shown in Figure 5.
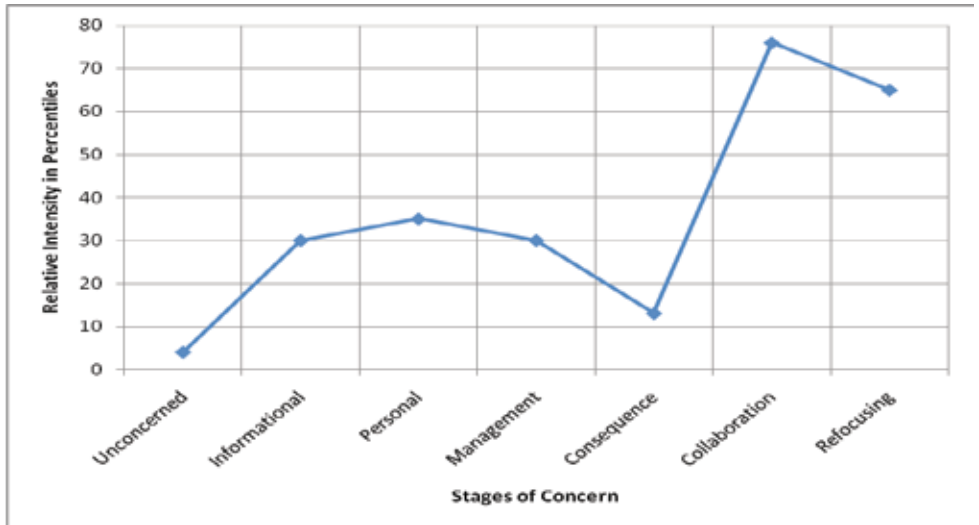
Figure 5: Stages of Concern Profile for a Physics Teacher: experienced user of the ASEI/PDSI innovation

The Physics teacher's profile indicates low percentile scores in the self-category of concerns, as well as in the third or management stage. However, the teacher had high percentile scores in stages 4, 5 and 6, which suggests that the respondent was an experienced user and was concerned about the impact of the ASEI/PDSI innovation. The highest percentile score at stage 5 implies the respondent's intense concerns were about collaborating with others in the use of the innovation. According to Hall et al. (2006), such a respondent is likely to be an administrator, co-coordinator or a team leader. The demographic data confirmed that the respondent was both a SMASSE District Trainer and a Dean of Studies and therefore co-coordinating others was a priority, as indicated by the high score at stage 5 (collaboration).

As mentioned earlier, the overall teachers' Stages of Concern Questionnaire group profile data indicate that the majority of the teachers in question were partial users of the innovation. This was further confirmed by their self-assessment, wherein the majority of the teachers indicated that they implemented ASEI/PDSI classroom practices only partially. This corresponded to the profile of inexperienced users in this study. However, among them were users with varied concerns about the implementation of ASEI/PDSI classroom practices. Concerns can be a highly

effective guideline for actions that facilitators might take in the implementation of change. According to Hord et al. (2006), the first step is to identify the intense concerns that individuals have, and the second step is to deliver interventions that might ease these concerns.

The change facilitators, such as the head teachers and the district trainers, should enhance the visibility of others who are excited about the innovation. In an interview carried out with some of the trainers, it was noted that many teachers were not enthusiastic about the training. They reported that most of the teachers made an appearance but did not participate in the activities organised by the trainers during the in-service training. One of them cited incidents such as '…trainees arriving at the venue but staying in the bus until time to go back to their homes at the end of the day for those who were commuters'. Others 'took very long breaks or refused to come back to the activities after a break or waited to sign in at the beginning of the sessions then left the premises soon after signing in' (Interview: SMASSE District Trainer).

Results suggest that this group of teachers may not have the necessary information about the innovation because they did not fully participate during the training. This is reflected by the high stage 2 scores (informational) of the Science teachers' profile shown in Figure 1, which indicates personal concerns were high (78%).

Respondents gave suggestions geared towards improvement in implementing the ASEI/PDSI innovation. For instance, one of the teachers had this to say: 'Fellow teachers should be counseled on the importance of their change of attitude towards implementation of ASEI/PDSI classroom practices.' When asked to indicate an opinion as to how the implementation of the ASEI/PDSI classroom practices could be improved, one respondent indicated, '…by all teachers practicing it from the heart rather than appearing to do it for the sake of doing it'. Some respondents further indicated: 'Teachers must change their negative attitude towards SMASSE in-service training.'

The study also revealed that the majority of the Science teachers in question had heavy teaching loads and other responsibilities. Many of them were also handling large classes. The teachers therefore indicated that they had little time left to prepare the ASEI/PDSI lesson plans. Comments such as the one below showed that the teachers felt the strain of overloaded timetables. One respondent noted that: 'It is not possible to apply ASEI/PDSI as the teacher will only be assessed in

terms of how many students pass, not how well they have understood the scientific concepts.'

Another respondent suggested that 'drilling was a better option', compared to pursuing the ASEI/PDSI approach. This opinion cannot compete with the constructivist methodology of learning, which the ASEI/PDSI approach has adopted for the teaching and learning of sciences.

Management concerns of the teachers were also high at 80%. The facilitators need to clarify specific 'how to' issues that often cause management concerns. On the other hand, many implementers indicated that they needed help in sequencing the activities and setting timelines for their accomplishments. Many of the teachers indicated that if they planned according to the ASEI/PDSI requirements, they would never complete the syllabus. Some mentioned that their heavy teaching loads did not leave them with time to prepare ASEI lesson plans, which are time consuming.

Consequence concerns for the majority of the teachers was the lowest score at 43%. There is a need therefore to understand why the teachers were not concerned with the impact of ASEI/PDSI on the performance of their learners. The low score could also be attributed to the teachers' focus on the role of the students, and of the administration, rather than on the process of being able to achieve good learning outcomes. For instance, one teacher commented: 'Students should be more positive about Science and the school should avail more resources to enhance use of practical lessons and improvisation.'

Collaboration concerns of the teachers were at 52%. The District SMASSE in-service training organises meetings with teachers from 40 different schools, where they can learn together and establish a network for future collaboration. The District SMASSE in-service training cluster management has also established resource centres where teachers can access various resources for teaching. This study revealed that the teachers were not making adequate use of this forum to establish networks. All four resource centres visited were under-utilised. The rooms were dusty and one of the facilitators lamented that the chemicals were expired because the majority of the teachers did not make use of the resource centre.

Refocusing concerns, stage 6, had the second highest teachers' score at 81%. This implies that the teachers had other ideas about the ASEI/PDSI innovation, whether positive or otherwise. The facilitators of change, such as the head teachers

and trainers, ought to encourage the teachers who may have better strategies for dealing with the innovation, to voice them freely. These individuals should be encouraged to channel their ideas and energies in ways that would be productive.

According to studies conducted by George, Hall, and Stiegelbauer (2006: 41-42):

> The tailing up and tailing down of the respondents curve at Stage 6 gives additional information about the attitude of the respondent toward the innovation.... When the respondents curve tails down at Stage 6, the respondent does not have ideas that would potentially compete with the innovation. When Stage 6 concerns tail up, one can infer that, the respondent has ideas that he or she sees as having merit rather than the proposed innovation.

The findings of the study indicated that 49% of the individuals in stage 6 showed tailing up while 51% showed tailing down at this refocusing stage. The tailing up, for most of the teachers, is more than 7%: the range needed to detect the overall concerns of the individuals as they implement an innovation (Hall, Dirksen & George, 2006).

The tailing up of the teachers who are non-users in this study, is a warning that the respondents might be resistant to the ASEI/PDSI innovation. This tailing up is considered severe and should therefore be heeded as a warning: resistance to the innovation should be addressed. The teachers seem to be resisting the use of the ASEI/PDSI classroom practice. Supporting data indicated that at least 30% of the teachers had negative attitudes towards the use of the ASEI/PDSI classroom practices.

RECOMMENDATIONS

The study makes the following recommendations:

- The management of the SMASSE in-service training programme at the national level, and the Quality Assurance and Standard Officers of the Ministry of Education in Kenya, should address the root cause of the teachers' concerns. Most of the concerns were traced to the in-service training phase. There is therefore a need to assess the training strategies of the trainers.
- The government should employ more teachers to reduce the student-to-teacher ratios and consequently reduce the teaching load. This will give teachers ample

time to prepare for ASEI/PDSI lessons. This will also facilitate students being put in manageable groups to apply the learner-centred approaches that the innovation recommends.

- There is a need for facilitators of change, both at the training and the implementation stages, to legitimise the existence of the implementers' concerns and allow the expression of their personal concerns. The facilitators should also establish whether the programme's expectations are attainable when they recommend the ASEI/PDSI innovation.

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CAUSES OF TEST ANXIETY AMONG STUDENTS IN THE FACULTY OF EDUCATION, UNIVERSITY OF CAPE COAST, GHANA

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ABSTRACT

Tests are invaluable tools to educators but their over-dependence on tests in recent times has heightened the negative impact of test anxiety on its victims. Though the causes of test anxiety are many and varied, understanding them could greatly help bring the rather perturbing test anxiety situation among students under control. The study was a descriptive research design involving a sample of 376 first- and final-year students, purposively selected from 2 871 students in the Faculty of Education at the University of Cape Coast, Ghana. Data was collected by means of a structured questionnaire, which had a Cronbach alpha reliability coefficient of 0.80. Focus group discussions were also held separately with students in each year group to gather further data. Questionnaire results were analysed as to frequencies and percentages under a two-point scale of 'Agree' and 'Disagree', while responses from the focus group discussions were transcribed and summarised under two relevant themes on test anxiety. The study revealed that fear of examination failure, poor preparation for tests and the rigid grading system at the University of Cape Coast are typical causes of test anxiety among students. It is therefore recommended that counsellors at the University teach students good study habits and encourage them to commence serious studies immediately when school reopens.

Key words: test anxiety, examination, nervousness, counselling, students, fear, failure, worrying, panicking, sweating

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INTRODUCTION

The use of tests as an assessment tool has gained prominence over the years. This could be attributed to the numerous benefits educators derive from using tests. Incidentally, the increased use of tests has emphasised the seriousness of the test anxiety problem by heightening its debilitating effects on its victims. Testing dates as far back as 2 500 years to the ancient Greeks (Whiston, 2005). The Chinese were also believed to have used a civil service examination for certain purposes about 500 years before the aforementioned Greek usage. Later, personalities like Francis Galton also used tests to measure certain human characteristics. Currently, testing has become an important part of the education system worldwide.

Various types of tests currently exist for different purposes. Whiston (2005) highlights the following categories of tests: cognitive and affective tests, verbal and non-verbal tests, speed and power tests, and objective and subjective tests. Gladding (2000) also adds standardised versus non-standardised tests, individual versus group tests, performance versus paper-and-pencil tests, norm versus criterion-based tests and maximum-performance versus typical-performance tests. Tests can also be categorised by the purposes for which they are created. In this regard, Gladding further identifies intelligence or aptitude tests, interest or career tests, personality tests and achievement tests. Tests are additionally used for screening job applicants (Coon, 2006), diagnosing clients in counselling situations, ascertaining school achievement and pupil appraisal (Gladding, 2000)**.** According to Whiston (2005), counsellors also use tests in settings like community agencies and mental health facilities to support their work with clients.

Despite the usefulness of tests, testing has been criticised for many reasons (Whiston, 2005). Harris and Coy (2009) describe testing as a typical source of anxiety among students (Illinois Counselling Center, 2013). Similarly, Robinson (2009) quotes Methia (2004), who reported that more than one third of pupils experience test anxiety. This has become even more prevalent in the early 2000s due to the increased use of tests in recent times. Robinson (2009) further confirms the pervasiveness of test anxiety among students, since research on test anxiety started as far back as the 1950s with Mandler and Sarason.

What exactly is test anxiety and what are the symptoms of test anxiety?

The nature and symptoms of test anxiety

Test anxiety refers to the nervousness that comes with writing a test. It emerges from the desire to score highly on a test. The Illinois Counselling Centre (2013) describes test anxiety as a 'distressful' and anticipatory state or feeling that influences examination performance. Robinson (2009) further describes it as a feeling of apprehension and discomfort that leads to difficulties in cognition while writing a test. He additionally identifies the cognitive, emotional and social elements of anxiety, emphasising that anxiety generally peaks at the beginning of the causal event and subsides once the event starts. He also opines that test anxiety sometimes lingers on in the victim until the end of the test.

Test anxiety is described as having two major aspects, namely, physiological hyper-arousal and cognitive disorganisation. The physiological factors manifest in increased heart rate, increased blood pressure, shortness of breath, and profuse sweating. The cognitive factors are described by Robinson as including symptoms like difficulty in thinking, low self-confidence, having negative thoughts and doubts about one's academic ability, difficulties in understanding test questions, and difficulties in recalling learnt information. Hashmat, Hashmat, Amanullah and Aziz (2008) and Harris and Coy (2009) also confirm the emotional aspect of examination anxiety, describing it as a common experience among students. In addition, they report symptoms like excessive worry, depression, nervousness, irrelevant thoughts, nausea, and frequent urination as typical in test-anxious people. Other symptoms such as stomach aches, headaches, shivering, sweaty palms, dry mouths, fainting and nausea are also reported.

According to Revina, Gregory, Gregory and Sheeba (2014), anxiety causes students to go blank, feel helpless and develop sweaty palms during examinations. High levels of anxiety, they note, also affect students' memory, reasoning abilities, self-esteem and academic achievement. Other mental reactions like worrying about poor test performance, perceiving tests as threats, and difficulties concentrating or recalling learnt materials, also exist (Illinois Counselling Centre, 2013; Lufi, Okasha & Cohen, 2004). Birenbaum (2007) also highlights worrying as a key hindrance to information retrieval among test-anxious people, but emphasises poor test preparation as a major cause of low test performance among such students. Similarly, Cassady (2004) discovered that highly test-anxious students usually had poor study habits, felt threatened by tests and also performed poorly on tests.

The causes of test anxiety

The causes of test anxiety, as indicated by several authors, are diverse and vary from person to person. These causes can, however, be generally categorised as psychological, behavioural, physical, or cognitive in nature. When investigating the causes of examination anxiety in medical students, Hashmat et al. (2008) reported behavioural causes such as inadequate rest, insufficient physical activity, poor nutrition, lack of time management and required information, procrastination, poor study habits, and poor test-taking skills as key contributors to examination anxiety. Birenbaum (2007) agrees with them when reporting that inconsistent content coverage, studying all night before examinations and poor revision of studied course material are significant causes of examination-related anxiety in students. The California Polytechnic Academic Skills Centre (2013) highlights additional common behavioural causes of test anxiety including, among others, lack of examination preparation, cramming the night before the examination, poor study habits and poor time management.

The physical factors causing test anxiety among students as highlighted by Barksdale-Ladd and Thomas (2000) include pressure from peers, family, and teachers; unfavourable testing environments, ineffective teaching and poor prior test performance. Lufi et al. (2004) also report negative outcomes of examinations and helplessness over examination situations as other physical causes of test anxiety among students. Parents have been found to create test anxiety in their children with constant demands for high grades. Barksdale-Ladd and Thomas (2000) additionally report that parental concerns about their children's performance and their continuous admonishing of their children to work harder at school often make children anxious.

Equally significant are the cognitive and psychological causes of test anxiety. The California Polytechnic Academic Skills Centre (2013) reports that lack of information organisation and worries about past test performance cause test anxiety among students. Einat (2000) also opines that test anxiety is caused by the high personal standards of people who expect maximum success, yet fear not being able to meet their own standards. Such students, Einat adds, often perceive tests as threats and thus react to them by worrying and entertaining irrelevant thoughts, which

eventually affect their performance. Furthermore, in medical school, Hashmat et al. (2008) identified students' perceptions of extensive course load during examination periods and irrational thinking as significant causes of test anxiety among final-year students. They explained that most final-year students felt anxious during the examinations period because they often perceived this period as excessively busy and intensive. Putwain, Woods and Symes (2010) also highlight a link between low academic self-worth and worrying about high test performance as a cause of test anxiety among students. This view is a combination of the psychological and cognitive factors as causes of test anxiety among students.

All of the above create significant levels of test anxiety and have diverse effects on students.

The impact of test anxiety on students

Deep concerns have been raised in recent times regarding the negative influence of test anxiety on students and other individuals. For instance, Harris and Coy (2009) describe test anxiety as a 'severely disabling' condition that 'paralyses' students' thought processes and hinders their performance in examinations despite their high cognitive abilities. Decker, Hermans, Raes and Eelen (2003) and Yousefi et al. (2010) agree with Harris and Coy by emphasising that anxiety, worry and subjective stress are closely related to memory deficits among students. Eysenck (2001) additionally reports a significant relationship between high levels of test anxiety and low cognitive performance. In a similar vein, Vasa et al. (2007) found that respondents with high test anxiety had lower memory scores and Datta (2013) suggested a similar situation among capable students with special educational needs: he noted that test anxiety led to high levels of distress and a corresponding academic failure among them. Chapell et al. (2005) additionally reveal that anxiety interferes in students' performance in most assessment situations.

Equally significant are Wild, Hofer and Pekrun (2006) and Yousefi (2012), who also indicate a higher probability of students dropping out of school early or falling into truancy mainly because of their test anxiety experiences. Bodas and Ollendick (2005) suggest that test anxiety is a key cause of psychological distress, low academic performance or underachievement, and feelings of insecurity among students. Mulvenon, Stegman, and Ritter (2005) additionally emphasise the predominantly negative impact of test anxiety on students' performance over the years. Robinson (2009) reported that test anxiety leads to cognitive difficulties during a test and,

like Chapell et al., found that low performance on standardised tests correlated with increased levels of anxiety and stress among students. He thus concluded that increasingly using tests only aggravated the test anxiety problem and harmed more students.

Test anxiety has also been found to be predicated on certain gender factors. Robinson (2009) reports that females generally experience higher anxiety levels than males. He notes that test anxiety in females peaks during Grades 5 to 10, after which it falls significantly. In like manner, Chappell et al. (2005) are reported by Robinson (2009) to maintain that female graduates with low test anxiety recorded significantly higher Grade Point Averages (GPAs) when compared to their high test-anxious female graduate counterparts; but undergraduate females comparatively had higher test anxiety and higher GPAs than their male undergraduate counterparts. Among both high and low test-anxious male graduate students, however, similar GPAs were recorded, while undergraduate females tended to have higher test anxiety and higher GPAs when compared to their male counterparts. Female graduate students additionally had significantly higher test anxiety and GPAs than male graduate students (Robinson, 2009).

