USING EDUCATIONAL MEDIA AND TECHNOLOGY[2] IN TEACHING AND LEARNING PROCESSES: A CASE OF TRAINEE TEACHERS AT AFRICA UNIVERSITY

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ABSTRACT

This paper is an outcome of an analysis of secondary school trainee teachers' views and their use of Educational Media and Technology (EMT) during teaching practice. It also sought their trainers' views on how the students used EMT. Sixty undergraduate education students from Africa University who had undergone a Teaching Practice[3] (Practicum) programme, in secondary schools, and their fifteen lecturers were involved in this study. A mixed methodologies approach was used, hence questionnaires, interviews and observations were used to collect data. Responses were analysed using frequency counts for the quantitative data while opinionated views were qualitatively analysed. The results indicate that while trainees appreciated the role of EMT in teaching and learning, the majority of the trainees did not however, use EMT during their teaching, and that there were inadequate and functioning EMT facilities in the practicing schools. Resources were limited for both teachers and pupils, with the exception of printed materials and some obsolete equipment that lacked compatibility with modern technologies. Text books, where available, were mostly foreign and hence not suitable for Zimbabwean conditions. Suggestions on how to promote the utilisation of EMT by teachers are made as part of the study's recommendations.

Keywords: Educational Media and Technology, Learning styles, Zimbabwe Education System, Teaching and Learning.

INTRODUCTION

Zimbabwe, since attaining independence in 1980, has failed to escape the wrath of economic instability, which is common in most post-colonial nations in Africa. Due to limited and stringent fiscal budgets, the education sector has been starved of both human and material resources. During the colonial era, schools were significantly few and that meant fewer Africans had access to an inferior bottle-necked education (Mutumbuka in Chisaka & Mavundutse, 2006; Abraham, 2000), deliberately designed to perpetuate hegemonic European dominance in the dual education system[4].

 However, soon after independence school enrolment in Zimbabwe rose exponentially as there was a drive towards mass education. For example, between 1979 and 1992, primary schools increased twofold by 189.5 % from 2401 to 4549 with corresponding pupil enrolment rising drastically from 81900 to 2.4 million during the same period (Zvobgo, 2003). There were also corresponding quantitative changes in teacher placement from 28455 in 1979 to 59874 in 1992 mainly due to the Zintecisation[5] of teacher education, a new teacher education

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[2] These are the teaching and learning media which can be commercial. They include modern technologies such as computers.
[3] Teaching practice, also called practicum, is an attachment programme in schools under the supervision of lecturers from the mother institution. There are different models of attachment depending on the entry qualifications of the students governed by individual university or Government policy for the colleges
[4] Colonial Zimbabwe had two systems of education, a superior one for the White minority and an inferior one for the black majority.
[5] ZINTEC is an abbreviation for Zimbabwe Integrated Teacher Education Course. It is a teacher training model initiated at independence that was meant to try to meet the teacher needs as there was free education that was also made compulsory at

concept introduced in five of the eleven primary teachers' colleges in the early 1980s in addition to the conventional programmes[6]. This initiative could however not meet the need for more teachers in Zimbabwe and the inevitable quality of education both in terms of qualified manpower and resources for teaching and learning. Teacher-pupil ratio remained high at 1:50 and that had implications on the provision and utilisation of resources (Ndawi, 1996). As the education system expanded, the number of untrained teachers stood above 59%. Later most colleges that had been following the ZINTEC model, popularly known as 2.5.2 (where students spend two terms in college, five terms on teaching practice and two terms in college) reverted to the conventional model, except for two, due to inadequate material support from Government and donor organisations among other reasons. As of 2012, the model has been reintroduced in all eleven primary teacher training colleges as Government policy despite an outcry among the implementers (college lecturers) on shortage of material resources, manpower and funding. As of 2011, both generalist[7] and Early Childhood Development teachers are now being trained under this model.

Besides focus on teacher qualifications and quality education in Zimbabwe, there has also been debate centred on material provision. Quality concerns were explored by Chisaka & Mavundutse (2006) in their assessment of provision of quality education in Rushinga and Bikita districts of Zimbabwe.

