RESEARCH ARTICLE

AN EVALUATION OF EDUCATIONAL TECHNOLOGY USE IN TEACHER EDUCATION IN KENYAN UNIVERSITIES

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ARTICLE INFO	ABSTRACT
	The basis of the development in educational technology is the possibility of improving the efficiency or quality of learning in a given situation. Appropriate application of educational technology contributes tremendously to the improvement and enhancing of effective teaching and learning. It would therefore be in order to note that there is much in education and training which could be improved by thinking more carefully about various aspects of educational technology in teacher education. Technology is becoming an important part of education and teachers are seen as a critical link in developing technology literacy among students (Phelps, 2002). This literacy can only be achieved if the teachers themselves possess it; one cannot give what one does not have. The expansion of information and communication technology presents educators of teachers with new issues and challenges, two of which are educating teachers to use technology in educationally effective ways, including teaching them about the technology, and incorporating technology with the delivery of teacher education. This suggests that preparation of teachers should teach educational technology as content and at the same use it as delivery resource. Consequently, educational institutions need to have a practical vision for effective use of educational technology to facilitate training and preparation for graduates. This paper is a presentation of findings from a study whose purpose was to evaluate educational technology use in teacher education in Kenyan universities. The findings are on lecturers' attitude towards educational technology, major types of educational technology used in the preparation of teachers at the Kenyan universities, frequency of use of educational technology by lecturers, effectiveness of educational technology in teacher preparation, and use of educational technology in public and private universities. Based on the findings of the study, this paper presents certain conclusions and recommendations which are expected to be useful to Policy makers especially in the Ministry of Education, teacher trainers, educational technologists and all those concerned with teacher preparation at university level; these are guided at improving, innovating, and evaluating their teacher preparation programmes to remain relevant in teacher preparation.

INTRODUCTION

New communication and information technologies have become major resources for teaching and learning in higher education (Chickering and Ehrmann, 1996). Any given instructional strategy can be supported by a number of contrasting technologies (old and new), just as any given technology might support different instructional strategies. Such technologies are tools with multiple capabilities. With sufficient access and support, teachers will be better able to help their students comprehend difficult-to-understand concepts and engage in learning, provide their students with access to information and resources, and better meet their students' individual needs. It is reasonable, therefore, to argue that teachers adequately trained in and by the use of educational technology would perform better in their use, or apply them more readily, than one not adequately trained or one not trained at all. The Report of the National Committee on Educational Objectives and Policies (Gachathi Education Report) of 1976 (Republic of Kenya,1976) recognized that improvement of the quality of education cannot occur without a major improvement in the quality of teachers as a result of appropriate preparation, especially in the use of the tools of their (teachers') trade. This is on the basis that programmes that employ technology for teaching and learning yield positive results for students and teachers. These positive results suggest a future for

education that could be more meaningful if institutions maintain their commitment to harnessing emerging technology for education. Quality training can only be received through a programme that is relevant to the needs of its recipients. Graduate teachers produced by universities go to serve in societies characterized by dynamism. The nature of the workplace environments provides a backdrop for realigning workplace needs with workforce competencies and strategies to ensure quality performance. Cornu (1995) asserts that future teachers do not teach the way we tell them to; they produce the way they are taught. For example, in his study on influence of secondary school teachers' perceptions on the adoption of computer use in selected districts of Rift Valley Province Kenya, Ngugi (2008) notes that secondary school teacher professional development does not emphasize the use of computer technology for instruction. Teachers then tend to teach the way they were taught by their teachers. There is, therefore, need for a paradigm shift in order to expose the teachers, practically, to a wide range of technologies that will adequately prepare them for their work place. In teacher education, the methods and the pedagogical strategies that are used are at least as important as the content. Institutions therefore need to have a far-reaching vision for the effective use of technology in education to help their graduates to be better educated and better prepared for the evolving demands of the new economy and changing society. Technology is becoming an important part of education and teachers are seen as a critical link in developing technology literacy among students (Phelps, 2002). This literacy can only be achieved if