Nonetheless, the Illinois Counselling Center (2013) asserts that, despite its predominantly negative nature, anxiety could sometimes be useful when it enables the individual to escape or avoid dangerous situations. Spielberger, Farooqi and Ghani (2012) similarly believe that a little nervousness is important to push the individual into peak performance.

Nevertheless, the above negative effects of test anxiety make the extensive use of tests in recent times a worrisome phenomenon. If tests are so significant to educators and are being used more often for various purposes, then it is important to consider the effects of test anxiety on students and adopt the necessary strategies to address them. A study investigating the causes of test anxiety could thus be considered a step in the right direction when searching for a practical solution to this predicament.

Significance of the study

Test scores are used by most educators, employers and students all over the world for making important life decisions. These decisions eventually determine the future of test takers. The study is of key importance to educators, examining bodies, and

employees, who use test scores for various purposes. These stakeholders should be well informed regarding the reviewed literature on the nature, symptoms and impact of test anxiety on students. With this awareness, in addition to the study findings and recommendations, they should become more conscious of anxiety-related factors, and thus able to initiate better strategies to reduce or avoid them in the planning and administration of their examinations and tests.

The study findings will also serve to educate the various staff members and counsellors in university counselling centres, and guidance co-ordinators at other levels of education, in order to further enhance their student support services in their respective institutions. With the study findings, these guidance and counselling professionals will be able to focus more on anxiety-related issues and thus re-package the student support services in their respective institutions.

Finally, the entire tertiary student body in Ghana (and worldwide) will benefit from this study, as the various factors, conditions and activities that create test anxiety among students within their respective institutions will be highlighted and subsequently controlled, so as to reduce anxiety among students. The study's recommendations in particular could help eradicate the anxiety-causing factors, thus reducing anxiety among students. By this means, students' test performance should eventually improve, and their self-esteem and confidence will be boosted to further enhance their personalities and performance.

STATEMENT OF THE PROBLEM

Several authors have documented the negative impact of test anxiety on students' lives in general and on their test performance in particular. The literature indicates that the causes of test anxiety are diverse and vary from person to person. Vasa et al. (2007) and others propose that test anxiety affects the academic performance of students. Lufi et al. (2004) further highlight its interference with students' cognition. In this present age of increased testing, deep concerns have been raised regarding the impact of tests on students, but little is known about how testing affects students, specifically at the University of Cape Coast, Ghana. This study seeks to shed light on the effects of text anxiety at the University of Cape Coast.

OBJECTIVES OF THE STUDY

The objectives of the study are to:

- Identify the causes of test anxiety among first- and final-year students in the Faculty of Education at the University of Cape Coast
- Outline the various symptoms of test anxiety among students in the Faculty of Education at the University of Cape Coast

RESEARCH QUESTIONS

- What are the causes of test anxiety among first- and final-year students in the Faculty of Education at the University of Cape Coast?
- What are the various symptoms of test anxiety among first- and final-year students in the Faculty of Education at the University of Cape Coast?

METHODOLOGY

The study made use of a descriptive research design involving an accessible population of 2 871 first- and final-year students from five departments in the Faculty of Education at the University of Cape Coast. There were 1 538 first-year students and 1 333 final-year students. The reasons for selecting only first- and final-year students were that, in the University of Cape Coast, failure of three courses in the first year of study leads to the outright dismissal of the student; and in the final year, failure in any course means not having an opportunity to graduate in that year. It was therefore rationalised that test anxiety could be heightened in these two groups of students.

The purposive sampling technique was used on different days to select first- and final-year Bachelor of Science (Psychology) students of the Faculty of Education (now College of Education Studies) to respond to a 29-item questionnaire. Just after their lectures, the students were approached in the lecture venue and briefed on the purpose of the research and the fact that it was an academic exercise. Students were then given the liberty to volunteer to be involved in the research. In both cases, some students left the venue, but 131 first-year students and 172 final-year students volunteered to respond to the questionnaire. This resulted in a total sample of 303 students. Prior to administering the questionnaire, the research participants were assured of anonymity, and for that reason they were asked not

to write their names anywhere on the questionnaire. They were also encouraged to provide candid responses to the items. The 29-item structured questionnaire mainly focused on the causes of test anxiety as identified from the reviewed literature. Item responses were on a four-point Likert scale of 'Strongly Agree', 'Agree', 'Disagree' and 'Strongly Disagree'.

The questionnaire was also validated by a pilot test involving 30 second-year students purposively selected after a lecture in the Arts Faculty at the University of Cape Coast. The Cronbach alpha reliability coefficient was 0.80. Gathered data from the questionnaire was analysed with the Statistical Package for Service Solutions through frequency counts and percentages. Results were presented with tables on a two-point scale of 'Agree' and 'Disagree'.

In addition to the use of the questionnaire, four focus group discussions were held with a total of 73 first- and final-year students from four departments in the Faculty of Education. Two focus group discussions were held with first-year students and another two with final-year students. Students for the first focus group discussion were purposively approached just after lectures in the Department of Arts and Social Sciences Education as well as the Department of Basic Education, at different times. They were then briefed on the purpose of the research work, after which a sheet of paper was sent round for those who were interested to write down their names in order to be involved in the study. A date was then fixed for the discussion and a total of seven students from the Arts and Social Sciences and 11 from Basic Education were present on the scheduled date for the discussion. Eighteen first-year students were thus conveniently sampled and involved in the first focus group discussion. For ethical reasons, participants were assured that any information they supplied was to be treated as confidential.

The same procedure was followed to select another group of 12 first-year students from the Department of Health and Physical Education as well as the Department of Vocational and Technical Education for the second focus group discussion. After purposively approaching and briefing these first-year students, six of them from each of the two departments were involved in the discussion.

The same procedure was used in selecting study respondents for the final-year focus group discussions. They were also purposively approached and briefed about the research at the end of their lectures in the Department of Arts and Social Sciences Education as well as the Department of Basic Education. Ten students

were sampled from each of the two departments for the discussion on the scheduled date. The 23 final-year students involved in the second focus group discussion were also conveniently sampled from the Department of Health and Physical Education as well as the Department of Vocational and Technical Education by means of the aforementioned procedure. They comprised 10 from Health and Physical Education and 13 from Vocational and Technical Education.

The total sample of 376 students involved in the study was determined by Cohen, Manion and Morrison's (2007) approved sample size for a population of 2 800. The focus group discussions explored two main themes: students' reactions when informed of an impending test (symptoms of test anxiety) and causes of test anxiety among students. At the beginning of each focus group discussion, students were briefed on the purpose and significance of the study. They were also encouraged to express their opinions freely and candidly on the issues under discussion, as their responses would not in any way be associated with them or used against them. All four focus group discussions were recorded and later transcribed. The various responses were then organised under the two main themes and used to write a report.

PRESENTATION OF THE STUDY RESULTS

Causes of test anxiety

Table 1 shows the various causes of test anxiety reported by students on the questionnaires.

Table 1: Causes of test anxiety among first and final year students

Causes of Test Anxiety	First Year		Final Year	
	Agree	Disagree	Agree	Disagree
1. Because I fear failure, I get anxious when writing tests.	73 (55.7%)	58 (44.2%)	80 (46.5%)	92 (53.4%)
2. I only get anxious when I have not prepared well for the exam.	112 (85.4%)	19 (9.9%)	150 (87.2%)	22 (0.12%)
3. I think the test will be difficult so I get anxious.	66 (50.3%)	65 (49.6%)	79 (45.9%)	93 (54.1%)
4. Once I start and realise the test is easy, my anxiety goes away.	109 (83.2%)	22 (16.8%)	155 (90.1%)	17 (9.9%)
5. Failure in previous examinations makes me feel anxious when writing tests.	19 (14.5%)	112 (85.5%)	16 (9.3%)	156 (90.7%)

Causes of Test Anxiety	First Year		Final Year	
	Agree	Disagree	Agree	Disagree
6. Fear of my lecturer makes me nervous when writing his or her exams.	23 (17.5%)	108 (82.4%)	23 (13.3%)	149 (86.6%)
7. Because my lecturer does not teach me well, I get anxious when writing his or her exams.	16 (12.2%)	115 (87.8%)	24 (13.9%)	148 (86.0%)
8. Lack of time to study makes me get anxious during examinations.	24 (18.3%)	109 (74.8%)	20 (11.6%)	152 (88.3%)
9. Poor retention of learnt material makes me nervous during examinations.	22 (16.8%)	109 (83.2%)	22 (12.8%)	150 (87.2%)
10. I think I am not academically strong so I fear writing examinations.	4 (1.4%)	127 (96.9%)	8 (6.1%)	164 (95.3%)
11. I feel lazy when studying so I get anxious when writing examinations.	14 (10.7%)	117 (89.3%)	17 (9.9%)	155 (90.1%)
12. I feel stressed when preparing for examinations, so examinations give me stress.	31 (23.6%)	100 (76.3%)	65 (37.8%)	107 (62.2%)
13. I have difficulty expressing myself on paper so I get test anxious.	12(9.1%)	119 (90.8%)	15 (8.7%)	157 (91.2%)
14. Because our exams are very theoretical, I get test anxious.	64 (48.9%)	67 (51.1%)	116 (67.4%)	56(32.5%)

The study results indicated that 73 first-year students (55.7%) identified fear of failure as making them anxious, but 92 final-year students, representing 53.4%, opposed this idea. Also, both first- and final-year students, 112 (85.4%) and 150 (87.2%) respectively, agreed that poor preparation for tests led to anxiety. A total of 66 first-year students also said they became anxious because they thought the test would be difficult, but 93 final-year students did not think so. Both year groups, (112 first year students or 85.5% and 156 final year students or 90.7%) reported that failure in previous examinations did not make them anxious when being tested, while 108 first-year students and 149 final-year students said they did not get nervous because they feared the lecturer testing them. Additionally, 115 first-year students and 148 final-year students said they did not get anxious due to their lecturer not teaching well.

Over 70% of both year groups did not agree that factors such as lack of time to study, poor retention of studied material, not being academically strong and feeling lazy when studying made them anxious during testing. While 67 first-year students denied that the theoretical nature of their tests made them anxious, 116 final-year students reported the contrary. Results also showed that 100 first-year students

and 107 final-year students did not think that preparations towards examinations made them anxious, and an even greater percentage (90.8% first-year students and 91.2% final-year students) denied that they had difficulties with self-expression during examinations leading to anxiety.

On the whole, 109 first-year students and 155 final-year students reported that once they started the examinations and realised that the questions were easy, their anxieties subsided.

Results from the focus group discussions generally highlighted similar causes of test anxiety among both year groups as identified by responses on the questionnaires.

The major factors causing test anxiety among first-year students as reported at the focus group discussions included uncertainty as to the difficulty level of tests, insufficient preparation for tests, transfer of negative course perceptions to the impending test, fear of failure, and the dreadful picture painted by friends about examination failure at the University of Cape Coast. Other test anxiety causes mentioned were the rigid grading system at the University of Cape Coast and the generally demanding nature of the academic system in the institution. The off-campus factors causing anxiety among first-year students were pressure from home for them to perform well and the extremely high standards set by parents.

In like manner, the final-year students highlighted several causes of test anxiety in their two separate focus group discussions. They listed the uncertainty of test outcomes, the desire for high test performance, transfer of negative course perceptions to the impending test, poor relations with the testing lecturer, the dreadful picture of examination failure painted by their seniors, and the generally unpredictable nature of examinations. They also mentioned poor preparation for tests, uncertainty regarding the topics to be covered by the test, and fear of failure. Final-year students also indicated that their inability to recall specific answers to test items, confusing information about test expectations (from course prefects and teaching assistants prior to writing the test), and the theoretical nature of examinations, created anxiety in them.

Symptoms of test anxiety among students

At the focus group discussions, students in both year groups highlighted a number of symptoms they often experienced immediately when they heard of an impending test or examination. The test-anxiety symptoms highlighted by first-year students

included restlessness, dreaming about the impending test when asleep, feeling cold, frequent urination, headaches, confusion about what to study, shivering, increased heart rate, and forgetting learnt material. Final-year students also mentioned test-anxiety symptoms like panicking, shivering, confusion, frequent urination, loss of appetite, diarrhoea, and sudden menstruation. They also said they experienced faster heart rates, headaches, profuse sweating, tension, fear, and shivering when writing the test. However, final-year students felt that their anxieties usually faded away once the test started and they realised it was not all that difficult after all. Students in both year groups, however, emphasised that these anxieties were often severe when the test was impromptu and they had no time to prepare for it. Students' reactions to the news of an impending test were thus similar in both year groups.

When asked whether knowing the test dates and the areas to target in preparation for the test helped to reduce anxiety, students reported that they still felt anxious, because they were often uncertain about the thoroughness of their preparation, and were also uncertain about the lecturer's style of setting questions.

Finally, students in both year groups acknowledged the importance of testing and the writing of examinations in schooling. They agreed that tests and examinations helped to evaluate learning outcomes and enabled students to identify their capabilities and weaknesses. They believed these were important in planning for their future. However, students suggested considering practical activities such as oral presentations in class, project work, group work, and other innovative activities when assessing their academic performance, rather than limiting evaluation to testing and the writing of examinations.

Discussion of the study results

The study largely confirmed various reports in the literature regarding test anxiety. It primarily established the existence of test anxiety among students as indicated by Hashmat et al. (2008), Robinson (2009), and Decker et al. (2003), among others. In asserting that test anxiety affects people in every field and at all evaluative and gradable ages, Lufi et al. (2004) emphasised the pervasiveness of test anxiety by indicating that it cuts across all arenas and a wide age group. Some other assessment activities that cause anxiety, as identified by Robinson (2009), were public speaking, social contests, and general areas of competition. In agreement with Lufi et al. (2004), Datta (2013) further identified that students with

special educational needs also experience test anxiety when faced with evaluative situations. Similarly, Lancaster, Mellard and Hoffman (2001) identified test anxiety as the greatest difficulty for students with learning disabilities. McDonald (2001) additionally highlighted test anxiety as a key source of concern for many children in school today.

All these views confirm Methia (2004), who reported an over 30% prevalence of test anxiety among children in school. It is thus not surprising that test anxiety is described as one of the most researched human traits (Lufi et al., 2004; Robinson, 2009). Hopefully effective strategies and techniques will be discovered in the near future to reduce test anxiety among students and thus eradicate its negative effects. This, however, will only become a reality when research findings and recommendations are taken seriously and implemented promptly.

The study confirmed several symptoms of test anxiety mentioned by the literature. Symptoms like profuse sweating, shivering, headaches, heart palpitations, forgetfulness and sleeplessness, which were outlined by Harris and Coy (2009) and Robinson (2009), were also mentioned by study respondents at the focus group discussions. A final-year student, for example, stated that he developed palpitations and a sudden urge to urinate when told to write a test, and another student reported profuse sweating and headaches when faced with a test. Yet another said, 'I immediately develop running stomach when I hear about an impending test and I urgently want to ease myself.' Another also responded, 'Madam, when I hold the pen in the test room, it shakes and the paper gets wet with sweat from my palms. My handwriting even becomes shaky and horrible.' These symptoms are in agreement with Datta's findings (2013): she found that eight out of her nine participants were extremely nervous and shaky before and during an examination.

Parents involved in her study also reported that their children experienced high levels of test anxiety, worry, nervousness, sleepless nights, and sweaty palms before and during an examination. Lowe (2014) likewise noted that worrying, being tense and experiencing feelings of apprehension were common symptoms for some students when they wrote tests.

Interestingly, all the symptoms mentioned by study respondents also matched the behavioural and cognitive elements of test anxiety discussed by Harris and Coy (2009). Symptoms like restlessness, panicking, frequent urination, profuse sweating, palpitations or shortness of breath, diarrhoea, sudden menstruation, and shivering

matched the behavioural elements; while confusion, forgetfulness, and lack of concentration were cognitive in nature. It is equally significant to note that despite reports by the Illinois Counselling Center (2013) and Spielberger et al. (2012) that some level of anxiety is necessary to push students into peak performance, none of the test anxiety symptoms mentioned by study respondents seemed to have had any positive impact on their performance. At the focus group discussion, a first-year student said: 'Whenever I have an impromptu test, I immediately develop headaches, get confused and don't know what to study.' Another said, 'I also begin to sweat and immediately feel like urinating.' The shaky handwriting, worrying, forgetfulness, sweaty palms, palpitations, and frequent urination mentioned by respondents would only distract students, impede their levels of concentration, and reduce their writing speed during testing. Possibly, the anxieties experienced by study respondents were rather extreme and thus had a negative impact on them. It is thus significant that highly test-anxious students have been proven to have poor test performance.

Experiencing such debilitating symptoms can hardly make one excel in a test. Datta (2013) in like manner found that highly emotional, test-anxious students also experienced higher amounts of bodily discomfort, and their emotional states eventually interfered with their true test scores. Chapell et al. (2005) also agreed with Datta regarding the interference of students' anxiety with their true potential in most assessment situations. In this vein Eysenck (2001) specifically reported that high levels of test anxiety lead to low cognitive performance, while Vasa et al. (2007) discovered that high test anxiety often led to low memory scores. Cassady (2004) similarly revealed that highly test-anxious students usually felt threatened by tests and performed badly on tests. A study respondent, for example, remarked during the focus group discussion: 'I feel uncomfortable and my heart begins to beat faster whenever I have to write a test.' Another said, 'I also begin to sweat and immediately feel like urinating.' Yet another also reported, 'I immediately develop headaches; get confused and don't know what to study.' These study findings are all real and in agreement with Datta (2013) who found that the majority of her study participants were worried, apprehensive and tense in an evaluation activity. Einat (2000) also asserted that test-anxious students were in the habit of worrying and thinking irrelevant thoughts. When explaining the emotional state of test anxiety, Birenbaum (2007) described worrying as a key hindrance to the information retrieval process among test-anxious people.