Several other local studies have also examined the availability and use of various resources in the teaching/ learning process. Among these are Zvobgo (2003), Chivore (1990), (Abraham 2000) & Mukono & Tambo (2000). Peresuh (1996) examined how learners form spontaneous opinions about teachers' use instructional media in teaching/ learning while Mavundutse et al (2005) in their study of quality education in new resettlement areas[8] in Makonde district of Mashonaland West further explored the availability and use of resources by teachers. In all cases, the use of Educational Media and Technology was found to be appalling.

It is against such background that this study investigated the use of EMT by trainee teachers from Africa University during their teaching practice in secondary schools. It also aimed at establishing their trainers' perceptions about the trainees' use of EMT in their teaching. This, it is hoped, could lead to increased production of such materials by the Audio-visual Services Unit[9] and provision of EMT by the Ministry of Education Sports, Arts and Culture.

CONCEPTUAL FRAMEWORK

The use of EMT is always paramount despite the subject or level of class one teaches. Observing student teachers on teaching practice in various contexts has revealed that effective use of teaching media is better than lengthy explanations. Learners tend to grasp the content to the desired level where media is appropriately used. Research has shown that use of varied teaching methods complemented by varied media, is vital in concept formation by learners. Rwambiwa & Driscoll (1984) observe the following information retention levels from different modes of lesson delivery.

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primary school level. Students spent more time in the field than at college, two terms in college, five terms on teaching practice and the last two terms in college for the three year diploma in education course. It is also referred to as the 2.5.2 model.

[6] A conventional model is a three year programme where students spend one year in college, the following year on TP and the last year in college. It is also referred to as the 3.3.3 model as there are three terms in a year.

[7] A primary school teacher trained to teach the whole range of grades, that is, grade 1 to 7. The nine year primary school curriculum can be divided into three: ECD for 4 to 5 year olds, Infant grades 1-3 for 6 to 8 year olds, and junior grades for 9 to 13 year olds.

[8] There have been two forms of Government resettlement programmes since independence. One was focused on decongesting unproductive land where the majority of indigenous people were forcibly moved to during the colonial period. The second programme focused on equitable distribution of arable land between the indigenous people and colonial settlers.

[9] This is a Unit of the Ministry of Education Sport Arts and Culture responsible for production of teaching/ learning media

Reading alone effects (10%), hearing (lectures) (20%), seeing visual aids (30%), seeing visual and hearing lectures (50%), doing (acting on lessons) (80%) and acting in lessons and saying (90%). A combination of modes of delivery and learning media therefore enhances lesson effectiveness.

Montegomery (1995) explores the use of multi-media computer software in engineering to enhance learning by students with different learning styles. The conclusion is that multi-media fill in the gaps created by a dichotomy in learning and teaching styles. An awareness of the pedagogical needs of various students' learning styles also results in improved use of media by teachers. These findings point to three major kinds of learners: the tactile/ kinesthetic, the visual and the auditory (Felder, *file:/C:/my Documents/Learning_Styles.htm*). The tactile prefers learning by doing and touching thus uses a hands-on approach for physical exploration of the world. Visual learners prefer visuals as they think in pictures while auditory learner's conceptulise best through nuances in speech. These learning styles point to the need for using media and making teaching and learning a dialogical process. Knowledge and application of instructional media is thus an essential part of every teacher.

The provision and effective use of media is what distinguishes a superior school or college from an inferior one, and an effective teacher from an ineffective one. In colonial Zimbabwe, the white learner was better catered for than the black African learner. For every $1 spent on an African learner, $13 was spent on a white learner (Martin & Johnson, 1980; Zvobgo, 2003; Mamvuto, 2006). Although the African child pursued the same level of academic education as the White child, both pupils and teachers from white schools were exposed to relatively richer environments, which were more conducive to experiential learning than their African counterparts.