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the teachers themselves possess it as one cannot give what one does not have. It is true that appropriate application of educational technology contributes tremendously to the improvement and enhancing of effective teaching and learning. Most scholars of educational technology (e.g. Aggarwal 2004; Romiszowski 1988; Heinich 1984; Galda 1984) argue that greater learning results are realized when educational technology is applied in teaching and learning, that equal amounts of learning are often accomplished in less time using educational technology, and that it generally facilitates learning and is preferred by learners when compared to traditional instruction. It is also an educational technology paradox to continue to do things the same way but expecting different outcomes (Mwaka and Salim, 2007). The assumption that educational technology can increase interest, comprehension and retention is based on the hypothesis that the more abstract the learning content the more difficult it is to comprehend it. Thus the theoretical rationale lies in the educational technology's ability to add concreteness to any learning situation, therefore, the need for resource-based learning. It is therefore evident that any teacher education programme needs to give careful consideration to the preparation of teachers to enable them handle resource-based learning competently; the concerned institutions also need to collect information on a regular basis in a bid to monitor technological changes taking place in their graduate teachers' workplace.

Use of educational technology allows individuals to satisfy their interests, progress at their own pace, time, and at their own base (Brunner, 1960). A variety of resources fulfil various needs at the same time. They allow greater levels of active participation by the learners, greater possibilities of interaction, and the use of a wider range of media. Examples would include the television, computer, teleconferencing, and photographs. The benefits of these technologies would be reaped by the student teachers at the university. Resource-based learning also allows a greater freedom to hear, see, and above all, to do. Traditional educational technology can never satisfy the needs of modern industrial society whose members require an education fitting them into a working life (Tienne, 1994). The expansion of information and communication technology is presenting the educators of teachers with new issues and challenges. Two major challenges are identified by Collis (1996) as:

a) Educating teachers to use technology in educationally effective ways, including teaching them about the technology;
b) Incorporating technology with the delivery of teacher education.

This suggests that preparation of teachers should teach educational technology as content and at the same use it as delivery resource. Collis (1996) and Cornu (1995) rightly note that teachers need to develop an overall awareness of how technologies can be used in education, and learn skills in handling these technologies. Research has shown that in an effort to keep up with the trends in the world, universities are acquiring state-of-the-art technological equipment (Cornu, ibid). In Kenya, a good number of institutions have computers, televisions, videos, telephone lines, and recorders. However, studies have shown that these equipment have not been adopted and adapted to instruction and professional purposes by the teachers (Ogoma, 1987; Odanga, 2000). Further, studies have shown that teachers who graduate from such institutions find it difficult coping with the demands of learners who may be ahead of them, or know more than they do (Abenga, 2005). This situation does not augur well for effective instruction and requires that teacher education institutions consider use of educational technology in their programmes. This owes to the fact that educators' use of educational technology influences the students' skills, strategies, techniques, and attitudes to be able to use the current and new technology in their future instruction and professional growth.

Statement of the Problem

Teacher training is one of the nerve centres of an education system (Abenga, 2005). Since education serves a dynamic society, there is need for teacher education to keep up with the changing realities in order to meet the changing needs of society. The introduction of democracy in education, independent learning, and much more requires teachers who are independent, innovative, critical, and globally oriented. This calls for strategic teacher education which is a crucial factor of development today, and that needs diverse initiatives to sustain it. Quality in teacher education can be achieved through, among other things, proper preparation of teachers using appropriate educational technology. In recent years, the quality and role of the teacher has become an issue of concern in Kenya (Digolo, 2006). More needs to be done to raise the standards of the teachers' preparation to have the graduate teachers competently discharge their duties in the teaching and learning process. Current training therefore needs a global outlook and approach which must be clearly expressed in the university curriculum, reflected in the objectives and technology applied during delivery. This is against a background where the world is becoming a global village and graduate teachers go to teach school children who keep abreast with the advancements in information and communication technology and apply them in their private studies.