Asked why they often reacted this way towards tests and not class exercises, study respondents explained at the focus group discussions that 'with class exercises, we can easily ask our colleagues or lecturer for explanations when confused about some questions but the test or examination rules forbid us to do so and this makes us anxious and scarred of failure'. Another student's explanation was that 'examinations themselves comprise so many issues, including uncertainty, and their strict rules often make students more tensed and scared than normal class exercises'. Harris and Coy (2009) thus described testing as one of the most threatening events causing anxiety in students of late, as it appears that once students sense an impending test, they immediately feel threatened (Cassady, 2004; Robinson, 2009) and begin entertaining thoughts of failure, which often come along with the fear of failure. This coincides with the study finding that fear of failure (Einat, 2000) was a major cause of test anxiety among students. Study respondents also reported feeling anxious even when they knew of their test dates and the topics to be covered. At the focus group discussions, students explained that, despite having advance information about a test, they still felt anxious before writing. One student explained: 'I still feel anxious because I don't know the questions to expect and until I see the questions, I feel uneasy.' Another's response was, 'I get anxious because I feel I have not prepared well for the test.' All this reinforces the fear of failure as a cause of test anxiety and more importantly, the prevalence of test anxiety among students (Methia, 2004).

Most probably, students and test takers in general have been conditioned to react with anxiety towards evaluative and competitive activities; hence their high anxiety states. Study respondents did however acknowledge a reduction in their test anxiety once they started the test and realised that it was not after all that difficult. This conflicts with the view of Robinson (2009) who noted that test anxiety often lingered on until the end of the test.

Parents were also reported to contribute immensely to test anxiety among students. The respondents indicated that their parents constantly demanded good grades from them at school and this heightened their anxiety during testing. A number of first-year students for instance revealed that their parents' constant advice for them to do well at school made them worried every time they had to write a test. One of them remarked: 'Madam, my parents always tell me to work hard and make high grades at school. I always think about this and it makes me shiver and worried anytime I have to write a test.' Clearly, parents' keen interest in the education of their

children is adversely affecting the children, to the extent that parents' emphasis on academic excellence is being perceived as a threat. Such a situation could occur particularly when the concerned children are not exceptionally brilliant at school, and their fears could come from their inability to meet their parents' rather high standards. Einat (2000) described such causes of test anxiety as a result of high personal standards set by people who expected maximum success and yet feared not being able to meet those standards. Parents do not realise that not all students can be academically exceptional and this could be frustrating for students who are not that exceptional. Einat explained further that such students often perceived tests as threats and thus reacted to them by worrying and entertaining irrelevant thoughts, which eventually affected their performance. This finding links directly with Barksdale-Ladd and Thomas (2000) who reported that constant parental pressure created test anxiety among students.

Correspondingly, Harris and Coy (2009) theorise that test anxiety emerges from a combination of fear and uncertainty. They explain that test-anxious people often perceive tests as threats to their ego or self-esteem and thus react accordingly once they are faced with a test. The study finding, that fear of failure is a major cause of test anxiety, is thus corroborated. Uncertainty during tests was also confirmed at the final-year focus group discussion, where a student attributed his anxiety to the unpredictable nature of tests. His words were: 'Tests have always been unpredictable and this makes me anxious whenever I have a test to write. You can never predict the grade you will make until you have seen the final results.' Another student remarked: 'The uncertainty about tests is often at two levels, Madam; first, not knowing the questions to expect at the test, and secondly not being able to predict one's performance until the results have been released. We have heard of cases where students expected grade A and yet received lesser grades upon the release of the results.'

Equally significant is the study finding that poor test preparation is a cause of test anxiety among students. The high percentage of study respondents (85.4% of first-year students and 87.2% of final-year students) who reported getting test anxious when they had not prepared well for the examination reinforced this logical point. In describing their reactions to an impromptu test, a study respondent said, 'I get very anxious and my heart begins to beat faster because I think I will fail. This is because we students do not often prepare before going for lectures.' This situation is in line with Hashmat et al. (2008) who reported that inefficient study

and lack of revision of study materials are causes of examination anxiety among students. The inefficient study in this case could imply a variety of causes, including poor study habits, lack of examination preparation, poor time management, and lack of organisation of notes, among others. The Academic Skills Center (2013) also mentioned these factors as causes of test anxiety among students. Sansgiry, Bhosle and Sail (2006) additionally identified ineffective studying styles, inconsistent content coverage, and lack of revision of course material as further causes of test anxiety. Since poor test preparation has been confirmed to lead to test failure, it is meaningful that a relatively high percentage of first-year students identified fear of test failure as a cause of test anxiety. The fear of test failure also links up perfectly with students perceiving tests as threats (Einat, 2000; Haris and Coy, 2009) and therefore fearing them.

The frequency of testing during mid-semester at the University of Cape Coast was also mentioned by study respondents as leading to anxiety. At such times, most lecturers often administer their first tests and this often has a toll on students, making them describe the period as highly stressful. Two respondents at the first-year focus group discussion agreed, and one said: 'Madam, the pressure on us during the middle of the semester when all our lectures administer their first test is just too much. Despite these many tests, they still give us assignments and group work while we still attend lectures. This tends to be very tiring and makes us very anxious about our test performance.' Similar findings were reported by Hashmat et al. (2008) who note that loaded examination periods made students test anxious. This clearly is a practical problem that also deserves attention, considering the number of courses students read at school and the need to assess them in each of these courses. Varying the tools for student assessments, as recommended by study participants, would help reduce this periodic stress that mounts up when lecturers schedule tests all at once. A number of such activities, such as oral presentations in class, undertaking project work, and group assignments among others, are currently used at the University of Cape Coast, although tests and examinations remain the typical assessment modes.

Factors such as poor retention of learnt material, not being academically strong, and feeling lazy, were rejected as factors by the majority of the study participants in both year groups (83.2% of first-years and 87.2% of final-years). All these factors imply negative attitudes towards academic work and it is reassuring that they were rejected by students. This highlights some admirable study habits of students at

the University of Cape Coast and it deserves commendation. Incidentally, the study finding disagrees with Putwain, Woods and Symes (2010) who opine that people with low academic confidence undergo excessive worrying and tension about their ability to perform.

Many are the causes of test anxiety and many more are its symptoms, but the largely negative impact of these symptoms on test takers in general reinforces the need to urgently seek redress, particularly in these recent times of high-stakes testing. Students all over the world would relish any such effort to bring this phenomenon under control.

RECOMMENDATIONS

- University academic advisors and counsellors should teach students good study habits and encourage them to start serious studies immediately when school reopens.
- Lecturers should adopt more group work presentations and tutorial methods in teaching. They should also teach students how to answer questions and make presentations to help boost students' confidence levels and eventually reduce anxiety in them.
- Counsellors should teach students some relaxation and desensitisation techniques and other esteem-building strategies to help control students' anxiety levels.
- Parents should also encourage their children to be assertive, responsible and independent in their youth to enhance their confidence levels.

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USING OPEN EDUCATIONAL RESOURCES TO DESIGN AN ONLINE ACADEMIC RESEARCH WRITING COURSE: A PROJECT REPORT

Dr Margaret Funke Omidire[1]

ABSTRACT

The DETA Conference of August 2011 and the workshops on the use of open educational resources (OER) were the catalyst for a project that aimed to design and build a multidisciplinary online course in academic research writing, using OER for undergraduate and postgraduate students at a Nigerian university as a resource for research reports, assignments, dissertations, and theses. The project provided an opportunity for collaboration among lecturers and IT specialists, thereby raising awareness about the benefits of using OER and broadening the user base for these resources. Some of the challenges encountered include the lack of adequate access to the internet, possible lack of commitment to the project by some participants due to pressures of their workload, unrealistic timelines, and lack of familiarity with OER. The paper concludes with reflections on the reasons for these challenges and suggests recommendations for scholars planning similar projects.

Key words: open educational resources (OER), academic research writing, course development, technology, learning

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INTRODUCTION

Participants in the DETA 2011 conference were challenged to explore ways to use new ideas and duplicate best practices, and to make new learning and information truly matter, by applying their ideas in order to address existing challenges. It is not enough just to attend conferences and workshops: efforts should be made to make practical use of the new knowledge acquired.

Based on the encouragement of conference organisers and facilitators of the open educational resources (OER) workshop, the idea to design and build a multidisciplinary online course in academic research writing was born. Subsequently, arrangements were made at a university in Nigeria for discussions that aimed to identify challenges that needed to be addressed, find a focus for a project, and identify prospective team members. Before describing the project that resulted from these discussions, literature on OER and the OER movement is briefly reviewed.

Open educational resources (OER)

The term OER, which was coined by UNESCO in 2002, originated from developments in open and distance learning (ODL). OER can be defined as 'teaching, learning and research resources that reside in the public domain or have been released under intellectual property licence' (Atkins, Brown & Hammond, 2007: 4). They include a range of resources such as course materials, modules, tests, videos, and full courses. The goal is to use information and communications technology (ICT) to promote and to increase access to educational materials and to remove barriers to teaching and learning. OER have also been defined as 'technology-enabled, open provision of educational resources for consultation, use and adaptation by a community of users for non-commercial use' (Butcher, 2011: 23). OER have two dimensions, the pedagogical and the digital, and both have the potential to transform education. Some of the benefits include making available relevant teaching and learning materials at little or no cost, opportunities to adapt materials to suit local contexts, and encouragement for individuals as well as institutions to develop their own materials (Butcher, 2011; Hilton III, Wiley, Stein & Johnson, 2010; Smith, Wang and Casserly, 2006). The availability and use of OER has risen exponentially in the last decade, and some of the current applications are as supplementary materials, core components in traditional modes like story books and textbooks, and full ODL courses and programmes (Glennie, 2013; Johnstone, 2005).

According to Butcher (2011), OER can be found through the use of specialised search engines such as:

- Global Learning Objects Brokered Exchange
- Folksemantic
- DiscoverEd
- Creative Commons
- OpenCourseWare Consortium

OER can also be found in repositories and directory sites such as:

- OpenLearn
- MIT OCW
- China Open Resources for Education (CORE)
- Teacher Education in Sub-Saharan Africa (TESSA)
- Multimedia Educational Resource for Learning and Online Teaching (MERLOT)
- OER Commons
- Commonwealth of Learning (COL)
- OER Africa

The users of the above repositories and directory sites are however expected to have the necessary skills for searching, evaluating and selecting the relevant OER. Users must be able to distinguish between the requirements of each type of licence. They should possess the skills required to adapt the materials for personal use and release the adapted materials for use by others. The users should also be able to knit together the materials into a coherent course (Glennie, 2013).

THE PROJECT REPORT

The report is divided into various sections. The problem and rationale for the project are first identified and clarified, and this is followed by a statement of the purpose of the project. Next the processes that were followed are described; followed by lessons from the project as well as the challenges that were experienced during the project. This section is followed by recommendations for individuals and institutions who wish to embark on such projects in the future, and the report ends with a brief conclusion.

PROBLEM STATEMENT AND RATIONALE FOR THE PROJECT

- It has been brought to the attention of heads of departments in the Faculty of Humanities at the university that the work of lecturers is complicated by the inability of students to write in the prescribed manner, to properly reference their work and to understand the issues surrounding plagiarism and its consequences. Other challenges identified by the participants include students' inability to source materials for their work, construct an argument, develop a proposal, and fully comprehend the ethical considerations and guidelines for conducting research. Consequently, assignments, proposals, dissertations, and theses that do not meet the basic expected standards are being submitted. Compounding the problem is the fact that some of the modules that are taught are offered to large numbers of students.

- The assumption of the team was that an online course on academic research writing, where there is guidance and the opportunity for self-assessment, would serve the needs of the students and ultimately reduce the need for continuous correction of mediocre work submitted by students. The course could also be used as a resource, to which students could be referred in order to do practice exercises. Lecturers could then spend less time on technical corrections of written assignments. Students could also be instructed to scan their work to detect plagiarism and attach a report as evidence that they have done so before submission. An online resource could ensure that, from their first year in university, the students have access to appropriate guidance that is be readily available as and when it is required. The students will be empowered at the same time to become independent learners.

PURPOSE OF THE PROJECT

During the conceptualisation phase the broad aims of the project were discussed. The aims of the project agreed upon by the participants were to:

- Address the challenges of academic writing among undergraduate and postgraduate students in the humanities
- Assist students to attain the knowledge and master the skills needed for academic writing, to assist them with their projects, dissertations and theses

PHASES OF THE PROJECT

During the planning discussions the team members were identified. There were six lecturers, an IT specialist and a co-ordinator. The project was divided into phases, namely, conceptualisation, design, production, piloting, and evaluation.

The conceptualisation phase aimed to provide opportunities for the team members to meet, understand the challenges, share ideas and jointly agree on the goals and objectives of the project. This phase of the project served to map the scope of the course and outline the main topics as well as the content of these topics. The design and the flow of the content were also discussed and agreed upon during this phase. The culmination of this conceptualisation phase was the development of a project plan.

The design phase focused on the acquisition of learning resources to suit the content of each of the identified topics. Learning activities, practice exercises and assessment strategies were to be identified and adapted for the relevant sections and subsequently integrated. Next was the production phase, when the learning resources were to be digitised and illustrations and graphics were to be created. In addition, videos, programmes, and package simulations were to be created during this period. The formatting, editing and evaluation of learning resources was intended to be the concluding activity for this phase. The implementation phases involved deploying the course on Moodle and evaluating the course after piloting. Finally, training would be provided for selected members of staff, who would then be able to provide support for the users. Table 1 below summarises the proposed project and time frame.

Table 1: Activities and time frame

Expected duration	Activities
	CONCEPTUALISATION PHASE
1 day	Introduce the Faculty of Arts team and team leader
	Project introductory presentation and workshop
	Identify and jointly agree on the goals and objectives of the project

Expected duration	Activities
1 day	Map the scope of the course and outline of topics
	Design the flow of content
1 day	Develop project plan
	DESIGN PHASE
1 week	Acquisition of learning resources
1 week	Selection of learning activities and assessment strategies
1 week	Integration and design of learning tasks and learning activities
	PRODUCTION PHASE
6 weeks	Digitise learning resources
	Create illustrations and graphics
	Format, edit and evaluate learning resources
	Create videos, programmes and package simulations
	IMPLEMENTATION PHASE
1 week	Deploy course on Moodle
	Evaluate course (piloting)
	CONCLUSION
1 week	Evaluation of course
	Training and support
	Handover of course

Conceptualisation phase

Deciding on the scope of the course involved lengthy discussions. However, having earlier agreed on the target and the aims of the project made it easier for the team to agree that the project had not set out to be a research methodology course per se, but to be a course that functions as a resource for students and other

individuals who find the writing of academic and research reports challenging. The team agreed that the scope of the course should include the following main units:

- Academic discourse
- Developing scientific arguments
- Writing process
- Research report writing process
- Plagiarism
- Referencing

Outline of content

Each of the proposed units for the course was presented for deliberation as to what should constitute the content. It was agreed that the outlines for each unit stated below (Table 2) should be a guide. The developers of the content for each unit could include subtopics they deemed suitable in their first draft, provided that such was not outside the agreed scope. Any inclusion would however have to be approved by the project team. The developers were instructed that the broad content of the course for each unit was to include the following:

Table 2: Outline of proposed content for each unit

Unit 1: Academic discourse	Unit 2: Developing scientific arguments
Language for academic discourse	Distinguishing between facts and opinions
Structure of academic texts	Inductive reasoning
Content in academic texts	Deductive reasoning
Academic literacy	Logical connectors
Communication skills – style and register	
Specialised texts such as narrative, descriptive, expository/factual, persuasive/argumentative	
Unit 3: Writing process	**Unit 4: Research report writing process**
Generate ideas	Research proposal
Gather information	Literature review
Synthesise structure	Methodology and ethics
Initial draft	Results and findings
Revise, edit, finalise	Present an argument
	Contribution to knowledge
	Recommendations and conclusion

Unit 5: Plagiarism	Unit 6: Referencing
Types of plagiarism	General Information on Referencing
Implications	Importance
Avoiding plagiarism	Tips on Noting Sources
Checking	Referencing Styles
Staying safe	MLA (Modern Language Association)
	APA (American Psychological Association)
	CMS (Chicago Manual of Style)

Course content structure

Various course structures were presented for consideration. These were discussed and a final course structure for the project was arrived at. For uniformity in presentation of the content, the structure below was the agreed course structure for the project during the development of draft content:

- Introductory statement
- Unit objectives
- Content of the unit
- Study activity and/or group work
- Self-study activities
- Unit summary
- Assessment task
- Alternative resources and/or further reading

Content development schedule

Table 3 below is the division of the content development per team member as agreed by the team.

Table 3: Task distribution

Participants	Task
A	Academic discourse
B	Developing scientific arguments
C	Writing process
D	Research report writing process
E	Plagiarism
F	Referencing

Timeline

It was suggested that the pace with which the project had started should not be relaxed; therefore the final submission was set at 12 weeks from the date of commencement. The team agreed that the deadline for the submission of the first drafts and their initial thoughts on the content should be two weeks. This date was set in order to make meaningful progress with the project relatively rapidly.

Once the course content and outline was agreed on, the next step was to give further support to team members in terms of understanding and sourcing OER. There was an introductory workshop to share knowledge about OER, and to discuss the scope and possibilities for use thereof. The introductory workshop also provided a forum for sharing ideas and motivating participants. Below are the main aspects that were covered the workshop:

- Introduction to OER
- Aims of project
- Importance and value
- Finding OER
- Important sources
- Acknowledging sources
- Creating and sharing

PROJECT MANAGEMENT

Once the preliminary planning, workshops and meetings were completed, the participants were to work on their individual sections and submit these to the co-ordinator for comments and suggestions for revision. This aspect proved especially difficult, as some members of the team simply wrote their sections in textbook fashion and submitted these. In some cases, only a paraphrasing of the recommended texts, or abridged versions that were no different from the original work, were submitted. These contributions lacked imagination and did not meet the interactive, self-study requirements discussed during the initial workshops.

Furthermore, the co-ordination of the project became problematic at this stage, because some of the participants did not comply with the agreed time frame for the submission of their drafts. When submissions were eventually made the drafts

did not meet the required structure and content (as described above). It was at this point that it became apparent that some of the participants themselves had difficulty with the use of ICT and OER, having only a basic knowledge of these tools. The institution also did not have internet access available to staff. Hence the participants had to fund access to the internet themselves. The participants were also not given time off from their normal duties to perform these additional activities. The implication of this is that institutional support and commitment to this kind of project is essential.