Research has revealed that teaching using media can extend the opportunities for learning far greater than chalk and talk (Obanya, 1985; Campbell & Dlamini, 1994). The learner is able to piece together patterns of new concepts using multiple sensory dialogues. These senses are not always stimulated at the same time. Much of their stimulation depends on the media the teacher uses (Brigg & Moore, 1993). Bruner in Heinich & Molenda (1996) observes that learning proceeds from direct experience through representation of that experience to symbolic conceptualisation. The sequence in which a learner encounters materials therefore has a direct effect on mastery, retention and usability of abstract symbols. Understanding is facilitated when the teacher's instruction follows a sequence from the actual experience through to symbolic representations (Heinich et al., 1996) or cone of experience (Dale in Heinich et al., 1996). A closer analysis of the cone shows that the process proceeds from the concrete to abstract. This confirms what was found by Rwambiwa & Driscoll (1984) in the levels of retention of information.

Some of the media considered by teachers are non-projected aids, which include magnetic boards, felt boards, photographs, charts, models and real objects. Audio media, which include CDs, DVDs and radios has the power to super-charge the meanings of words and sounds, giving them a dimension which is absent in printed media. Audio media also make certain demands on the receivers' initiatives and imagination. Projected aids like the overhead and LCD projectors are also critical in learning in particular with their use of colour, overlays, revelations, demonstrations, enlargements and animation. Other projected aids include videocassette recorders and video cameras, slide projectors and episcopes as well as computers.

RESEARCH QUESTIONS

The following research questions guided this study:

1. How do teacher trainers and trainee teachers rate the importance of EMT in teaching and learning?

2. Can trainee teachers produce and effectively use EMT to enhance the learning process?

3. How does the obligatory use of EMT compare with the professional drive to use EMT in the teaching process by trainee teachers?

4. Is there adequate and functioning EMT in practising schools?

5. What is the level of support by schools in terms of funding for EMT?

RESEARCH METHODOLOGY

The study used a fusion of qualitative and quantitative paradigms (Borg & Gall, 1979). Two questionnaires, one for trainee teachers and another for trainers, were administered to sixty trainees and fifteen trainers, all purposively sampled from the Faculty of Education, and then collected to ensure a 100% return rate. Questionnaire items on both instruments were based on the five research questions and included closed and open-ended questions. Discrete data from the questionnaires were mostly quantitative while open-ended questions yielded qualitative data. Trainers' views and perceptions in which the objective was to find out how teacher trainees used EMT were mostly qualitative.

The trainers' views were sought because it was assumed that they would give more informed responses due to their privileged roles as supervisors and assessors of students on Teaching Practice. Their perceptions therefore, triangulated the trainees' views. A purposive sample of twenty students (33.3%) was observed whilst teaching various subjects at different levels of the school system. Focus was on production and use of EMT in their teaching. The observations yielded qualitative data (Oyedele, 2003) on availability and use of EMT by the trainee teachers in the practising schools. Data from respondents were presented under emerging themes according to the research questions. Descriptive data from the questionnaires were analysed using frequency counts. Direct responses from some of the trainees and trainers were quoted verbatim. Use of multiple data gathering methods ensured collection of views from both categories of respondents, which was then validated through lesson observations.

PRESENTATION AND ANALYSIS OF RESULTS

The following table presents trainee teachers' views and perceptions about EMT derived from their practice during teaching practice.

Table 1. Trainee teachers' views on use of EMT, (N=60)

Emerging themes	Opinions of trainees (%)				
	SA	A	UD	D	SD
EMT is important in aiding the teaching episode	62.6	31.2	6.2	0	0
There is production and effective use of EMT	0	0	16.6	83.4	0
There are adequate funds allocated for EMT	56.4	31.2	6.2	6.2	0
There are adequate and functioning of EMT	0	0	12.6	56.2	31.2

SA: Strongly agree; A: Agree; UD: Undecided; D: Disagree; SD: Strongly disagree

In the table above 62.6% of the trainee teachers who responded to the questionnaire strongly agreed that EMT is important in teaching. This is consistent with what their trainers also revealed. A total of 31.2% agreed that EMT is useful while 6.2% were undecided. None disagreed or strongly disagreed.