Universities experience challenges that are likely to affect the quality of instruction (Consultation of Experts on Future Trends and Challenges of Higher Education in Africa. 1992). Some of these challenges are large classes occasioned by high numbers of qualifiers who require facilities. The likelihood is that they end up exposing their students to conventional instructional technologies. Resulting from this kind of exposure, on completion of their training course, teachers go on to schools and teach in more or less the same methods, using the same approaches, techniques, media, and equipment. They may find themselves using the conventional instructional technologies regardless of the needs of the learners, and without minding the advancements in information and communication technology (ICT) that are influencing instruction. Mukwa (2007) states that educational technology is dictated by the type of audience and objectives of a particular teacher education programme. There is evidence of changes in the audience knowledge levels, practices, attitudes towards development, and socially accepted behaviour in Kenya. These changes need to be constantly studied by the Kenyan universities in order to prepare the graduate in and with appropriate use of educational technology to adequately prepare him/her for the workplace.

African leaders and higher education experts who participated in seminars held in Accra, Ghana, in 1991 (UNESCO, 1992), and in Dakar, Senegal, in 1992 (UNESCO, 1993) identified major areas of concern about the status and future prospects of African higher education. Among these areas were mission of higher education - producing the kinds of graduates who would not only be adaptable to the rapidly changing needs of African society but also contribute to innovation and development. In addition, deliberations of a forum of experts on higher education research in developing countries sponsored by UNESCO and the University of Pittsburgh (Spaulding, *et al.*, 1991), which included representatives from Kenya, identified curriculum, teaching, and instructional technology as an area needing research. A follow-up of these deliberations would have seen studies carried out on particular areas of instruction, among them educational technology in teacher education. Yet literature reviewed on studies carried on educational technology reveals that not much research has been carried out on use of educational technology in teacher education (Abenga, 2005; Odero-Musakali and Mutula, 2007; Wanyonyi 2007; Ngugi, 2008). For these reasons, this study set out to evaluate educational technology use in teacher education in Kenyan universities.

Purpose of the Study

The purpose of this study was to evaluate educational technology use in teacher education in Kenyan universities. The objectives of this study were to:

a) establish the lecturers' attitude towards educational technology,

b) examine the major types of educational technology used in the preparation of teachers at the Kenyan universities,
c) determine the frequency of use of educational technology by lecturers,
d) establish the effectiveness of educational technology in teacher preparation, and
e) compare use of educational technology in public and private universities.

This would provide valid and empirical information on the practice and status of educational technology use in teacher education.

Theoretical Framework for the Study

This study was guided by the General Systems Theory (GST), advanced by Bertalanffy (1975). This theory is an interdisciplinary field of science which studies the nature of complex systems in nature, society, and science. It is a framework by which one can analyse and/or describe any group of objectives that work in concert to attain some goal. Adopting a systems approach to teacher education, one is able to orderly examine characteristics and interactions of different systems, subsystems (smaller collection of entities that comprise a section/portion of the system), and suprasystems (the total environment in which the system operates).
A system has the following characteristics:

- Goals and Mission
- Elements or subsystems
- Boundaries or interfaces which distinguish each part from the other part of the system, thus ensuring that a specific task is performed at a particular point.
- External Environment - each system has an external that can affect it. System objectives operate within environmental constraints and there is a critical point at which the system may collapse. There is thus a need to ensure flexibility in operational objectives to minimize *entropy* (internal disorder).
- Living organisms - systems are likened to living organisms which receive input and act on them to produce output/outcomes and are capable of growth.
- Feedback which is specific input into the system that gives information about the achievement (output) for purposes of re-examining the system.
- Growth - a system grows either through transformation or diversification or multiplication.
- Dynamic Stability – each system is dynamically in harmony with the environment.
- Equifinality which suggests that there is no one right way to accomplish important results.

In looking at teacher education as a system, the goal is to produce graduates who are able to meet the demands of their profession. Teacher education consists of a series of interrelated components called subsystems, which would include content, methodology, and professional training; use of educational technology is part of methodology. Each of these have to be effectively carried out if teacher education is to be successful. What is outside of teacher education can be considered its environment. This can be defined as those factors that (1) have an impact on the behaviour of the system, and (2) over which the system has little or no control. The environment consists of those factors the teacher educatio needs to consider, for decision making, that are outside of its control. Elements in the environment include syllabus changes, curriculum review, labour market, technology, and demographic and economic trends. The GST therefore provided a useful theoretical framework for this study as it explained the need for a teacher education university to appreciate the role of use of educational technology in achieving the overall goal of its teacher education programmes.