It became apparent that the pressures and demands of the project were proving to be too much for the participants. In terms of planning and with the benefit of hindsight, the time given to the participants was not feasible and probably meant having to prioritise their duties, which resulted in the project losing out. However, having observed the process adopted by other institutions and their commitment to supporting similar projects, the institution in question now appears to be ready to support the team so that they can successfully complete the project.

LESSONS FROM THE PROJECT

The project had a number of positive and negative aspects. It is hoped that this report will lead to some of the negative results being avoided in future projects.

The project provided an opportunity for:

- Collaboration on the use of OER
- Raising awareness about the benefits of using OER
- Broadening the user base for these resources
- Being proactive about creating OER to meet the specific needs of those involved
- Increasing the numbers of those who could also create OER for others to use

The challenges encountered that hindered the success of the project include:

- Lack of adequate access to the internet, exacerbated by irregular power supply
- Lack of commitment to the project by some participants due to the pressures of their workload and little familiarity with OER
- Possible lack of motivation and incentives
- Lack of flexibility in terms of timing and unreasonable timelines

The anticipated commencement-to-completion period for the project was 12 weeks. This now appears to have been overly optimistic, as similar projects embarked upon more recently took between 6 and 12 months. A typical example is the Bihar India Project (Rani, Mishra, Moore & Dheeraj , 2013).

Since the initiation of the project, awareness about OER has increased. Guidelines for engaging in such projects are now available, as are samples that could be adapted for use. More institutions are now involved as well. Even though the project has not been completed, despite 12 months having elapsed since conceptualisation, there is renewed hope of completion, since the process of training for the participants has now been initiated.

RECOMMENDATIONS

There is no doubt that open educational resources are here to stay, and need to be understood by individuals and institutions alike. Based on the experiences reported and reflected on in this paper, the following recommendations could make future projects and collaborations more feasible:

- Awareness among lecturers regarding the nature and the use of OER has to be raised
- Basic computer/internet skills have to be taught and encouraged among academics
- Regular local/regional workshops and training in OER uses, production, and support systems need to be organised, so as to ensure that those in remote areas have access
- Mentorship programmes and follow ups should be initiated by the promoters of OER

CONCLUSION

The value of OER is not in doubt and the increase in the use thereof over the last decade is an indication that those who are not on board will be left behind. Both open and distance learning institutions and mainstream institutions of higher learning need to embark on a re-orientation campaign to ensure that both old and new members of their faculties are aware of the potential uses of OER. The fact that one project has stalled does not mean that the next will not be successful. The

lessons learnt from this project can be heeded and applied to ensure that similar projects do not fall prey to the same mistakes in future. Finally, academics need to develop enthusiasm for new knowledge and be conversant with the opportunities provided by new technology.

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SCIENCE TEACHING IN AFRICA: ENHANCING AND SUSTAINING TEACHER EFFICACY

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ABSTRACT

Given the well-established need for teacher intervention in Science learning, it is now time for closer attention to be given to research on teachers and teaching in schools, so as to address the question of quality Science education locally (in Africa) and internationally. In this paper I argue that Science teacher efficacy is a key issue and a major factor in successful implementation of effective Science education in Africa. It presents the Kenyan case as a typical African scenario. Located in the sub-Saharan region, Kenya shares similar national development plans and dreams as well as socio-economic conditions with most African countries. In this report, the current status of Science education in Kenya is explained, and a blueprint for how to enhance and sustain effective teaching of school Science, likely relevant to any country in Africa, is presented. This work argues that teachers' use of contextual and practical approaches would enhance the efficacy of school Science teaching. The aim of this paper, though focusing on a Kenyan context, is to generate debate about Science education in Africa, as well as expose issues for cross-border research on teachers and the teaching of Science.

Key words: teachers, teaching, Physics, Science education, Africa, Kenya, efficacy

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INTRODUCTION

The aim of this paper, though focusing on a Kenyan context, is to generate debate about Science education in Africa, as well as expose issues for cross-border research on teachers and the teaching of Science. As a background to the particular focus on teachers, the paper refers to the old argument by Schwille et al. (1983) that has highlighted the central role or power of the teacher in the teaching process. This argument is stated as follows:

> Teachers, as they interact with students, are the ultimate arbiters of what is taught (and how). They make decisions about how much time to allocate to a particular school subject, what topics to cover, when and in what order, to what standards of achievement, and to which students. Collectively, these decisions and their implementation define the content of instruction (Schwille et al., 1983: 3).

What is evident in this argument is the fact that teachers, especially the way that they plan and go about their teaching duties, can profoundly impact student learning and outcomes (Ngware, Oketch & Mutisya, 2014). Drawing on this key role of the teacher, this paper particularly foregrounds the quality of Science teaching at secondary school level as the single most important factor of the overall success of any Science education curriculum. This is in line with the argument that the success of a formal Science education curriculum is dependent on the quality and performance of Science teachers across the school levels (Allais, 2014; George, 1999 & 2000; Monteiro, 2015). This in effect suggests that successful Science education depends unequivocally on how effectively Science teachers educate students in Science knowledge, skills, and dispositions. The relevant faces of successful Science education and the relevant perspectives on effective Science teachers' practices are incorporated along the way. The discussion that follows presents the Kenyan Science education situation as a typical example of the prevalent situation in Africa, and suggests a way forward.

SCIENCE IN THE KENYAN SCHOOL CURRICULUM

Science is a high-status subject in Kenya because of the many job and training opportunities available to graduates in Science-related professions. Its high status has also been achieved due to its deliberate promotion by the government as a necessary ingredient towards the realisation of a fully industrialised economy

(Oyoo, 2010; Republic of Kenya, 1998). Science education, as currently conceived, arguably started in Kenya after independence in 1963, since formal education was not widely available in Kenya prior to independence. The system of education in Kenya prior to independence was discriminatory and fell exclusively in the domain of a minority non-indigenous population. Due to the non-universal, non-compulsory nature of formal education at the time, a very small number of privileged indigenous students attended school. Access to Science is therefore relatively new in the national school curriculum. Apart from the discriminatory school education inherited at the time of the country's independence, teaching approaches then in use best fitted what could be termed a 'cookbook' approach to the teaching of Science (Ogunniyi, 1986; Swift, 1983). The Science syllabus was of the 'traditional' variety: students were taught the basic principles of Science and good thinking skills through standard topics and experiments. The main aim was to prepare youths for further studies in Science, but it was also hoped that they would be able to apply the skills that they learned in Science in everyday situations. The fact that this primary aim remained the same even when the first post-independence system of education (Republic of Kenya, 1964-65) changed to the current one, the 8-4-4 system of education, means that successful Science education is Science education that can enable the achievement of this primary aim. The current system of education is named 8-4-4 because learners attend eight years of primary school and four years of secondary school, and those who are selected to join universities take at least four years to complete an undergraduate degree at any of the Kenyan universities (Bogonko, 1992; Republic of Kenya, 1981; Wasanga & Somerset, 2013; Wosyanju, 2009).

At inception of the current 8-4-4 system of education in 1985, its good feature was the fact that it allowed all school children a chance to learn Science as a compulsory subject, using a common syllabus for the first 12 years of schooling; that is, from the primary school level right to the end of secondary education. In the primary schools, the subject was, and still is, taught as a single subject called Science, while the secondary school level Science is divided into and taught as three distinct subjects: Biology, Chemistry and Physics (Republic of Kenya, 2002). The syllabi were designed to make each subject 'interesting, real and more meaningful to the learner through the emphasis on the application of knowledge gained to the local environment'. Furthermore, 'project work in the syllabus was intended to create a new dimension in application of knowledge gained and to add more interest and fun to the subject' (Republic of Kenya, 1992: 25). Also included in the Science

syllabi were issues regarding how Science impinges on society, as the following general aims of the Physics course illustrate:

- To help the learner discover and understand the order of the physical environment
- To make the learner aware of the effect of scientific knowledge in everyday life through application to the management and conservation of the environment, the utilisation of resources and production of goods
- To enable the learner to appreciate the responsibility of the scientist to the society
- To inculcate in the learner a willingness to co-operate in using scientific knowledge in the society (Republic of Kenya, 1992: 75)

While the overall intention of Science education as illustrated above includes the important aim to enhance learners' understanding of the environment, the achievement of this initial intention has remained elusive. The implementation of the Science curriculum has never achieved this aim. The secondary school Science curriculum has therefore had to undergo a number of adjustments and revisions in order to more readily achieve its objectives.

Science subjects were previously offered either as three separate subjects (Biology, Chemistry, and Physics) or as two subjects: Biological Science and Physical Science. It was expected that only the schools with well stocked laboratories (mainly the national and provincial/county schools) were to offer the three Science subjects separately in Forms 3 and 4. Although Physical Science as a subject has since been phased out, Biological Science, instead of Biology, is still offered to students with disabilities, perhaps because of the nature of the practical examination in Biology. Other students without disabilities are now expected to select at least two Science subjects from Physics, Chemistry and Biology. Since Chemistry has been made compulsory in most schools, students are expected to choose between Physics and Biology as their other secondary school Science subject. Many students therefore take Chemistry and Physics or Chemistry and Biology examinations at the end of secondary school in order to be granted the Kenya Certificate of Secondary Education (KCSE), which is equivalent to other countries' university entrance examinations. A small number of students in a small number of schools register for Physics and Biology. Some students take all three (pure) Science subjects, although these are mostly youths from secondary schools with better equipped laboratories.

In spite of the changes to the Science curriculum thus far discussed, the secondary school Science curriculum continues to be broad and overloaded. A survey of the revised Science education curriculum currently being used in schools reveals that the order of the topics and the clearer definition of the specific objectives are the only things that may have been revised (see Republic of Kenya, 1992 & 2002). The teaching requirements in particular therefore remain the same, and similar demands are placed on relatively underdeveloped infrastructure in the less endowed schools, mainly from the rural and poorer regions of the country (Development Policy Management Forum [DPMF], 2012). With the introduction of pure Sciences in all secondary schools, changes now need to be made to allow for the teaching of separate Science subjects in all secondary schools. Yet, all along, this has not been affordable in the less endowed schools. This seems to suggest that Science education in these secondary schools could be heading toward more problems, and by extension, Science education in the country will continue to be challenged because most schools lack the materials and resources to enact the mandated curriculum objectives.

Furthermore, the many curriculum reforms, like the recent phasing out of the Physical and Biological Sciences, have resulted in making 'whole' Science available to fewer students in secondary schools. The consequence of this has been that the students in the less endowed secondary schools have been disadvantaged further, since their access to Science has now been reduced. While this might resurrect the question of what the aims of Science education in Kenya need to be, it also suggests that reconsideration be given to the government's plan to industrialise the economy by the year 2030 (National Economic and Social Council of Kenya [NESC], 2007; Wosyanju, 2009) through generating a qualified and scientifically literate human workforce. Curriculum changes may work against the development of Science education in the country: the curriculum reforms thus far may hinder both the intended wider access to Science education and the success of the plans to industrialise the economy.

Apart from the challenges that curriculum changes have posed on the attainment of the aims of Science education in Kenya, Science education has also faced other problems and challenges, some being a consequence of the government's policy of cost sharing, as will now be discussed.

PROBLEMS AND CHALLENGES

The Kenyan government's policy of cost sharing in education has been a major stumbling block to the success of education in the country generally (Mulongo, 2013; Mungai, 2012). Under this policy parents have been left to meet most of the costs of secondary schools, which include general maintenance, physical facilities development, vehicles, electricity, water and other services, as well as personal reimbursement of support staff (Sifuna, 2005; Republic of Kenya, 1999). The high level of unemployment in the society overall and the absence of any social security arrangements have rendered most parents unable to share costs (UNESCO, 2004). This is despite the fact that the government has since reduced the amount of school fees paid by parents for the secondary school education of their children (Jagero, Ayodo & Agak, 2011; Ohba, 2011). The amount of the government subsidy for secondary-school fees is such that the main governmental responsibility is still largely that of provision of teachers' salaries through the Teachers Service Commission (TSC). The salaries account for 90% of the expenditure (Mulongo, 2013; Odhiambo, 2003 & 2004; Sifuna, 2005). The government is still unable to provide all the basic infrastructure for learning and teaching; this therefore remains grossly inadequate in many primary and secondary schools. The Science subjects, because of their capital-intensive nature, remain the hardest hit in this respect. This is so even with additional funding being made available through the Constituency Development Fund (CDF) managed by the members of the legislative assemblies for the constituencies (Nyamori, 2009).

In many secondary schools, for example, Science laboratories, workshops and equipment are inadequate and curriculum materials such as textbooks are in short supply. The situation is so serious in the poorer regions of Kenya as to make it safe to claim that, apart from the enrolled students, such schools lack everything else needed for the successful learning of Science (DPMF, 2012; Ojwang, 2004; Sifuna, 2007). Furthermore, in many schools the number of students in a classroom is higher than a teacher can effectively handle; in some schools, a stream has as many as 65 students (Sifuna, 2005). As a result of this, giving individual attention to students is not possible.

While there is a chronic shortage of teachers for Science subjects resulting in very heavy teaching loads for the teachers who can teach these subjects, the shortage of Science teachers has been aggravated by the government's freeze on mass employment of teachers, which has been in force since 1997 (Kwayera, 2011;

Thuranira, 2010). All teachers at secondary level are supposed to have two teaching subjects, and the rule that expects all students to register for at least two of the three Science subjects (with an option between Physics and Biology) is an apparent attempt to reduce the large teaching loads for the existing Physics teachers. This would seem to be supported by the phasing out of Physical Science in all schools and Biological Science in some, because some teachers have been teaching both of their Science content areas to large classes.

The need for better leadership in secondary schools is rarely mentioned, although many Science teachers have talked about school principals who are deliberately not interested in the Science disciplines (Mwangi, 2009). In the lived experience of this author, some school principals have often frustrated Science teachers' efforts to improve the learning of Science subject matter in secondary schools (Oyoo, 2004). While some principals have openly discouraged students from registering in certain subjects, notably Physics, others have deliberately avoided acquiring even the most basic scientific equipment. This is despite the fact that parents have had to pay for the purchase of scientific equipment and chemicals as part of the cost sharing of education. In some schools, lack of apparatus and materials for Science teaching has apparently been due to the diverting of funds by school principals (Kigotho, 2004). This may be due to the amount of money used in extra-curricular activities such as drama and sport, in relation to the amount of money put aside for these activities in the annual fee structures. This apparent diversion of funds may be the reason that often, no money is allocated to activities related to Science learning, such as students' participation in Science conferences and fairs, or even trips and study excursions.

The overall annual outcomes in each of the Science subjects at the end of the secondary school examinations in Kenya has generally been low. The highest mean score ever attained in each of the subjects in the KCSE since its inception in 1989 confirms that on average, quality scores have always eluded Kenyan Science candidates. An analysis of the levels of attainment in the KCSE covering the period 1989 to 2006 (inclusive) as in Table 1 reveals that in none of the three tested Science areas has the overall mean score ever reached the 50% mark in any one year. Although Table 1 presents an analysis based on the statistics for the period 1989 to 2006 (inclusive), a more recent analysis of the situation (Musasia, Abacha & Biyoyo, 2012) has indicated that this low level of performance in the Science subjects is still prevalent in Kenya.

Table 1: Highest KCSE mean scores between 1989 and 2006 (inclusive)

Subject	Biology		Chemistry		Physics	
GENDER	Female	Male	Female	Male	Female	Male
HMS* %	30.07	33.64	22.31	26.76	38.81	40.57
YEAR	1994	1996	1992	2006	2006	2006

HMS – Highest Mean Score. Source: Oyoo (2008: 274)

In spite of these consistently low Science outcomes, there has been an apparent bias on the part of the Ministry of Education and the Kenya National Examinations Council to highlight only the relatively lower outcomes of females, in comparison to the outcomes of males, as the only problem that needs to be addressed (Chetcuti & Kioko, 2012; Sifuna, 2006). The gravely low mean scores on the National Examinations highlight the need to generally enhance student outcomes in the Science subjects. How to improve the level of outcomes in Science is a perplexing challenge to education stakeholders in Kenya. Generally the fault has been attributed to students' and teachers' negative attitudes towards Science. Teachers in particular have borne the brunt of the blame and a review of the current teaching carried out in Kenyan secondary school classrooms may reveal why.

TEACHING OF SCIENCE IN KENYAN SECONDARY SCHOOLS – A REVIEW

Research studies focusing on Science education in Kenya and Africa have been scanty. Consequently, efficacy of pedagogical practices in the teaching of Science in Kenya and Africa has been considered against findings in research conducted mainly in the developed world, regardless of the different contexts. In a review of Science education research, Harlen (1999) has revealed themes that have dominated research in Science teaching to include: use of practical work, taking into account students' alternative conceptions, emphasis on meta-cognition, relating assessment to content, proper lesson planning, strategic questioning, ability of the teacher to display knowledge of subject matter, and use of theories of learning and teaching Science. In the paragraphs that now follow, a review of the teaching that goes on in Kenyan schools is conducted using some of the themes that have dominated international research on effective Science teaching as the lenses to highlight what kind of Science teaching goes on in Science classrooms in Kenya.

Teachers' inability to relate Science to students' real-life situations

In the current Science teaching context, Science teachers have been criticised for not being intuitive and innovative enough in their teaching. Many Science lessons are still chalk-and-talk lectures, in some cases, straight out of the textbooks. The representation of Science in the mainly imported course books has also not been of help to the teachers. Mostly, teachers have aimed at teaching the content as represented in these textbooks, an approach that has not been beneficial to the students' understanding of Science, especially with regard to relating it to their immediate environments. To corroborate this with respect to school Physics, the following is a common comment from Kenyan youths, including current as well as former school students:

> Physics is not applicable anywhere in my life. I would just be swinging pendulums in class but would not see where it could help me. It is never made applicable in our lives and it just looks like something meant for the classroom (Oyoo, 2004: 28).