It can be concluded that the majority viewed EMT as important but differed in perceptions on their role and significance in a teaching/ learning context. This is in line with what various authorities say about the usefulness of EMT in enhancing the teaching and learning process. The 6.2% is a worrying percentage considering the value attached to EMT in the literature and also the fact that at almost this exit point of their training some trainees seemed not to appreciate the importance of EMT. This, impacts negatively on their attitude and use of EMT in lessons.

None of the trainee teachers agreed that there were adequate and functioning media in the schools. In fact, a total of 87.4% of the trainee teachers disagreed on the fact that, there were adequate and functioning EMT in schools. The majority indicated general inadequacy of EMT. The wide distribution of frequencies could be a reflection on the status of practising schools. Privately run schools were found to be more resourced than other categories of school. Student teachers teaching in private schools were observed to produce and use EMT more than their counterparts in other categories of school.

An assessment of availability of EMT in schools indicated that besides the chalkboard, very few charts, models and specimen as well as photographs, maps and some equipment were available in the schools. Media use was also restricted to particular curricula subjects such as geography. Lesson delivery was characterised by the lecture method with little dialogue with media. This could imply that learners' concept formation was somehow marred by the unavailability or minimal use of media.

Equipment and technology expected in schools such as cassette recorders, overhead and LCD projectors, video-cassettes, video-recorders, digital and still cameras, magnetic and flannel boards, episcopes and computers were not available. Where some of these were available, they were mostly obsolete and needed replacement. Most computers, where available, were not hooked to the internet. These findings were congruent to those by assessors in the University of Zimbabwe, Scheme of Association[10] in which they observed the sparing use of EMT by secondary school teacher trainees (2008 UZ (DTE) T.P Report).

56.4% of the trainee teachers strongly agreed that there were inadequate funds provided for EMT, while 31.2% agreed that there was general inadequacy of funds. The graph is skewed towards inadequate funding by schools. This supports respondents' views on the adequacy of EMT in the practising schools. The current unstable economic environment could be a major contributory factor to unavailability of funding despite that the majority of participants acknowledged the significance of EMT. While this was true for most schools that were investigated, private schools[11] appeared to be better positioned in terms of funding. They channelled more resources towards EMT while most rural schools[12] appeared grossly disadvantaged.

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[10] The Scheme of Association is the relationship between the University of Zimbabwe (UZ) and teachers' colleges in which the colleges request for the university's participation in their programmes. In the relationship, the UZ monitors standards in the colleges and certificates successful graduates

[11] These are high fee paying schools that are also mostly better equipped in terms of resources

[12] Schools located in the remote areas of the country and are usually disadvantaged in terms of resources. Untrained teachers are mostly found in these schools as qualified teachers tend to shun such schools.

Table 2. Trainers' views on the use of EMT by trainee teachers, (N=15)

Emerging themes	Opinions of trainers (%)				
	SA	A	UD	D	SD
Trainees use of EMT as an obligation	0	66.6	0	33.4	0
Trainees produce and effectively use EMT	0	0	16.6	83.4	0
Trainers view EMT as important	50	50	0	0	0
Practising schools have adequate and functioning EMT	0	0	16.6	66.8	16.6
Adequate funds are provided for EMT	0	0	0	50	50

Table 2 shows that 50% of the trainers strongly agreed that EMT were very important in teaching while 50% also agreed that EMT were useful in school and none were undecided, disagreed or strongly disagreed. This is expected given trainers' level of experience in use of media and from observing student teachers' use of EMT during teaching. In fact trainers always emphasise use of media in lesson delivery to aid concept formation. The trainers gave several reasons on the importance of EMT, which include improving the quality and range of instructions, appealing to all the senses and making lesson ideas and concepts more concrete, meaningful, understandable and clear. The trainers indicated that from their experiences during supervision of students on TP students rarely used EMT, but limit themselves to chalkboard, a few models and equipment especially inhumanities. In a few cases commercially printed media such as charts would be used in some subjects such as Geography. One trainer summed up the significance of EMT when he reported that "educational media and technology ensures that the learner receives, understands, retains and applies the experiences gained to achieve the educational goal." If properly used educational media and technology result in effective learning and skills acquisition than mere learning without such media. They however, indicated that EMT cannot be substituted for actual teaching but rather assumes a supportive role.