METHODOLOGY

The study was a descriptive survey, carried out in four universities selected from ten Kenyan universities engaged in teacher preparation programmes. Data was collected from 213 fourth year Education students, four Heads of Department, and 40 lecturers from the selected universities. The study subjects were selected using both probability and non-probability sampling designs. Questionnaire and observation schedules were used to collect data. Inferential and descriptive statistics were used for data analysis.

Summary of Findings

Lecturers' Attitude Towards Educational Technology

Lecturers' attitude towards educational technology affects their instructional use of the technology and likelihood of profiting from any related training (Thomas, Tyrrell, and Bullock, 1996). Table 1 shows the means of the attitude of lecturers towards educational technology. Each statement had a mean score of over 4.000, an indication that lecturers had a positive attitude towards educational technology. It can therefore be concluded that lecturers considered educational technology to play a major role in teacher preparation.

Types of Educational Technology

The means for the types of educational technology used by lecturers were computed and are presented in Table 2. The statistics show a favourable use of printed texts, chalkboard, internet, and whiteboard. All the others, as shown in the table, were rated low in terms of use.

Frequency of Use of Educational Technology by Lecturers

Eighteen educational technologies were listed for rating by both lecturer and student respondents. Table 3 shows the scores of each group of respondents in terms of the frequency of use of each of the presented educational technologies by lecturers. An analysis of the frequencies on students' responses, as shown on Table 3 indicates that 3.7% of the respondents indicated lecturers hardly or never used the chalkboard while 96.3% indicated their lecturers occasionally or always used chalkboard. Among the student respondents, 12.7% indicated the lecturers hardly or never used printed texts while 87.3% indicated the lecturers occasionally or always used printed texts. These findings agree with Hodas (1993) and Kafu (1976), who say that teachers always use chalkboard and printed texts, and that adoption of other technologies registers a slow pace. This scenario calls for rapid changes in educational technology use in teacher education universities. The gravity of this is articulated by Jowi (2003) who says that while they have responded rather slowly in the past, to changing circumstances, there is now an urgent need for universities to adjust rapidly in order to fulfil their missions and the needs of other stakeholders.

From Table 3, it can also be noted that about 20% of the students reported that lecturers always or occasionally used video conferencing (14.6%), tape recorder (16.9%), film projector (19.2%), radio (17.4%), and opaque projector (17.4%). About 21-30% of the student respondents reported that the lecturers always or occasionally used e-curriculum (23.4%), overhead projector (27.2%), e-mail (28.2%), and slide projector (29.6%). About 31-40% of the student respondents reported that photographs (30.5%), LCD projector (31.5%), whiteboard (33.8%), computer (35.7%), and television (40%) are always or occasionally used by the lecturers. About 41-50% of the students reported that the lecturers always or occasionally used the internet (47%) and realia (46.9%). The low use of internet can be attributed to access, as Kozma (2003) regards access to internet a major challenge in developing countries. From the lecturers' responses, about 20-30% of the lecturer respondents reported that they always or occasionally used opaque projector (20%), video conferencing (22.5%), e-curriculum (25%), and tape recorder (27.5%). About 31-40% of the lecturer respondents reported that they always or occasionally used film projector (30.5%), radio (32.5%), and T.V. (40%). About 41-50% of the lecturer respondents reported that they always or occasionally used photographs (47.5%),

Table 1. Lecturers' Attitude Towards Educational Technology

Statement: Perception of the role of educational technology in teacher education	N	Mean	Std. Deviation
Educational technology supports high quality professional development	40	4.2750	.8767
Educational technology increases the student teacher's motivation, achievement, and competence	40	4.3500	.6222
Educational technology increases the lecturer's ability to teach	40	4.2250	.8619
Educational technology enables adequate preparation	40	4.1000	.6718
Educational technology allows interaction between the student teacher and the lecturer	40	4.2250	.7334