This has partly been because getting students to pass the mandated examinations is always foremost in the minds of the teachers, and priority is always given to completing the (wide) syllabus. Examples of bad or unfavourable teaching practices are still common. Students' experiences in some Science classrooms still bear characteristics of what was typical in the immediate post-colonial years as described by Museveni (1997):

> In some Science subjects like Chemistry, the teachers would teach badly, introducing new subjects without explaining their genesis and expecting pupils to 'cram' things without understanding them. They would say: 'The symbol for sodium is 'Na'. When I asked 'Why not say 'So' if it is sodium?' they replied: 'You must just take it as it is'. It was only later that I came to learn that symbols were taken from Latin and were internationally recognised. It was really incredible the way some teachers were turning children against their studies, and so unnecessarily. Their attitude was: 'If you want to pass your exam and get a good job, you take it as it is and memorise it' (Museveni, 1997: 12).

This account also illustrates the authoritative nature of some Science teaching approaches, which may be traced to poor preparation of lessons and/or a poor

grasp of subject matter by some of the teachers. Lack of knowledge of content, and perhaps the consequence of experiences during their own schooling (similar to Museveni's experience as just described), may be part of the reason many teachers do not teach in ways that relate scientific content to students' physical and social environments. This implies that the teaching approaches being used in some schools are not geared to demystifying Science. In some instances, teaching has served to perpetuate the view of Science as a mysterious thing to students. This claim is based on this author's experience, documented in Oyoo (2004: 28) but reproduced immediately below, with a secondary school teacher of Chemistry during an introductory lesson in Organic Chemistry:

> On teaching us the properties of the element *Carbon*, the teacher stated that 'Carbon can form a chain' and perhaps to help us visualise how long the carbon chain could be, this teacher said that 'carbon can join to carbon, to carbon, to carbon, to carbon, to carbon… up to *Siri Guru Masawa. Siri Guru Masawa* is a place beyond the horizon, usually formed by the red rays of the sun as it sets over … a very large water mass near my rural home. It is alleged (as a local myth) that beyond the horizon, at *Siri Guru Masawa*, wild animals, in fact man-eaters, live. To have to imagine that carbon can form chains up to such a place made me wonder about carbon. In the process I stopped writing but I was forced to write all words including *Siri Guru Masawa* – in my mind, *Siri Guru Masawa* was not Chemistry, yet this teacher did not welcome any questions about this at all (Oyoo, 2004: 28).

> Another example of a teaching approach lacking in sensitivity toward Science learners and their backgrounds is evident in the following student's comment about a Physics teacher at a top secondary school in Kenya:

> Sometimes he does something on the blackboard and we just wonder what he is doing... Like working out a question he just speaks to himself... We do very few practical examples and we think he could plan more for us... We are given questions by the teacher and when we look at them and we find that they are too hard and we ask the teacher for help, he does not help (Oyoo, 2004: 235).

> Similar findings have been reported in a study that covered both primary and secondary schools (Sifuna & Kaime, 2007: 121) from across the country.

Use of practical work in teaching Science

In many Kenyan schools, including even some secondary schools with ample resources, fully-fledged practical approaches to teaching Science are not a common feature; many teachers do very few Science demonstrations and almost no classroom experiments (Sifuna & Kaime, 2007). It is common in many schools for practical work sessions to be held just before the national examination, particularly once the schools are aware of which apparatus the candidates would be expected to use in the practical exam; this practice still persists across the country (Mabatuk, 2014). Some teachers do not engage in hands-on work because they consider some chemicals as harmful to students' health. This lack of practical work during the teaching of Science means that school Science graduates never attain a mastery of the skills necessary in the learning of Science.

Gender issues in teaching Science

Some teachers still hold to the belief that students' Science learning abilities are determined by their gender (Chege & Sifuna, 2006; Tsuma, 1998). Hence, teachers have been blamed for discouraging girls:

> … by consciously or unconsciously perpetuating long-held myths about girls' inability to cope with these subjects which are deemed more suitable to males. Many teachers discourage girls from continuing with Science… by accepting mediocre performance by the girls as opposed to boys… enforcing the belief that the subjects are designed for boys (Oyoo, 2004: 29).

In one study in the Kenyan context (Oyoo, 2007a) a girl-favourable approach (though not an exclusively girl-specific approach) to the teaching of Physics has been characterised. With this approach, teachers need to attend more to students' social needs in Physics/Science classrooms during teaching. This is the way that has been associated with the 'feminisation' of Science by many Physics teachers (Baram-Tsabari & Yarden, 2008; Chege & Sifuna, 2006; Chetcuti & Kioko, 2012; Sifuna, 2006). Meanwhile, Physics teaching methods in boys-only classrooms have been markedly different. A typical approach is evident in the following statement made by one teacher at a well-established boys-only secondary school:

> It should be known that Physics is a doing subject and the learner has to do more than the teacher does… In Physics, pupils should be involved more with exercises and practical [activities] (Oyoo, 2004: 230).

Such an opinion is perhaps the result of the belief widely held by Kenyan Physics teachers and the society as a whole: that boys are better able to take responsibility for their learning, including the ability to do things using their own initiative. It is therefore a surprise finding that the academically stronger boys who formed part of the sample in the Oyoo (1999) study gave a higher rating than girls to the 'girl-favourable approach' to Physics education. As reported in the study, 'the boys, more than the girls would prefer a teaching approach where Physics teachers give students notes, motivate students and smile at the students in class' (Oyoo, 1999: 44).

While it is the expectation that teachers should know that even among the boys in the Physics classrooms there are individual differences, it could be inferred that the study revealed neglect of use of the affective domain to enhance teaching Physics to male students. The Physics teachers, as a result, could be argued to be exercising gender bias against the male students just as they have been blamed generally for the alienation of girls.

Insensitivity to linguistic ability of Science learners

English is the language of most school education in Kenya, including secondary education. The non-uniform distribution of educational resources in Kenya (Mulongo, 2013; Thuranira, 2010), including the deployment of English teachers, has resulted in students not attaining the required level of proficiency in English at the end of their primary schooling (Clegg & Afitska, 2011; Wagner, 2014). With regard to the role of the English language in mastery of school subjects, the common observation is that students who score poorly in secondary school examinations tend to be those who had low primary school English scores. Hence, proficiency in English is a major contributor to successful learning of most school subjects (Clegg & Afitska, 2011). This observation has led to the widely held assumption that once the students have attained proficiency in English, they should be able to understand everything taught in the classrooms (Rollnick, 1998 & 2000). Consistently lower outcomes in some school subjects in Kenya, especially the Sciences, have however shed doubt on the validity of such an assumption. Yet even Science teachers have fallen victim to this inaccurate assumption; as a result, they have contributed to making Science not only difficult but also unattractive to school students through their classroom language usage. This is evident in one Kenyan Physics teacher's recollection of how he went through school Physics during his school days:

> The first teacher who taught me Physics in Form One messed up my life. He could not communicate. I think he was a very bad speaker and he would also assume a lot of things; yes, just talk, talk, talk and go and he did not involve us in any communication. We didn't have the chance to talk; that was Year One and Year Two. Year Three I was taught by a lady teacher, who would explain every word of the sentence and very exhaustively and I liked it and even now when I meet her I tell her *mwalimu* (teacher) that was good. So I have had those two extremes. Then I think when I was in 'A' level, I was taught by another teacher who was not very keen on explaining the words. So he talked…superficially but in Form Five I had the interest and I could go looking for the meaning of the words myself (Oyoo, 2004: 219).

In this recollection, it is apparent that the first Physics teacher might have assumed that the students had been well prepared in English at the primary school level. Meanwhile, the second teacher taught in a way that the speaker liked. As for the third instructor, the Physics teacher forgave him, since by Form 5 (A level), the student (now teacher) was able to take responsibility for his learning. The question remains as to when or at what level students are best able to take control of their learning. It seems a benchmark level of proficiency in the instructional language and its relationship to successful learning remains elusive (Oyoo, 2007b).

Evidence that Science teachers' use of language during teaching has the potential to reduce or discourage enrolments in Science classrooms can be construed from the response by the same Kenyan Physics teacher when he was asked the following additional question:

> **Question:** So from that experience would you say that the teacher who did not communicate well almost made you opt out of the subject?

> **Response**: Yeah it is true. You know Year [Form] 1 and 2 Physics was compulsory and at Year [Form] 3 it was optional… So, at the time I could think of quitting Physics, the better teacher came (Oyoo, 2007b).

The aforementioned are examples of the unfavourable Science teaching approaches that have persisted throughout Science education in Kenya (see also Sifuna & Kaime, 2007). The existence of approaches considered unfavourable by students in secondary schools is itself enough evidence for seeing Science teachers' work as one reason that students' outcomes in Science have continued to be low, as

already discussed. While it would be an inaccurate and unfair representation of the Kenyan Science teaching situation to generalise these claims to all teachers in all secondary schools in the country, the point is that some teachers have continued to perpetuate the reputation of the Science subjects as being very difficult. However, other factors mentioned, such as how schools are endowed with resources for teaching Science, impact teaching methods differently in different schools and must not be ignored. Also noteworthy is the fact that individual differences exist among Science teachers. It can safely be stated that in reality, teaching approaches are never the same between any two teachers and may be expected to vary from teacher to teacher even within the same school following the same local and national teaching policies.

Since most Science teachers in Kenya are relevantly qualified, many factors, some beyond the control of these teachers, can be considered instead. Most of the challenges and problems discussed thus far are direct outcomes of the economic policies put in place by the government, especially that of cost sharing (Jagero, Ayodo & Agak, 2011; Mungai, 2012). So the question may be: what is the best approach to successful Science education in Kenya, given the limitations already discussed? As mentioned, the secondary school teacher holds the key, and strengthening the teacher may be the solution. In this light, teaching practices and activities that could help turn around Kenyan students' outcomes and experiences in Science classrooms will now be discussed. This will be accomplished through focusing on the teaching of school Physics, the most challenging Science subject in all Kenyan secondary schools (Oyoo, 2008).

TOWARDS EFFECTIVE TEACHING OF SCIENCE IN KENYA: SOME SUGGESTIONS

Teaching has been described as a web of alternatives in which students engage with content: sometimes with the teacher, sometimes with each other and sometimes alone (Ronkowski, 1998). This view of teaching fits well with the argument that effective teaching of Science requires multi-pronged approaches (Harlen, 1999; Gunstone & Mitchell, 1997; Leach & Scott, 2000 & 2003) in order to make the subject relevant to the students' immediate environment. Matthews has made this even more apparent in the following standard summary of teachers' attempts to create meaningful learning in Science classrooms:

… during effective teaching of Science, teachers convey the ideas of Science by trying their best to explain the *concepts* and *operations* clearly, to make use of metaphors, to use demonstrations and practical work to flesh out abstractions, to utilise projects and discussions for involving students in the subject matter (Matthews, 1998: 9).

Thus, in Kenya's case, teacher activities that use approaches that make Science/ Physics more accessible and relate it to everyday life would help make teaching more effective. It is the use of these that will provide proof of effective teaching, especially when benchmarked against the themes that have dominated research on effective teaching (Harlen, 1999), including being cognisant of nature and the role of the language of instruction in learning and assessment (Oyoo, 2004). What will be highlighted next are suggestions that help teachers manoeuvre among formidable curriculum and resource challenges that could otherwise deter them from both successful Science education and effective classroom practice.

Countering the foreignness of Science as presented in textbooks

In order to counter the foreignness of Science as presented in imported textbooks, it would help learners to embrace the subject if teachers *used relevant examples for questions and problems during teaching*. The questions can be related to local developmental topics. Assignments after a lesson can be used to show how the lesson topic relates to real-life situations, and this can be done without taking up any valuable lesson time.

Using the environment in teaching

Another way of encouraging learners to embrace the subject as well as a way to relate the content to the students' immediate environment can be when teachers *use a visit or a familiar item to introduce a topic* – a teacher entering a class with a charcoal stove should certainly arouse some interest, probably more than if using standard equipment (Pearce, 2007). Alternatively, a visit can stimulate learning to the extent that, on balance, time is saved and subsequent lesson time may be made even more efficient. It is for this reason that school principals need to support school visits to Science centres or industries in the schools' neighbourhoods.

Using everyday items for experiments and demonstrations

This is the essence of being innovative in Science teaching, for example by using freshly prepared orange juice as a source of electricity. This suggestion is part of the need to be able to improvise (Ndirangu, Kathuri & Mungai, 2003) as and when necessary, especially because of the general lack of teaching materials for Science, including chemicals. Improvisation needs to be considered to include the use of our environment to enhance teaching (Carelse, 1983; Chiaverina, 2008; Martinuk, Moll & Kotlicki, 2010). In this line of argument, it has been suggested that the teacher should be aware of all potential visual aids in the vicinity (Krieble & Salter, 2008; Swift, 1983). For example, black and white wall and metal surfaces in the sunlight can be used to illustrate heat radiation; desk lids and pencils and rulers are ideal for illustrating 'moment of forces' or torque; sagging of power and telephone lines can explain thermal expansion; etc.

Planning for practical work

Mastery of the skills necessary for the learning of Science includes the students' ability to manipulate different pieces of apparatus that they may need to use during practical lessons. A method of training students in handling apparatus (practical work) while at the same time managing time during practical teaching would be teachers' use of a *circuit approach.* This is where a teacher plans for a number of different short group experiments using different pieces of apparatus within one lesson. This way, it becomes possible for the teacher to cover different practicals or make students use different pieces of apparatus in one session – this approach will also enable effective use of scarce Science teaching resources.

Helping with the school Science Club

Many schools have Science clubs or similar out-of-class groups, often working towards a national Science congress or other inter-school competition. If the topics illustrated are being covered in lessons, they will help the keener students to develop their knowledge of the topic and perhaps save time that could have been used during the normal lessons for an explanation. Some projects that relate directly to the local situation will help relate Science to the students' normal environment, and in the process make them see the connection more vividly. Alternatively, this can be done through a formal project.

Using a project approach

Instead of teaching Science/Physics topic by topic, the subject matter to be taught can be embodied in a practical project, for example, a design study. The project could be introduced through a study visit and the Science/Physics topic introduced as needed. Depending on student performance and involvement, such projects could even replace practical examinations, or internal continuous assessment. At a national level this could also be implemented[1] providing safeguards are taken to restrict the degree of teacher and parent participation in the project.

While the above teacher activities are meant to help the teacher to enhance students' understanding of what is taught, teachers rarely question their own practice; yet such questioning would enable them to better their performance as teachers. Such questioning would include the teacher assessing his or her own lessons.

Following up on or assessing own lessons after teaching is necessary, as this provides a reflection on efficacy of approach as a means to effective learning (Hopp, 2008). This is an aspect of 'professional development' under the action research concept. Action research is conceptualised as the act of teachers systematically recording what they do and how the students respond during the lessons. It is a relatively untapped form of educational research that allows teachers to learn from experience. By keeping these records, 'teachers help to halt epidemics of pedagogical amnesia' (Nafziger, 1998: 72). In practice, since teachers rarely look back on their teaching, it is forgotten year-to-year, with the consequence that the learning that does occur is rarely articulated and shared with others. Reflecting on and documenting experiences during teaching sessions could revolutionise teaching and identify favourable approaches for learners in similar environments. This is especially true in determining the cultural propriety of teaching approaches.

Sensitivity to equity issues in Science teaching as an aspect of effective teaching must not be ignored (McCullough, 2007). Neither can the need for sensitivity within the school's language policy toward students' linguistic capabilities be discounted. With regard to gender in the Kenyan Science learning context, changes in how teachers treat female learners would affect how they respond (Oyoo, 2010). Ultimately, the effective teaching of Science requires that the teacher relate to each

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1   It is noted that the implementation of this approach in primary schools has not been successful, as parents would buy ready-made items which they would present for assessment on the pretext that they were made by their children.

student in the classroom as an individual, who happens to be of a certain gender (Roudebush, 2010). The following assertion by Murphy (1996) is especially relevant to this line of thinking:

> We need to talk in terms of not a pedagogy for girls or boys but a pedagogy being composed of a range of strategies (which include a range of materials and content, teaching styles, and classroom arrangements/rules) for different groups of students … The key issue is for the teacher to understand which strategy is appropriate and effective in which setting and for which group of students and individuals (Murphy, 1996: 8).

With regard to the language difficulties students may encounter due to inadequate instruction, it might be necessary for teachers to respond to the students' circumstances by lowering the classroom language level (Henderson & Wellington, 1998) so that it does not become a barrier to the learning of Science (Bautista, 2014). This can be done by adjusting for how meanings change when words are used in a scientific context or as scientific terms (Oyoo, 2012). Teachers need to be conscious of learners' proficiency levels in the language of learning and teaching.

In sum, the use of a contextually relevant approach to teaching Science is necessary, especially when Science is taught to learners whose environment is different from what is taken to be conventional (or mainstream) by the scientific community, and reflected in textbooks or research contexts. An effective teaching method involves the judicious implementation of the widely recommended approach to Science teaching: connecting concepts to students' personal, social and physical environments. It is probable that this approach to teaching will demystify Science. Now we turn to the next consideration: How may this approach be sustained?

SUSTAINING EFFECTIVE TEACHING OF SCIENCE IN SCHOOLS: TEACHER AND PROCESS

The central role of secondary school teachers

The central role of Science at secondary school level as the key to the overall success of Science education is first discussed in some detail. The many challenges and problems facing Science education in Kenya, which have been touched on earlier, hinge on policies that the government or other interested stakeholders can work to remove from the schooling system. However, the success of any changes will

depend of the quality of the teachers and teaching of Science in schools (Ngware, Oketch & Mutisya, 2014; Schwille et al., 1983). The problem of poor performance in Science education at secondary school level can be traced to the primary school level, where a good foundation in Science needs to be laid. In the Kenyan system (which is similar to many other countries) there is a generalist or non-specialist approach for preparing teachers to teach in primary schools.

At the primary teachers' colleges in Kenya, teachers study 13 compulsory subjects without specialisation in any of them. It can be argued that many graduates of teacher education programmes often leave college without adequate mastery of either the content or relevant methodology required for teaching Science. Many of them are therefore challenged when it comes to laying the necessary foundation in Science for learners at primary school level. However, they cannot be blamed them for this; the entry requirements for Kenyan primary teacher training colleges do not emphasise Science (Chege & Sifuna, 2006). Thus, many teacher trainees who possess a poor background in Science subject matter have gained admission into teacher training colleges. A long-term solution to this problem may be found in secondary school teaching of Science.