The majority of trainers (83.4%) also indicated that the trainees could not produce, besides not being able to effectively use EMT while 16.6% remained undecided. A contradicting observation was that 66.6% of the trainers agreed that the trainee teachers used media as an obligation implying that the majority of the trainee teachers actually produced and used media in their teaching and yet as observed earlier, trainees could not produce and use EMT. Thus It becomes difficult to validate the above assertion. 33.4% of the trainers disagreed, while 16.6% were not sure about the adequacy of functioning EMT. In total 83.4% disagreed that there was adequate and functioning EMT in schools confirming the researchers' observations that inadequate equipment, commercial media and models were available in schools. Text books that were available were substantially outdated and foreign. Most equipment was either non-functional, requiring servicing or obsolete and incompatible with modern technologies hence the graph tilted strongly towards unavailability of functioning EMT. This could be a reflection of the effects of the ailing economy on the schools. 50% of the trainers strongly agreed while the same percentage disagreed that there were inadequate funds provided for EMT.

DISCUSSION AND RECOMMENDATIONS

It is evident that both the trainers and trainees view the use of EMT as inclined towards improving the quality of teaching. In one trainer's words, EMT "helps convey the intended message effectively to the learner." The trainee teachers should, besides being able to use teaching skills acquired from training colleges, have the initiative to produce, improvise and

use EMT more effectively and efficiently. They should have a high degree of creativity in producing media, which can motivate learners. Apparently a few trainees who produced and used media did so as an obligation rather than as emanating from a professional drive to do so. Negative attitude and lack of understanding of the importance of EMT could be the cause of this unhealthy situation (Cangleosi, 1995) & (Cooker, 2002). The different kinds of learners such as the kinesthetic, visual and auditory are not being adequately catered for through such limited use of media. Thus in order to make learning more functional, purposeful and meaningful, the teacher must find ways and means of achieving the objectives of education through adequate provision of EMT. This would enable effective communication with learners through illustrations and demonstrations thereby catering for the different learning styles and appealing to all senses.

The government through the Ministries of Education Sports, Arts and Culture, and Higher and Tertiary Education should fund for the purchase and maintenance of equipment in schools, which some trainee-teachers felt, were obsolete and required replacement. As observed by one trainee who said "all things are available but not functioning. The schools need technicians to service the equipment and probably donations too for new machines." In addition, individual schools should find means of generating funds for the purchase and production of EMT for effective teaching and learning processes. It appears the sluggish economy has had profound negative impact on availability of EMT. However due to meagre salaries teachers cannot afford to buy basic materials and other media and thus there is a limit to which media could be improvised.

One major category that emerged from the trainers, was buying more EMT, as illustrated in the following two excerpts:

1. "Schools should buy more materials for teachers, for example. OHPs, VCRs, LCDs, radios, TV sets etc. Teachers should pressurise school authorities on the advantages of having such teaching aids."
2. "Schools should buy video cameras, TV sets and video recorders to help learners access concrete materials for effective learning."

However, the availability of EMT really depends on the state of the macro-economy. The problems and their solutions are intertwined and tangled in a complex web of economic crises bedevilling the country.

CONCLUSION

While there is mention of quality education and acknowledgement of the importance of EMT in achieving quality education, it should be noted that in most teacher training institutions, educational media and technology departments are now non-existent or defunct. Where these exist, little utilisation of the facilities is evident. The departments have been reduced to mere centres for simple chart and model making. The complementarities of teacher's knowledge and his/ her ability to maximise the use of EMT cannot be belaboured. It is hoped that training institutions, through results from studies such as this one, will be persuaded to rejuvenate their EMT departments in order to improve the production of quality media and most importantly, initiate utilisation of EMT for enhancing the teaching and learning process. It is with this view that the present teacher training system should gear itself towards producing teachers who are capable of efficiently using EMT, both modern and traditional. It is also hoped that once trainee teachers understand the impact of EMT on the learning process that would spur an increase in demand of such materials from the Audio-visual Services of the Ministry of Education Sports, Arts and Culture, thereby encouraging the Government to increase their vote allocation to the Audio-visual Services Unit.

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