Table 2. Types of Educational Technology

Educational Technology	N	Mean	Std. Deviation
Printed texts	40	3.675	0.5256
Chalkboard and talk	40	3.5	0.9337
Internet	40	3.2	0.9115
Whiteboard	40	3.025	0.8317
Realia (objects, specimens)	40	2.875	0.6864
Computer (MS Office programmes	40	2.825	0.9578
E-mail	40	2.8	1.0178
LCD projector	40	2.625	0.9789
Photographs	40	2.6	0.8412
Slide projector	40	2.425	0.9578
Overhead projector	40	2.375	0.9524
Film projector	40	2.2	1.0908
T.V.	40	2.1	1.1048
Radio	40	2.05	1.061
E-curriculum	40	1.975	0.9737
Tape recorder	40	1.925	1.0225
Videoconferencing	40	1.9	0.9819
Opaque projector	40	1.85	0.8022

Table 3. Students' and Lecturers' Responses on Frequency of Use of Educational Technology by Lecturers

Educational technology	Students				Lecturers			
	Always	Occasionally	Hardly	Never	Always	Occasionally	Hardly	Never
	F(%)	F(%)	F(%)	F(%)	F(%)	F(%)	F(%)	F(%)
Chalkboard	176(82.6)	29(13.6)	6(2.8)	2 (0.9)	29(72.5)	5(12.5)	3(7.5)	3(7.5)
Whiteboard	19(8.9)	53(24.9)	43(20.2)	98(46.0)	14(35.0)	13(32.5)	13(32.5)	0(0)
Printed texts	79(37.1)	107(50.2)	18(8.5)	9(4.2)	28(70.0)	11(27.5)	1(2.5)	0(0)
Radio	4(1.9)	33(15.5)	42(19.7)	146(68.5)	5(12.5)	8(20.0)	11(27.5)	16(40.0)
Tape recorder	6(2.8)	30(14.1)	34(16.0)	143(67.1)	4(10.0)	7(17.5)	11(27.5)	18(45.0)
T.V.	5(12.5)	11(27.5)	7(17.5)	17(42.5)	5(12.5)	11(27.5)	7(17.5)	17(42.5)
Computer programmes	19(8.9)	57(26.8)	42(19.7)	95(44.6)	10(25.0)	18(45.0)	7(17.5)	5(12.5)
Internet	33(15.5)	67(31.5)	28(13.1)	85(39.9)	19(47.5)	12(30.0)	7(17.5)	2(5.0)
E-mail	14(6.6)	46(21.6)	40(18.8)	113(53.1)	12(30.0)	13(32.5)	10(25.0)	5(12.5)
E-curriculum	12(5.6)	38(17.8)	29(13.6)	134(62.9)	4(10.0)	6(15.0)	15(37.5)	15(37.5)
Videocon-ferencing	4(1.9)	27(12.7)	33(15.5)	149(70.0)	4(10.0)	5(12.5)	14(35.0)	17(42.5)
Photographs	17(8.0)	48(22.5)	58(27.2)	90(42.3)	7(17.5)	12(30.0)	19(47.5)	2(5.0)
Realia	29(13.6)	71(33.3)	38(17.8)	75(35.2)	5(12.5)	27(67.5)	6(15.0)	2(5.0)
LCD projector	13(6.1)	54(25.4)	39(18.3)	107(50.2)	8(20.0)	15(37.5)	11(27.5)	6(15.0)
Slide projector	10(4.7)	53(24.9)	30(14.1)	120(56.3)	5(12.5)	15(37.5)	12(30.0)	8(20.0)
Film projector	6(2.8)	35(16.4)	40(18.8)	132(62.0)	8(20.0)	4(10.5)	16(40.0)	12(30.0)
Overhead projector	10(4.7)	48(22.5)	36(16.9)	119(55.9)	4(10.0)	16(40.0)	11(27.5)	9(22.5)
Opaque projector	10(4.7)	27((12.7)	32(15.0)	144(67.6)	1(2.5)	7(17.5)	17(42.5)	15(37.5)