In Kenya's 8-4-4 system of education, secondary school graduates at Form 4 are recruited to be educated as teachers of Science at all levels depending on their overall examination outcomes (KCSE). How effectively the secondary school Science teachers teach Science to the secondary school students determines to a certain extent the level of competence of secondary school graduates, who themselves are potential Science teacher trainees. The secondary school graduates recruited to the primary teacher training colleges, as well as those who will join the diploma colleges and universities to be trained as secondary school Science teachers, need to have a good grounding in Science. Currently, these candidates have to pass Science subjects and Mathematics as prerequisites in order to be accepted into teacher training institutions.

The secondary school Science teachers, by teaching Science effectively, will provide a solid foundation on which tertiary educators can build, to produce better and more confident teachers of Science for the Kenyan school system. The quality and efficacy of Science teachers at secondary school level therefore remains the major factor in moving successful Science education forward in Kenya. The processes required to sustain suggested approaches to enhanced practice of Science teaching at the secondary school level are discussed next.

The processes necessary to sustain the suggested teaching approaches

The themes that have dominated research in Science teaching as reviewed in Harlen (1999) have been mentioned in this discussion. Even though the research studies have been conducted mainly in the Organisation for Economic Co-operation and Development (OECD) countries, the findings within these same research themes have always informed pedagogical practices in the teaching of Science in Kenya. Investigating the findings of these research studies has been problematic in that the dissemination of the findings has often occurred without any attempts to localise them to fit the African milieu, which differs from the 'mainstream' Science education terrain. A dire need exists to interpret findings and recommendations from these studies to suit the circumstances prevalent in Africa; some, though understandably not all, of these circumstances have been mapped in this work.

Since field-based research on teachers and teaching in Africa is sparse, this necessitates the raw consumption of findings arising from studies conducted in other contexts. Perhaps the time has come for more *collaborative forms of research aimed at connecting what is known in research terms to the African situation.* Possibly through theory, practice and policy fruitfully informing one another, a means to enhancing teacher efficacy and more successful Science education in Africa will be discovered. Locally, this would begin with wider access to quality Science education, and resources that would promote rather than hinder its success. A further recommendation would be to make 'whole' Science once again compulsory for all at the secondary school level, either with learners taking all the three Science subjects separately or combined under the Biological Science and Physical Science focus areas. The foregoing has arguably justified the potential contribution of *(collaborative) research and curriculum review for sustainable effective teacher practice in Science education.*

Initial and continuing professional development of Science teachers is also a means to ensure and sustain teacher efficacy: appropriate curricula in higher education would aid in the preparation of relevantly qualified and experienced teacher educators over the long term (Creemers, Kyriakides & Antoniou, 2013; Guskey, 2002). Where in-service training or continuing professional development programmes are concerned, foci need be on the weak areas as contextually determined in order to respond to the needs of the local milieu. Calloids, Gottelmann-Duret and Lewin (1997: 125) have outlined the following approaches to in-service education:

- In-service days where teachers are gathered locally at special centres to discuss particular topics
- Short in-service courses lasting up to a week, in regional centres run by national staff members
- Longer in-service courses lasting three months or more, associated with certification and upgrading of qualifications
- School-based in-service support (otherwise known as on-service) during and after school hours, located in schools (see also Sifuna & Kaime, 2007)

Since the financing of education in Kenya is such that funds for these in-service courses are the responsibility of the parents, it is important to consider the most economical approach (Sifuna & Kaime, 2007). It may be true that the cheapest forms of in-service support are almost certainly those which are delivered locally or through school-based sessions, and these can be conducted by local amateurs such as subject associations and panels (Calloids, Gottelmann-Duret & Lewin, 1997; Guskey, 2002). However, the most economical approach and the most lasting approach may constitute two different approaches used in combination.

CONCLUSION AND WAY FORWARD

This paper has revealed that Kenya, along with other African countries (see Ogunniyi, 1986 and Reddy, 1998 for detailed reviews), experiences problems that hinder proper access to and outcomes in Science education. These include, but are not limited to, lack of resources for teaching Science, inadequate laboratory facilities, too few Science teachers and large classes. An additional factor is the remuneration of school teachers, which has been a major source of teachers' dissatisfaction with their work (Sifuna & Kaime, 2007). Hence, it also is an important consideration in the shaping of teachers' general commitment to and satisfaction with their jobs. As is apparent from the discussion in this paper, the scenario in the Science education field in Kenya has been adversely impacted by the government's economic policies. Paradoxically, the government hopes to improve the country's economy through Science education and training (see Republic of Kenya, 1998) and Science education and training requires more of the nation's resources to improve the economy. The reality is that with or without a good Science curriculum, the country's economic circumstances remain an important factor in the level of success of Science education as well as in the efficacy of Science teachers. Curriculum and resource issues aside, it remains a fact that the cause of consistently poor

outcomes in Science as discussed can be traced to Science teachers' classroom and teaching practices at both primary and secondary school levels. Hence, a great deal has been suggested in this work concerning how a teacher as an individual can be helped to improve his or her pedagogical practices to become more effective.

In this paper, I have argued that Science teacher efficacy is a key factor in the successful implementation of effective Science education in Africa. The discussion has centred on Kenya as a typical African country that shares similar national development plans and dreams as well as a socio-economic context with most African countries. In this work, suggestions of contextual and (not so new) practical approaches meant to enhance and sustain Science teacher efficacy have been discussed. It is hoped that this work will generate debate within and about Science education in Africa, to ignite productive cross-border research and other ventures to tackle the whole question of quality Science education in Africa and elsewhere. This work is a clarion call aimed at 'waking up' all stakeholders across all nations to the current state of affairs in Science education.

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EXPERIENCES OF DISTANCE EDUCATION AND DEVELOPMENT IN AFRICA: A CASE STUDY OF THE NATIONAL OPEN UNIVERSITY OF NIGERIA

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ABSTRACT

The place of teacher education in the context of the overall development of any nation is extremely important. The emergence of open distance learning, with its particular characteristics and its usage in offering teacher education programmes, has created unique challenges for teacher education. This paper uses a historical-cum-descriptive approach to provide an overview of various attempts at using distance education in offering teacher education in Nigeria. It aims to focus attention on important aspects of teacher education such pedagogy, teaching practice, and curricular as well as programme administration, among others. The challenges that the National Open University of Nigeria experiences, as well as efforts to address these, are highlighted with the purpose of providing evidenced-based experiences from which other countries can learn.

Key words: open distance learning, pedagogy, teacher education, teacher effectiveness, teaching practice, teaching skills

INTRODUCTION

The global target of the year 2015 (namely the eradication of illiteracy, ignorance and poverty) calls for a radical result-oriented strategy for producing effective and efficient teachers as anticipated change agents. The choice of open distance learning (ODL) is seen as an answer to the challenge of training about sixty million unqualified teachers (UNESCO, 2001 as cited in Jegede 2002). The need to adopt or adapt a teaching mode such as ODL is also necessary when one considers the fact that the content of teacher education is truly diverse, and it has expanded beyond the confines or scope of any particular geopolitical entity.

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In Nigeria, the relevance of ODL for the provision of the required quantity and quality of teachers is not in doubt. Although the shortage of trained teachers cuts across all levels of the nation's educational system, the country's greatest need is for teachers at basic education levels. Ali (1997) reported that the number of university professors who have left the university system in Nigeria either due to retirement, brain drain, death, or other causes has continued to increase: from 273 professors in 1982 to 793 in 1995.

During the year 2000 (UNDP, 2001 as cited in Alan and shahjamal 2008; UNESCO, 2000; UNESCO, 2001as cited in Jegede 2002), the educational data revealed that the teaching force comprised 224 896 primary school teachers and 113 215 secondary school teachers compared to the total enrolment data of students of 133 000 and 96 000 both at primary and secondary school levels. During June 2013,it was obtained from Nigerian dailies that the governor of one of the states threatened to declare about 96 000 primary school teachers redundant, since according to him they were either not qualified, or qualified but not competent.

Teaching in Nigeria is fast becoming a female-dominated profession, and is becoming one of the least-preferred professions for young school leavers. ODL has become the choice of many adults, mostly women, who for economic reasons choose teaching rather than other professions as their first choice. This affects the training of the pre-service as well as in-service teachers already in the ODL system.

It could be disastrous for society at large to discard the acquisition of basic skills that student teachers need before they leave the colleges or universities where they receive training. Salawu, (1999) posits that trainers of teachers are expected to make use of best practices to support their students in learning essential skills, knowledge and attitudes.

Many countries make use of the opportunities that science and technology provide in the training of their professionals. However, this is not the case in the training of teachers in Nigeria. As the world constantly changes and thus affects educational practices, there is a dire demand for the use of better educational tools. In light of this, there is a need for Nigeria to provide the best form of training to teachers. There is truth in the statement that no educational practice can rise above the quality of its teachers. Therefore, in situations where the present training models are inadequate or deficient, these should be replaced with better, result-oriented methods.

In Nigeria the conventional lecture method has dominated in the training of teachers since the colonial era (Salawu, 1999). This mode is no longer considered entirely suitable in assisting student teachers to acquire complex teaching skills. The public associates the annual mass failure of students in almost all subjects in public examinations, especially the Senior Secondary Certificate Examination (SSCE) conducted by the National Examinations Council, to the manner in which teachers are trained. As teachers remain facilitators of learning, it can be assumed that they have a role in determining the success or failure of their learners (Okebubola, 2013). Adokiye, (2013) suggested that one of the roadblocks to harnessing the power of education in the pursuit of the Nigerian Vision 20:2020 is the quality and quantity of teachers. The entire system is understaffed and deprived of good teachers, which in turn depresses the quality of outcomes at all levels. Nigeria's vision 20:2020 is a roadmap focused to transform the country into one of the world's top twenty economies by the year 2020. This initiative was first mooted by the administration of Chief Olusegun Obasanjo (1999-2007), but it was the late President Umaru Musa Yar'adua led administration that set up the National Council on Vision 2020, in May 2009, to develop a blueprint for the vision in collaboration with the National Planning Commission (Igbuzor, 2010). According to Nigeria vision 20:2020 Economic Blueprint (2009).Due to compromised human resources, the goal of attaining Vision 20:2020 becomes impaired.

Teacher education programmes in Nigeria

According to Aleyideino (1996) teacher education is designed to groom those who teach, or would like to be involved in relevant professional services to schools, colleges and the ministries of education, as needed. Nwana (1996) also defines teacher education as the production of would-be-teachers for pre-primary, primary and secondary schools and colleges. Robinson and Latchen (2003) as cited in Dorado and Orero (2007) describe teacher education as encompassing the whole process of teacher preparation in terms of academic subjects, pedagogy, as well as personal development.

Adeoye and Salawu (2005) posit that teacher education has become a central issue of public concern across the globe as the ramifications of political, economic and social change impinge on educational systems. The Nigerian Federal Government recognises the importance of teacher education, as entrenched in the National Policy on Education of 2004; the main objective of teacher education is the production of highly competent and motivated teachers. The aim is to produce teachers who are

emotionally, intellectually, and professionally equipped for effective teaching of all subjects at all levels.

Teacher education in Nigeria is about 160 years old. Within this period, much change has taken place. Okobia (1985) noted that, throughout the developmental history of education in Nigeria, there had never been a clearly perceived, identified, planned and sustained pattern of teacher training education.

Different categories of teachers have emerged at all levels of the nation's school system, e.g. those who obtained Grades III, II, and I Certificates; or the Nigeria Certificate in Education (NCE); or the Postgraduate Diploma in Education (PGDE) (Obanewa,1986). The Grade III teacher education programme has been abolished and attempts are being made to phase out the Grade II certificate programme, as the NCE is now accepted as the minimum teaching qualification.

The global trend in teacher education calls for the teaching of foundation courses such as Psychology, History of Education, Educational Technology, Philosophy of Education, and Curriculum Development, with emphasis on practical teaching, in order to prepare teachers for teaching at primary and secondary schools. This practice corroborates the view of Fagbolu (1984) when he asserts that it is now universally accepted that teachers at whatever level should have a broad-based education in addition to a specialisation in a specific field of study.

The practical aspect of teacher preparation in Nigeria's universities and colleges of education takes the form of a short-term attachment, followed by longer-term attachments, to the schools of practice (Obanewa, 1986). The first encounter is a 12-week period in total, consisting of the six weeks of teaching practice during each of the second and third year of a four-year B.A./B.Sc. Ed./B.Ed. degree programme. This model applies to most of the colleges of education. The 12-week teaching practical for the second- and third-year students in the NCE programme is also divided into two- six-week per session. There is also, the 12-week single block approach. A third approach is one whole session of teaching practice, which is popularly known as the Ikere-Ekiti teaching practice model.It is so called because the it was originated by Ikere Ekiti College of Education,Nigeria.

Diverse opinions have been voiced regarding the organisation of both the short- and long-term teaching practice exercises in Nigeria. Obanya (1984) lists issues associated with short-term teaching practice:

- The period of practice is too short to enable the trainee teacher to practice anything.
- Due to the large number of students involved in practice teaching, college/ university supervisors cannot supervise all.
- Permanent teachers seem not to realise their roles relating to the student teachers allocated to their care.
- Supervision of teaching practicals is not at all adequate, as supervisors seem more interested in students' scores, showing little concern for interpersonal discussions at the end of a teaching period. It is not uncommon for supervisors to assess student teachers' performance by merely reading through the prepared notes of lessons, and thus opportunities for professional growth are lost.

DEFINING OPEN DISTANCE LEARNING

ODL is a self-paced learning process, in which the student dictates his or her own time and place of learning (Chandler, 1991). Open education implies freedom from formal restrictions and the rigidity of the conventional face-to-face mode. It also differs as to the teaching media, space and time, course contents, and in some cases, course objectives. Greenberg (1998) as cited in Tshibalo (2007) describes distance education as a planned teaching and learning experience that uses a wide spectrum of technologies to reach learners and certify learning. Teaster and Blieszer (1999) as cited in Rashid and Rashid, (2012) posit that the term 'distance education' has been applied to many institutional methods. However, the primary distinction is that the teacher and the learner are separated in space and time. The term ODL is therefore used when addressing a whole range of related forms of teaching and learning, which focus on openness concerning access, organisation, and methods, as well as flexibility in delivery and communication patterns, and the use of various technologies in support of learning.

OPEN AND DISTANCE LEARNING (ODL) AND TEACHER EDUCATION IN NIGERIA

Teacher education in Nigeria evolved in about 1842, due to the work of western missionaries. Since then, Nigerian teacher education has undergone much change. Initially, the curriculum comprised mainly religion-based learning, English, and

arithmetic, using a conventional face-to-face mode. Later, the paradigm shifted to reflect the needs of the society. This shift has allowed for a diverse range of teachers and outcomes. In all of the categories, the preparation programmes that are conducted (through a conventional mode at all levels of teacher education) are triadic (Salawu & Aniemeka, 1992 as cited in Adeoye and Salawu, 2005): an academic programme, a general studies programme and a practice teaching programme. ODL at all the institutions effectively serves three broad categories of teacher education and training: (i) initial training of would be teachers (pre-service), (ii) continuing professional development (in-service training), and (iii) and curriculum reform.

During the last thirty years, the teacher education programme has witnessed many changes in terms of instructional delivery mode in the institutions responsible for teacher training:

- The Correspondence and Open Studies Unit (COSU) of the University of Lagos was established in 1974. It later changed to the Correspondence and Open Studies Institute (COSI) and is currently known as the Distance Learning Institute. This was the first attempt in establishing a distance education unit as part of a university in Nigeria. Initially it offered teacher training in Science education at first-degree level in Biology, Chemistry, Mathematics, Physics, as well as the Postgraduate Diploma in Education (PGDE).

- With the support of UNESCO, the National Teachers' Institute (NTI) started as a distance education organisation in 1976. It began by training Grade 2 Teachers (TC.II). In 1990, the Nigeria Certificate in Education (NCE) programme was introduced, when the expectation of a minimum teaching certificate changed. The institute also introduced the PGDE in 2005.

- Ahmadu Bello University (ABU) also showed interest in distance teaching for Grades 2 and 3 teachers, with a view of helping them to qualify for the next higher grade in teaching through an arrangement known as the Teachers-in-Service Education Programme (TISEP).

- TISEP also provided distance education courses, which culminated in the awarding of the Nigeria Certificate in Education (NCE).

- The concerns of ABU regarding distance education at the tertiary level were articulated in November 1972, when it established a 'university of the air' programme for teachers in secondary schools and teacher training colleges.

- The external degree programme of the University of Ibadan, which commenced in 1979, recently changed over to the Distance Learning Institute. The programme was designed to provide in-service training for NCE holders, in order for them to become degree holders in education.

- The resuscitated National Open University of Nigeria (NOUN), a strictly ODL institution, has a school of education with the mandate to provide pre-service and in-service training of teachers.

- Besides the institutions previously mentioned as involved in the training of teachers through distance learning modes in Nigeria, there are other universities that also engage in training of teachers through various forms of distance learning programmes.

The use of ODL for teacher education has achieved success in a number of ways:

- Providing cost-effective teacher education and training

- Reaching remote and rural teachers and widening their access to learning opportunities and resources

- Providing large-scale education and training (initial and continuing) within a shorter time span than conventional face-to-face training

- Providing an affordable alternative to 'off-the-job' residential models of in-service training for either initial training or continuing professional development

- Supporting school-based programmes of initial teacher training

- Providing a route for unqualified graduate teachers to gain the required teaching qualifications while working, i.e. simultaneously upgrading their qualifications

ICT AND TEACHER EDUCATION IN NIGERIA

ICT refers to a whole range of information and communication technologies involved in information processing and electronic communications (Salawu, 1999). The use of ICT includes radio, television, videos, computers, sensors, interface boxes, email, satellite connections, the internet, and software and materials that teachers can employ for teaching and learning. In many countries, educational planners and policy makers are faced with the dilemma of how to improve the quality of education as a response to the challenges of the advanced use of ICT, as well as developments in science and technology that have caused the incorporation

of new concepts and techniques into the teacher education curriculum. Technology is changing the instructional process (Kosakowski, cited in Charakupa, 2002). Furthermore, teaching and learning in an online environment is different from traditional classroom settings. Kosakowski, cited in Charakupa, 2002 posits that online education allows increased flexibility in scheduling and location matters. It also allows increased frequency of interaction between students and instructors. Furthermore, email enhances meaningful person-to-person discussion with students about their academic work.

Ajayi (2001) proposes that new ICT facilities could allow teachers and lecturers to move into the roles of guides and facilitators, assisting students to gain the skills required to acquire and utilise knowledge available in various forms all over the world. According to UNESCO (2002) teacher education institutions may either assume a leadership role in transforming education, or be left behind in the swirl of rapid technological change. Some advantages of infusing ICT into teacher education Nigeria include the following:

- Facilitating an increase in qualified teacher creation, especially in disciplines where there are insufficient teachers, i.e. Mathematics, Science, English language
- Enhancing the quality of teacher education by exposing pre-service and in-service teachers to resources and information beyond their immediate horizon
- Limiting or eliminating the requirement for building large classrooms, laboratories and libraries
- Enabling easy access to institutions responsible for teacher education, such as the National Teachers' Institute (NTI), colleges of education, faculties or institutes of education in universities, and the School of Education at the National Open University of Nigeria
- Enhancing easy handling of large student populations
- Allowing students easy access to information in ODL programmes
- Simplifying the task of teachers/lecturers/facilitators, while the scope of interaction with materials is broadened

USE OF OPEN AND DISTANCE LEARNING IN TEACHER EDUCATION IN OTHER COUNTRIES

ODL for teacher education is widely used around the world, in small and large countries, and in a variety of contexts. In Latin America, some of the largest distance education programmes are for teacher education (Chacon, 1999 as cited in zondiros, 2008). Two thirds of tertiary institutions that offer distance education in Egypt also provide teacher education. Many countries with large populations, such as Bangladesh, Brazil, China, India, Indonesia, Mexico, and Pakistan, make use of open and distance learning. Brazil, China, and Indonesia all have large-scale programmes for distance education teacher training.

India has a wide variety of ODL programmes for teachers, and Pakistan and Bangladesh train teachers through their open universities. Egypt has established a video-conferencing system to provide in-service teacher education to more teachers. However, in Africa there is still much scope and need for the further use of ODL. Currently there are more than 140 public and private institutions that offer distance education programmes. More than half of these institutions offer teacher training (World Bank, 2001).

Some of the least populated countries embrace distance learning as well. Mongolia has used ODL to reach teachers scattered across large distances (Robinson, 2001) while Canada employs ODL for its unpopulated areas (Burpee & Wilson, 1995). In industrialised countries such as Great Britain and the United States of America, a wide range of education programmes are available through distance education. With the integration of ICT in schools, teacher education institutions are expanding their provision and promotion of the use of ODL in contexts where it was previously seldom used for teacher education.

TEACHER EDUCATION PRACTICE: THE NATIONAL OPEN UNIVERSITY OF NIGERIA MODEL

At the National Open University of Nigeria, the School of Education is one of the five academic schools within the University. The training of student teachers is divided into three major areas: content, pedagogy and practical teaching. In order to ensure production of quality teachers, certain precautionary steps are taken:

- Preparation of Outlines Programme Proposal (OPP) and Detailed Programme Proposal (DPP): these are in line with the National Universities Commission Benchmarks for senate consideration and approval.

- Development of course materials: course materials form one of the available means through which students' access the content of the courses for which they register. In order to ensure quality course materials, specialists engage in the development of courseware. In addition, editing is performed at three levels. Firstly, a specialist is engaged in editing the material. Secondly, outsourced editors, as well as an in-house editor, are ensured. Thereafter, a competent editorial team, comprising subject and language experts employed on a permanent basis, provide the final editing work for each of the courses under development. The courseware is developed with utmost regard for open and distance learning courseware tradition, using a modular approach, with consideration for the specific attributes of distance learners. The adoption of a team approach ensures the integration of the expertise of subject experts, instructional designers, editors, and graphic artists.

Admission requirements for the National Open University of Nigeria programmes

Criteria for admission into any of the twelve academic programmes at undergraduate level in the school are the holding of a:

- B.A. Ed. Early Childhood Education
- B.A. Ed. English
- B.A. Ed. French
- B.A. Ed. Primary Education
- B.Sc. Ed. Biology
- B.Sc. Ed. Chemistry
- B.Sc. Ed. Business Education
- B.Sc. Ed. Agricultural Science
- B.Sc. Ed. Mathematics
- B.Sc. Ed. Computer Science
- B.Sc. Ed. Integrated Science
- B.Sc. Ed. Physics

These programmes are based on criteria set by the National Universities Commission (NUC) and approved by the university senate. Candidates are expected to have acquired a minimum entry qualification of five credits at two sittings, or to hold a National Certificate in Education (NCE) with a minimum of five points.

Admissions are processed online, with the end product being a printed letter of admission. A follow-up screening of credentials is performed at the candidate's study centre of choice, where full-time student counsellors attend to prospective candidates. The candidates are judged according to merit and the admission procedures continue, which include the payment of required fees and collection of course material at the study centre, where students also receive course facilitation. During the training programme, students take part in continuous assessments, also known as computer-based assignments, using the e-exam platform. They are expected to write four such tests, of which the best three results are recorded.

Semester examinations

At the end of each semester, students write end-of-semester-examinations. All students, except those at 200 level and above, write pen-and-paper examinations (the one hundred (100) and two hundred (200) level students write e-exams). All examination questions from levels four hundred (400) to eight hundred (800) are subjected to external moderation. Experts from other universities are tasked with these responsibilities, as well as post-assessment moderation of the students' final scores.

Teaching practice

Measures of quality assurance ensure the prevention of undue interference due to distance during teaching practice. The Dean is the chairperson of the Teaching Practice Committee. The committee maintains a close and effective communication link with the study centre on issues relating to teaching practice. Students on the 300 to 400 levels, as well as postgraduate students, are allocated to schools of practice. Students who are teachers are not dislocated from their schools. The School of Education provides students with a disc containing information on teaching skills before teaching practice.

Working and learning

Comprehensive reports from external examiners and moderation reports of students' scores are scrutinised and acted upon.

The internet and mobile phones assist greatly in the provision of information to staff and students. The teaching practical lasts for a period of six weeks each at the three hundred (300) and four hundred (400) levels for undergraduates, while it lasts for twelve weeks for the postgraduate diploma students.

In order to prepare the students for teaching practice, the school prepares a teaching practice manual and makes it available online for students and the supervisor to read. At least two experienced specialists drawn from relevant tertiary institutions supervise each of the student teachers. Students have to turn in at least two scores. The average score is used as the student's teaching practice score.

Handling of projects

Project writing is a prerequisite in the training of student teachers. An effort is made to ensure the sanctity of the exercise, and qualified personnel supervise the projects. It is compulsory for the study centre directors to forward the names, as well the qualifications of each of the prospective project supervisors, to the teaching practice headquarters. The teaching practice committee provides approval for the list and the responsibilities of the supervisory personnel are made clear. Approved topics are forwarded to the headquarters for further clarification and final approval before the students commence on their project work. The bound copies of the projects are submitted to the school and subsequently undergo external assessment. However, the school is currently on the verge of introducing online project supervision.

Handling of Science practicals

In order to ensure quality of content delivery to Science education students, a memorandum of understanding exists between the university and other tertiary institutions with model Science laboratories. The selection of such institutions is based on the recommendation of an expert team from the university. In order to ensure effective handling of practical scientific courses, the university is considering the use of virtual laboratories for practical experiences. Arrangement for this will soon commence.

CHALLENGES

There are many challenges that the School of Education is confronted with when providing quality teacher education through distance learning:

- Assessment of the course materials: students are the direct beneficiaries of course content and their observations are valuable to the university. However, not many students provide such feedback.

- Production of teaching skills on video: as distance students undertake teaching practice in schools everywhere, micro-teaching laboratories at the 47 study centres would be ideal, but not feasible in terms of financial implications. The gap can be bridged by professionally packaged instructions for teaching skills being made available to the students. However, finding experts who have the time and inclination for such an exercise is a big challenge.

- Project supervision: the challenge of online supervision in a country that cannot guarantee a 24-hour uninterrupted electrical power supply is a major hindrance. In addition, the problem of plagiarism on the part of the students is also a problem. With the intervention of software packages designed as anti-plagiarism tools, this problem could be overcome. Over and above this issue, many academics who are computer literate still lack the skills needed for editing.

- Online facilitation: financial challenges have made online facilitation attractive to the university. The university is committed to full implementation of online facilitation. However, erratic power supply, low levels of computer literacy in course facilitators, and demands from students for synchronous e-learning, etc., are challenges still to be addressed.

- Virtual laboratory: when fully implemented, the Science programme students will be provided with the unique opportunity of not only hearing, but also participating in virtual laboratory experiences. The virtual laboratory has been in use at some conventional universities in Nigeria, namely Obafemi Awolowo University, Ife-Ife, and Lagos State University. As NOUN student-teachers are located in each of the 47 study centres across the country, the University has many challenges in terms of cost, maintenance, capacity building, and a host of other implications, before it can provide effective and meaningful laboratory experiences.

CONCLUSION

Teacher education in Nigeria has come of age. It has progressed from its rudimentary approach, now employing the modern methods of distance education in the training of teachers at all levels. Nonetheless, in order for distance education to be a reliable instrument for producing quality teachers for the country, many issues still need to be addressed.

RECOMMENDATIONS

Based on the information provided on the historical development of distance education, the following solutions are recommended:

- The Nigerian Federal Government should encourage young men and women with academic potential to consider teaching as a profession.
- Teacher education should be better funded, to enable the country to have the kind of teachers it deserves, in order to meet the expected outcomes of Vision 20:2020.
- The two purely distance learning institutions in the country in particular, and other dual mode institutions in general, should work together to adapt the training of teachers, moving away from the traditional approach to the modern day high-tech curriculum integration approach, taking into account pedagogical and practical teaching aspects required by the profession.
- Online project supervision is viable not only in teacher education, but also in other disciplines. Support should be provided for this endeavour.
- NOUN, as a single-mode tertiary institution that provides highly accessible and enhanced quality education, anchored in social justice, equity, and national cohesion, should be adequately funded to serve the country as required.
- Mass media, such as television and radio, should be used to provide additional teacher education content to students.
- The deans of faculties and schools of education are encouraged to oversee the integration of the products of international organisations, for improving teaching as a profession. An example is "Tuning Africa" a project funded by African Union (AU) which is aimed at generating specific and generic competences in teaching.

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PRIMARY EDUCATION EXPANSION AND THE CHALLENGE OF INADEQUATE TEACHER SUPPLY IN SUB-SAHARAN AFRICA

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ABSTRACT

This paper focuses on the expansion of teacher education and the efforts to introduce universal primary education (UPE) in Africa. It also looks at the need for an adequate supply of primary school teachers. With specific reference to the expansion of teacher education in Kenya after independence, and the country's issues regarding quality education, it shows that the poor supply of teachers in most African countries, following the introduction of free primary education, has more to do with (among other factors) the ad hoc manner in which UPE programmes were introduced, structural adjustment programmes (SAPs), and the teachers' wage bill, rather than the inadequacy of inherited systems of teacher education.

Key words: primary education expansion, challenges, inadequate teachers, universal primary education

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INTRODUCTION

The teaching sector relies primarily on the human resources it employs. Their work significantly determines the quality of the educational services that are delivered. These facts most certainly make teacher issues central to the development of educational systems. In this regard, the challenge that many countries face in maintaining quality education is to recruit an adequate number of qualified teachers. Consequently, the teacher plays a dominant role, in that he or she is central to the learning process. In addition, quality education is often associated with specific teachers' characteristics. Thus, for many people, quality education corresponds to teachers having a good academic qualification, solid teacher training, and a comfortable salary, preferably with civil service status. Naturally, these factors are to be taken into account, but are not necessarily a measure of what pupils have learnt, which is the ultimate goal of education (and so to be considered as the principal focus in assessing systems of education) (UNESCO-BREDA, 2010).

It is for these reasons that this paper focuses on the expansion of teacher education, the efforts to introduce universal primary education (UPE) in Africa, and the need for an adequate supply of primary school teachers. By focusing on the expansion of teacher education in Kenya after independence and issues of quality education, the paper attempts to show that the inadequate supply of teachers in most African countries, following the introduction of free primary education, has more to do with the ad hoc manner in which UPE programmes were introduced, the effect of the structural adjustment programmes (SAPs), and teachers' wage bill, among other issues, rather than with inherited systems of teacher education. It has been claimed that these systems have proved increasingly unable to meet the dual demands for higher quality training and substantially increased output, which are necessary due to commitments to universalise primary schooling. Such assertions have contributed considerably to a strong advocacy for distance teacher education programmes, without any serious thought being given to expanding and modernising existing teacher education colleges. As a matter of fact, despite the fact that teacher pupil ratios continue to rise due to UPE interventions, in some countries teacher training colleges as well as universities have trained many teachers who remain unemployed.

EXPANSION OF PRIMARY TEACHER EDUCATION

At the dawn of independence in Africa in the early 1960s, education for human resource development and modernisation was strongly embraced by donor agencies and western scholars as an important model of economic growth. With the achievement of independence in most African countries in the early and mid '60s, planners were guided by these theories, which assumed that education was the most profitable form of investment, not only for society, but also the individual. Education was believed to contribute to economic growth by improving the quality of the labour force, and equipping workers with the skills, knowledge, and qualifications expected of them in the modern economic sector. This would also make workers more productive and motivated, due to better standards of health and child care, and the resulting reduced fertility rates. To illustrate the validity of an investment in formal education as being essential to high and sustainable rates of economic growth, the experiences of the United States of America, Japan, and more recently Korea have been cited, supporting the causal link between education and growth (Simmons, 1980).

Apart from human capital and modernisation theories, which lay behind the expansion of formal education during the early period of political independence in each African country, human resource planning was dictated by the need to provide local replacements of expatriate personnel. The provision of formal education opportunities, especially secondary education and higher education, was a major political issue in the colonial period. In the eyes of African nationalists, the colonial administration had deliberately suppressed the expansion of secondary and higher education, the two levels modelled on the western education systems, in order to limit the number of Africans taking important jobs in the administrative and private sectors (Tuqan, 1976).

Donor agencies and western expertise, combined with local personnel needs, were largely responsible for promoting education for human resource development in Africa. The Addis Ababa Conference of African Ministers of Education, held from 15 to 25 May in 1961, sparked the expansion of formal education systems in Africa, and crystallised the donor and national perspectives on the development of education. The conference was the result of a decision taken at the General Conference of UNESCO during its fifth session: to convene a conference of African states for the purpose of 'establishing an inventory of educational needs and programme to meet those needs in the coming years'. The conference was held under the joint sponsorship

of UNESCO and the United Nations Economic Commission for Africa (United Nations Economic Commission for Africa/UNESCO, (1961:1).

The conference report stressed Africa's need for more and better educational opportunities, and suggested that the substance of education be adapted to fit the era of independence. Although mention was made of the need for agricultural training and community development, emphasis was on academic reforms, such as the inclusion of African history and culture in the curriculum, and the importance of meeting the high-level human resource requirements of emerging nations. Greater urgency was assigned to secondary and post-secondary education rather than UPE (in case it were to become apparent that, for financial reasons, the two were incompatible). Primary and adult education was to be developed at the same time, with the goal of achieving universality by 1980. There was a need for massive financial commitment, and in order to meet this need, African nations would have to allocate increasing percentages of their national budgets to education. Massive amounts of supplementary external aid would be required, and the conference called on UNESCO, developed countries, and non-governmental organisations to support and share in the implementation of the proposed plans. The Addis Ababa conference set the stage for educational development strategies in most independent African countries. These strategies centred on the expansion of secondary and tertiary education, with clear implications for teacher education – in fact, this was the focal point (United Nations Economic Commission for Africa/UNESCO, 1961).

In most African countries, especially the Anglophone ones, many of the teacher training colleges, which largely trained primary school teachers, were originally established by the bodies who were also responsible for establishing the majority of the schools. These bodies were religious organisations or voluntary agencies that operated during the colonial period. Teachers' colleges that were set up by governments were either established at a later date to provide training where no provision existed, or to increase the number of trained teachers where voluntary agencies' colleges were unable to do so. Colleges established by voluntary organisations varied quite considerably in size and in the numbers of students. In many of them, there were fewer than 100 students in total, and it was often difficult to provide specialist training. It was also manifestly impossible to do so in the very small colleges with around 30 students and two or three tutors. For practical reasons, therefore, there was a good basis for some re-organisation of the smaller colleges into fewer but larger colleges, especially following independence (Burns, 1965).

To improve the quality of teacher education, there was an increasing need for reform; this became more urgent as some countries moved towards attaining independence. Among the major reforms was the amalgamation of small teacher colleges, to make them more economical and effective. This was initially difficult to achieve, as most colleges belonged to different religious agencies. Another important reform was the need to co-ordinate the work of different colleges through some central institution, which could play a leading role in the study of modern pedagogy, experimentation and research. Different Anglophone countries contributed to the co-ordination processes, set up by means of the establishment of national teacher training councils, while others set up institutes of education. Such bodies were responsible for functions that included overseeing the selection of students for admission into teachers' colleges, designing course programmes and examinations, giving recommendations for the awarding of certificates, the in-service training of qualified teachers, and creating programmes of research in education (Burns, 1965).