Table 4. Paired Samples Test: Frequency and Effectiveness of Technology

Choice and Use/Effectiveness	Paired Differences		t	df	Sign. (2-tailed)
	Mean	SD			
Chalkboard	-.7500	1.1266	-4.210	39	.000
Whiteboard	-.8250	1.1742	-4.444	39	.000
Printed texts	-.5500	.7143	-4.870	39	.000
Radio	-.1.1000	1.2770	-5.448	39	.000
Tape recorder	-1.2000	1.5722	-4.827	39	.000
T.V.	-1.2250	1.2907	-6.002	39	.000
Computer programmes	-.9000	1.3737	-4.143	39	.000
Internet	-.7500	1.1712	-4.050	39	.000
e-mail	-.6750	1.3085	-3.263	39	.002
e-curriculum	-1.1000	1.3359	-5.208	39	.000
videoconferencing	-1.6000	1.2969	-7.802	39	.000
photographs	-1.1000	1.0328	-6.736	39	.000
Realia (objects, specimens)	-.7750	1.3299	-3.636	39	.001
LCD projector	-1.000	1.3587	-4.655	39	.000
Slide projector	-1.3750	.9251	-9.401	39	.000
Film projector	-1.3000	1.3812	-5.053	39	.000
Overhead projector	-1.3500	1.0754	-7.940	39	.000
Opaque projector	-1.4500	1.311	-8.101	39	.000

Table 5. Mann-Whitney Test: Use of Educational Technology and Type of University

	Ranks				Asymp. Sig.
	University	N	Mean Rank	Sum Of Ranks	
Chalkboard	Public	54	51.58	2785.50	.380
	Private	45	48.10	2164.50	
	Total	99			
Whiteboard	Public	54	62.61	3381.00	.000
	Private	45	34.87	1569.00	
	Total	99			
Printed texts	Public	54	51.12	2760.50	.643
	Private	45	48.66	2189.50	
	Total	99			
Radio	Public	54	49.94	2697.00	.981
	Private	45	50.07	2253.00	
	Total	99			
Tape recorder	Public	54	53.70	2900.00	.124
	Private	45	45.56	2050.00	
	Total	99			
T.V.	Public	54	56.60	3056.50	.007
	Private	45	42.08	1893.50	
	Total	99			
Computer (MS Office) programmes	Public	54	58.36	3151.50	.001
	Private	45	39.97	1798.50	
	Total	99			
Internet	Public	54	56.31	3041.00	.011
	Private	45	42.42	1909.00	
	Total	99			
E-mail	Public	54	60.69	3277.50	.000
	Private	45	37.17	1672.50	
	Total	99			
E-Curriculum	Public	54	58.64	3166.50	.000
	Private	45	39.63	1783.50	
	Total	99			
Videoconferencing	Public	54	54.99	2969.50	.034
	Private	45	44.01	1980.50	
	Total	99			
Photographs	Public	54	54.75	2956.50	.060
	Private	45	44.30	1993.50	
	Total	99			
Overhead projector	Public	54	57.46	3103.00	.003
	Private	45	41.04	1847.00	
	Total	99			
Opaque projector	Public	54	56.36	3043.50	.008
	Private	45	42.37	1906.50	
	Total	99			
LCD projector	Public	54	57.83	3123.00	.002
	Private	45	40.60	1827.00	
	Total	99			
Slide projector	Public	54	58.91	3181.00	.000
	Private	45	39.31	1769.00	
	Total	99			
Film projector	Public	54	55.27	2984.50	.034
	Private	45	43.68	1965.50	
	Total	99			
Realia (objects, specimens)	Public	54	57.94	3128.50	.002
	Private	45	40.48	1821.50	
	Total	99			

slide projector (50%), and overhead projector (50%). The LCD projector was reported to be always or frequently used by 57.5% lecturer respondents while about 61-70% of the lecturers reported that they always or frequently used e-mail (62.5%), whiteboard (67.5%), and computer (70%). About 71-80% of the lecturers always or occasionally used internet (77.5%) and realia (80%). The table further shows that 85% of the lecturers always or occasionally used chalkboard, while 97% always or occasionally used printed texts. These findings agree with Nyaigotti-Chacha (2004) when he reports that universities in Kenya have very limited access to modern computing and communication technology. In terms of responsiveness, this state makes it increasingly difficult for lecturers and students to keep abreast with current developments in their academic areas. These findings indicated that the lecturers' main concern in their use of educational technology was to prepare lectures well using a variety of technologies, while not considering the

students educational technology needs of their profession. This practice contravenes what the Afro-Asian Higher Education Agency for Development (2007) declared, that relevance of higher education should be assessed in terms of the fit between what society expects of institutions and what they do. The concern should be to provide to students access to both broad general education and targeted, career-specific education, focusing on skills and aptitudes, both of which equip the learners to live in a variety of changing settings, and be able to change occupations. This means that lecturers should also consider using the educational technologies with students.

The Effectiveness of Educational Technology in Teacher Preparation

A paired-samples *t* test was calculated to compare the mean score of the lecturers' frequency of use of educational technology to the mean

of the effectiveness of the technology in teacher preparation. According to the output on Table 4, at 0.05 level of significance, there is a significant difference between frequency of use of educational technology and effectiveness of the technologies in preparing student teachers to meet the technological challenges of their work environment. This means that the fact that lecturers use educational technology in teaching does not mean it is effectively done for teacher preparation.

Comparison of Use of Educational Technology in Public and Private Universities

A Mann-Whitney test was conducted to compare use of educational technology with different types of universities. This test examined if the private and public universities differed in their use of educational technology. The analysis of the test was presented in Table 5. From the output, a significant result was found in the use of whiteboard, television, computer programmes, internet, e-mail, e-curriculum, videoconferencing, overhead projector, opaque projector, LCD projector, slide projector, film projector, and realia. This was done at 0.05 level of significance. These findings indicated that use of these forms of educational technology differed from public to private universities, with private universities ranked better in the frequency of all these forms of technology than public universities. There was no significant difference in the frequency of use of chalkboard, printed texts, radio, tape recorder, and photographs. The findings showed that there was a significant difference in the frequency of use of most of the listed educational technologies between public and private universities. These findings could further indicate that private universities were adapting faster to new and emerging technologies than did the public universities. This agrees with the Association of African Universities (2004) who says that some universities show a higher aptitude than others for engaging in innovative reforms; these universities are, therefore, "on the move". The private universities can be classified among the former category of universities. The solution is to understand why this category of universities has been able to do what it is doing, whether its experience can be replicated in the public universities category, and if so under what circumstances.

Conclusion

This study established a dependence on printed texts, chalkboard, whiteboard, and internet by lecturers, while use of other technologies was found to be low in terms of use. The frequency of use of educational technology in teacher preparation did not mean that the technologies used were effectively used in preparing students for technology use in their work environment. This study found that there was a significant difference between frequency of use and effectiveness of use of listed educational technologies. The implication here was that lecturers used a variety of educational technologies at preparation level, meaning the technologies were 'effectively used' in as far as they enabled the lecturers prepare their lectures. This implied that the students would be taught 'of technology' and not 'with technology', a scenario that would result in inappropriate preparation to meet the educational technology challenges of their work environment. Cuban (2001) and Zhao and Frank (2003) say that concerns over slow adoption of technology by lecturers are not new; nine years down the line, the same case holds for Kenyan universities. The study also found that private universities adopted educational technology faster than public universities. This finding could be attributed to large numbers of students admitted in the public universities and the associated cost of acquiring enough equipment, as well as the commitment of the universities to offer training that adequately prepares the graduate teachers for their work environment (Consultation of Experts on Future Trends and Challenges of Higher Education in Africa. 1992). But the size of the classes and the quality of training desired for the graduate teachers should be the driving force for the university to acquire enough technologies to facilitate teaching and learning in teacher education. The positive attitude lecturers have towards educational technology,

as established in this study, should also be harnessed to enhance use of its use in teaching and learning.

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