The rapid expansion of education depended heavily on the expansion of teacher education. In Kenya, for example, at independence the government embarked on a policy of consolidating small primary teachers' colleges established during the colonial period into larger and better-equipped facilities. The number of primary teachers' colleges went down from 37 (with an enrolment of about 400 students) to 17 (with an enrolment of 9 843 students). With fewer but larger colleges, teaching technology improved tremendously, and the variety of subjects that could be taught also increased. With assistance from the first and second International Development Association (IDA) projects, the quality of buildings and facilities improved considerably at most of these colleges. With World Bank assistance, 10 new primary teachers' colleges were to be completed by 1985, bringing the total number to 27 public teachers' colleges, with a total enrolment of 16 500 student teachers. Emphasis was also placed on upgrading the academic quality of entrants into primary teacher education (Sifuna, 1997). The majority of the entrants from this period are now holders of the Kenya Certificate of Secondary Education (KCSE) with a C average, having scored at least a C in English and Mathematics in the KCSE. These individuals were trained as Primary 1 (P1) teachers, which was then the highest grade of teacher in primary education. A small percentage of the former KCSE division four graduates, (the lowest attainment in that examination) and the Kenya Junior Secondary Education (KJSE) graduates used to be trained as Primary 2 (P2) teachers, and holders of the Kenya Certificate of Primary Education (KCPE) were trained as Primary 3 (P3) teachers. This last group

of teachers catered for less developed areas like the North-Eastern Province, parts of the coast, and the former Rift Valley Province, but was later abolished. The duration of the course for all teachers in training was two years, and this has continued to the present. They study the following subjects: Professional Studies, English, Kiswahili, Mathematics, Science, Religious Education (Christian or Islamic Studies), Physical Education, Art Education, Music History, Geography, Agriculture, Home Science, and Teaching Practice. The P1 and P2 groups take a national examination at the end of the two-year course, set by the Kenya National Examinations Council (KNEC).

Public primary teacher colleges produce around 8 200 graduates annually. Nonetheless, it must be noted that despite teacher-to-pupil ratios continuing to rise due to the free primary education intervention, there are many trained primary school teachers who remain unemployed by the public Teachers' Service Commission (TSC) (Chege & Sifuna, 2006). Since the late 1990s, a good number of private primary teacher colleges have also been established all over the country, by religious organisations and individual entrepreneurs. It is important to mention that the Kenyan trend in the development of teacher education has by and large been followed by many of the Anglophone African countries (Sifuna & Sawamura, 2010).

Following post-independence developments, the proportion of qualified teachers in relation to pupils has been exceedingly high at both the primary and secondary school levels in Kenya. The number of qualified primary school teachers rose from 184 393 to 192 306 from 1996 to 1998, which constituted an increase of 3.1%. The proportion of trained teachers rose to 96.6%, while the number of untrained teachers decreased by 37.8% (from 10 556 in 1997 to 6 570 in 1998). The trained teacher-to-pupil ratio remained at 1:32 in 1996, improving slightly to 1:30 in the next two years (UNICEF/Government of Kenya, 1999; Kafu, 2011). In other words, by the turn of the century and leading up to the free primary education intervention in 2003, primary teacher education institutions in Kenya produced adequate numbers of teachers to staff most of the public primary schools in the country, and considerably reduced the number of untrained teachers in the system. This was the general trend in many African countries (Sifuna & Sawamura, 2010).

In Kenya, the National Conference on Education of 2003 and the Sessional Paper No.1 of 2005 on Education and Training stressed the importance of reforming teacher education, by enhancing the quality of training, and adopting better teacher management and deployment strategies (Republic of Kenya, 2005). The in-service training of teachers was to form an important component of these policy

reforms. The policy articulated the need for continuous improvement in the quality of services through ongoing teacher development. It was observed that:

- Primary school teachers in Kenya lack adequate capacity to discharge their teaching duties effectively, as training does not allow for specialisation.

- The in-service training programme that should ensure that teachers in the field have a chance for professional development does not function efficiently. A survey commissioned by the Ministry of Education revealed that most teachers do not think that in-service courses respond to their needs. This shows that the in-service courses, when provided, are supply driven and not sufficiently linked to teachers' needs.

- A related finding was that 60% of teachers reported that they had never received any in-service training (or feedback) based on a pedagogical problem that had been reported. This again suggests that the in-service courses are supply driven and not focused on the classroom or student achievement. It may also suggest there are no structured programmes for in-service training of teachers over a defined period (Republic of Kenya, 2005).

QUALITY OF TEACHER EDUCATION

A major area of concern in teacher education in general, and primary teacher education in particular, is the inadequate quality of teacher training. Indeed, this is an area which was noted over 50 years ago by the Australian educator, C. E .Beeby (1966), when he pointed out that in the context of planning education for development, attempts to change the quality of learning in schools have to be linked to improvements in the education of teachers if they are to be effective. Yet this area has received relatively little attention from policy makers, donors and researchers since then. For example, while development agencies have supported a range of teacher education projects, few have contained support for research on learning processes and practices. As a result, the evidence base is weak, and much policy on teacher education has not been grounded in the realities that shape teacher education systems and their stakeholders, in less industrialised countries in general and African countries in particular.

A glaring example of the neglect of teacher education at the international level is that, not perhaps surprisingly, the World declaration on Education for All (EFA), which emerged from the conference in Jomtien, Thailand in 1990, devoted scant attention

to the problems of teachers and teacher education, despite their centrality to the achievement of better learning outcomes for all (World Conference on Education for All, 1990). It was not until 10 years later, at the global forum on EFA in Dakar, Senegal, that it became clear that in many of the countries that had fallen short of the goals set at Jomtien, teacher supply and teacher quality were among the most salient constraints. At the Dakar EFA forum, therefore, teacher education moved up the agenda to the extent that the Sub-Saharan Regional Action Plan included it as one of its 10 targets: '[e]nsuring that by the year 2015, all teachers have received initial training, and that in-service training programmes are operational. Training should emphasise child-centred approaches and rights and gender-based teaching' (UNESCO, 2000: 11).

At a local level in many countries, while the importance of teachers is given a lot of emphasis, including in international reports, attention given to teacher education and the professional development of teachers often lags behind that given to other levels of the education system (UNESCO, 1998; UNESCO, 2000; Organization for Economic Cooperation and Development, 2001). While there is a strong recognition that teacher education and professional development need to be integrated in ways that operationalize lifelong learning for teachers, the resources allocated to this are usually inadequate. Consequently, in much of the developing world in general and Africa in particular, teacher education has reached a serious crisis. Inherited systems of teacher education are said to have proved increasingly unable to satisfy the dual demands of higher quality training and substantially increased output, as demanded by commitments to universalise primary education (Ncube, 1982; UNESCO, 1998; Lewin & Stuart, 2007; Little, 2006).

The quality of teacher education is dependent on the availability of qualified and motivated teacher trainers, a curriculum that is both relevant and manageable, and adequate physical facilities and instructional materials in teacher education institutions. For public teacher training colleges, grants from the public budget are the main source of resources for teacher education. As is the case in other subsectors, due to constraints in the state budget and the rising cost of living, allocations for teacher education are inadequate. Due to shrinking public capitation, teacher colleges have been forced to introduce user fees. Some institutions have even developed income-generating activities through which some revenue is being realised (Sifuna & Sawamura, 2010).

Following the over-enrolment of student teachers, teacher training classrooms in many countries are reported to be congested, because they were built to cater for smaller groups of student teachers. Other physical facilities such as laboratories, workshops, special rooms, and resource centres (which include libraries and catering facilities) are also grossly inadequate and poorly maintained. Additionally, because over-enrolment was not systematically accompanied by a commensurate increase in government grants, inadequacies in instructional materials, such as textbooks, library books, stationery, and equipment, are rampant. Of special importance is the lack of facilities for training teachers in the practical subjects of the school curriculum, inadequate transport options, and poorly maintained vehicles, making the organisation of teaching practice difficult.

In many countries, at all levels, practical teaching is under threat. Given budgetary constraints, training institutions are increasingly under pressure with regard to meeting travelling and subsistence expenses of both student teachers and supervisors during teaching practice. There are situations in which teacher education institutions, including public universities, have found it necessary to shorten the usual duration of teaching practicals. This has a far-reaching effect on the quality of teacher education provided by these institutions (Sifuna & Sawamura, 2010).

THE CHALLENGE OF INADEQUATE PRIMARY SCHOOL TEACHERS

Issues regarding the quality of teacher education are often quickly translated into the challenges confronting primary education following the UPE intervention. It has been noted that many education systems in Africa still contain high proportions of untrained teachers; at the primary level many are said to enter teacher training after completing nothing more than secondary school. The quality of primary schools is such that many are unable to provide a supportive professional environment for trainees: the kind where staff are fully trained and mostly graduates. Donor enthusiasm for new pedagogy, which frequently advocates learner-centred approaches, group work, attention to special needs, and a panoply of methods of training associated with best practice in rich countries, has sometimes sat uneasily with the realities of the training environment, the teacher education infrastructure, and different cultural and professional expectations for the role of the teacher in Africa (Kunje, 2002).While it cannot be denied that issues of expansion in teacher education and quality are still a major challenge in the provision of qualified primary

school teachers in sub-Saharan Africa, key factors, seemingly not given sufficient emphasis, are the approaches chosen for the launch of UPE, as well as for ensuring efficiency in primary education.

Many countries in the sub-Saharan region, similar to countries in other regional blocks, have committed themselves to the achievement of UNESCO's Education for All (EFA) goals and the UN's Millennium Development Goals (MDGs), which include the completion of UPE by 2015. As a result of commitment to these goals, various initiatives have been launched to provide free primary education, which has led to an upsurge of school enrolments since the 1990s. This has created an urgent need for African countries to devise and implement policies to meet the demand for trained and resourceful teachers, due to increased pupil enrolment and participation. The major challenge with the UPE interventions in most African countries, however, is that they were unplanned, often proposed in response to a political agenda. Hence they have led to undue pressure on existing institutions and resources. For example, in East Africa, it was only Tanzania that displayed a modicum of preparation in its UPE intervention; in Uganda and Kenya the introduction of free primary education was based on ad hoc arrangements.

The UPE interventions seriously exacerbated the presence of a high percentage of untrained primary teachers in many African countries. It is estimated that half of the existing 2.6 million teachers in the region are unqualified. In some countries, there are high proportions of untrained teachers who are often thrown into their jobs with little or no induction. Multi-grade teaching is quite common, but most teachers are not adequately prepared for the special demands of this type of teaching (UNESCO, 2006). Poor quality in-service training compounds the negative effects of poor pre-service training and induction in many countries. As Matson (2006) observed, in many countries legislation for UPE has introduced a 'fire brigade approach' to teacher training and deployment, with entry requirements and minimum qualifications being lowered and training reduced in order to meet the growing demand – with the inevitable result of declining teacher quality.

The UPE conventions and policies in many countries seem to have reduced the economic burden of primary education for disadvantaged groups, and have decreased delayed enrolment, hence boosting participation. Consequently, UPE policies have had positive impacts for the poor in improving access to schooling. In this respect, these policies have contributed significantly to access and equity in primary education. However, the push for UPE in many countries has come

to be identified with increasing deterioration in the quality of primary education, from the provision of physical facilities and teaching and learning materials, to the deployment of teachers, their performance, and their pupils' ability to transition from primary to secondary education as a result (Sawamura & Sifuna, 2008). There seems to be strong evidence of internal inefficiency, due to enrolment of over-aged children, high rates of repetition and dropouts, and use of unsound pedagogical approaches. On the whole, in the majority of sub-Saharan African countries, the primary education sector is quite inefficient, with very high attrition rates reaching an average of over 60%, especially in the lusophone and some francophone countries. The completion rates even in many anglophone countries are rarely 50%, and have consistently remained below that mark (Sifuna & Sawamura, 2010).

The impact of repetition policies and the demand for more qualified teachers are both issues. Government policies on repetition certainly have repercussions: notably, the need for more teachers. Basically, a high rate of repetition increases the number of pupils, and so the number of teachers who need to be recruited. This practice has given rise to much criticism regarding poor political decisions, questionable pedagogic efficacy, and the negative impact of keeping children from the most disadvantaged families in school; others try to justify direct action to limit this practice. If sufficiently extensive, policies to reduce repetition can provide an opportunity to reduce the need for new teachers (UNESCO-BREDA, 2010).

In determining teachers' needs, it is also important to consider the foreseeable number of teachers leaving the system: every year, adequate numbers of teachers have to be recruited, not only for new teaching posts, but also for the replacement of teachers who are no longer teaching, either due to retirement, sickness or death, secondment to non-teaching administrative posts, or resignation from teaching (UNESCO-BREDA, 2010).

In sub-Saharan Africa it is estimated that teachers living below or near national poverty levels are likely to suffer from high levels of illness. Teachers are also believed to be a 'high risk' occupational group with respect to HIV and AIDS infection. This has a major impact on teacher motivation in certain areas of sub-Saharan Africa. Apart from the obvious impact of teachers who are living with HIV and AIDS, working with colleagues who are sick and who may eventually die is also demoralising. The extra workload created by covering for sick teachers is also a key factor. HIV and AIDS is now said to be a major cause of absenteeism among teachers as well as

other educational personnel, even if they have not reached the terminal stage of the disease. The disease affects teachers' absenteeism in two ways, namely: teachers themselves become infected and are unable to travel to school to carry out their teaching duties, and teachers become care-givers to members of their families who have been infected (Benavot & Gad 2004; Tamukong, 2004).

Teachers, who usually represent a younger and more mobile workforce, are said to be more likely to be infected by the pandemic than other workers (Akyeampong & Bennell, 2007). An estimated 860 000 children in sub-Saharan Africa have lost their teachers to HIV and AIDS. The high level of infection and death rates among school teachers has undercut the ability of schools to find suitable replacement teachers. In the Democratic Republic of the Congo, for example, the lack of teachers due to the pandemic resulted in many schools closing (Kelly, 2000; UNESCO, 2000). Evidence from several African countries suggests that the number of newly trained teachers graduating from teacher training colleges does not approximate the quantity of teachers no longer working in the profession due to death, disease, or new and conflicting responsibilities within the family. This also reflects the escalation of mortality rates among teacher trainees. Despite this critical situation, few ministries of education have adequately addressed the problem; even fewer have developed feasible intervention strategies (Kelly, 2000; Benavot & Gad, 2004; Tamukong, 2004).

In order to understand the implementation of these new policies, it is relevant to explore the breakdown of government expenditure on education, and more particularly the position of salary costs within that expenditure, and the impact on enrolments. When examining teachers' salaries and the recruitment process for new teachers in many countries, one can clearly see that recent recruitment dynamics as a whole are, to a large extent, determined by these salary adjustments (UNESCO-BREDA, 2010). It must be taken into account that salary level is connected to certain aspects such as academic qualifications and professional training, which in any case are not the only determining factors to be considered in educational financing. Trade-offs in expenditure on education cannot be restricted to teachers' salaries alone. There are also concerns regarding other educational expenditure, with the supply of textbooks at the top of the list, but also pupil-to-teacher ratios, and expenditure connected to the pedagogic and administrative management of primary education. Indeed, whether looking into the best way of allocating additional resources for the system or striving to make the best use of dwindling resources,

seeking the best possible trade-off between the different factors mentioned above cannot be avoided. Hence, the recruitment of adequate teachers to cope with demands of UPE is not just determined by the supply of teachers, but also by the cost of their salaries, as well as the overall cost of education in a given country (Michaelowa & Wechtler, 2006; Akyeampong & Bennell, 2007; UNESCO-BREDA, 2010).

Another important consideration is that the implementation of UPE programmes in most African countries was affected by the impact of structural adjustment plans and budget constraints on education systems. Many sub-Saharan African countries have faced a serious economic crisis since the mid-1970s, through to the 1990s. Under pressure from international financial institutions, the African economies, which were suffering from significant structural and financial deficits, were obliged to adopt measures with a view to more rigorous budgeting, by reducing government expenditure (especially the payroll, where the teaching profession was high on the list). This tendency became more pronounced in the 1990s when the International Monetary Fund (IMF) set new terms for granting loans, concerning not only the traditional area of monetary and tax policies, but also the management of the public sector. While agencies such as the World Bank encouraged African governments to reform their education systems with the aim of ensuring education for all, the IMF expected many governments to reduce the level of their public expenditure, with a view to ensuring some macroeconomic stability and solving problems related to the economic crisis. The freeze on teacher training and recruitment within the civil service during a period of high growth in the demand for education (enhanced by the Jomtien Conference in 1990) led to spontaneous adaptations in communities that were anxious to offer their children an education: using their own initiative, they recruited community teachers and paid for them as well. Governments in turn envisaged new solutions to increase teacher recruitment within the context of maintaining or even reducing the size of the civil and teacher services. These solutions varied, depending upon the historical legacy and specific characteristics of each country (World Bank, 2007; UNESCO, 2006; UNESCO-BREDA, 2010). In 1999, the IMF set up the Poverty Reduction and Growth Facility (PRGF), an instrument that enables access for low-income countries to concessional loans. These loans are intended to support poverty reduction programmes and strategies, as developed in the Poverty Reduction Strategy Papers (PRSP). The latter are the reference for any IMF or World Bank loan or debt relief transaction.

The freeze on civil servant teacher recruitment and training contributed further to the drop in public funding. This had two major consequences initially: a rise in pupil-to-teacher ratios in the classroom on the one hand, and the emergence of teachers recruited and paid by parents on the other hand. Concerned about offering their children an education, some communities have indeed attempted to address teacher shortages by recruiting community teachers. Many African communities have had recourse to this category of teachers since the 1990s. What community teachers in different countries have in common is that they respond to a need for schooling, which the public authorities have been unable to satisfy. They have generally been selected from the most qualified people available locally, and often have had no professional training. They may have been recruited as a result of local community initiatives, or else as an interim solution in public schools lacking teachers (UNESCO, 2005; Mulkeen & Chen, 2008).).

CONCLUSION

This paper has focused on the expansion of teacher education, the interventions to introduce UPE in Africa, and the need for an adequate supply of qualified primary school teachers. By means of specific reference to the expansion of teacher education in Kenya after independence and issues of quality education, it has been shown that the poor supply of teachers in most African countries, following the introduction of free primary education, has much to do with the ad hoc manner in which UPE programmes were introduced, as well as structural adjustment programmes (SAPs) and teachers' wage bill, among other factors. These have been considered over and above the inadequacy of inherited systems of teacher education, although these have proved increasingly unable to meet the dual demands for higher quality training and substantially increased output, as have been called for by commitments to universalise primary schooling. Before the UPE interventions, existing colleges of education in many African countries trained sufficient numbers of teachers. These teachers coped with existing demands, and the ratio of untrained teachers was being reduced significantly. Colleges continue to train many primary school teachers whom the public sector is unable to accommodate, despite high teacher-to-pupil ratios, largely due to a restricted budget for teachers' salaries. In this regard, policy makers should not jump on the bandwagon of introducing alternative methods of teacher training, especially distance teacher education programmes. Rather, they should consider expanding and modernising existing teacher education institutions.

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ISBN 978-1-77592-115-8

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