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INTRODUCTION

REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

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APPENDIX/ANNEXURE

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PREPARING PRE-SERVICE TEACHERS TO INTEGRATE EDUCATIONAL TECHNOLOGY IN THE COLLEGES OF EDUCATION CURRICULUM IN THE CENTRAL REGION OF GHANA

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ABSTRACT

The enclave of education through educational technology continues to raid the whole wide world with its attendant benefits. If how 21st century classroom pre-service teachers in the colleges of education teach with educational technology is our bother then how teacher educators prepare pre-service to teach with technology should be the utmost concern. Recent changes in basic qualifications for teacher educators to teach in Ghanaian colleges of education as well as the acceptable qualification for teachers who wish to teach at the basic school level has necessitated an assessment of teacher know-how on technology integration. This study used survey method to explore 128 out of 140 teacher educators' (tutors) opinion on how they go about integrating educational technology in their pre-service teacher preparation. The findings of the study suggest that little or nothing is being done to teach pre-service teacher candidates how to integrate technology in their classroom practices. It was consequently recommended that policy makers, researchers, curricula developers and other policy publics must take advantage of the high awareness of the usefulness of educational technology to proliferate this ubiquitous tool to education's advantage.

KEYWORDS

Educational Technology, Integration, Pre-service Teachers, Teacher Educators

INTRODUCTION

The use of computer technology and the internet in education, especially in the teaching and learning process has resulted in academic improvements globally (Butzin, 2000; Sivin-Kachala & Bialo, 2000). As a result, there is an emerging concern for training teacher educators who have no background in Educational Technologies (ET) in developing countries (Cawthera, 2003), such as Ghana, to learn from countries that have already taken the lead in integrating educational technology into teaching and learning. An examination of the use of computer technology in Ghanaian schools indicates that computers and the internet for educational purposes are used more in urban than rural secondary schools (Parthermore, 2003).

The term *educational technology*, also referred to as learning technology is the study and ethical practice of facilitating learning and improving performance by creating, and managing appropriate technological processes and resources (Laurillard, 1993). The term educational technology is often associated with instructional technology theory and practice. While instructional technology covers the processes and systems of learning and instruction, educational technology includes other systems used in the process of developing the human capability to use technology in teaching. Laurillard further stressed that educational technology includes, software, hardware, as well as internet applications and resources. Other technologies commonly available to the mass of the population like television and mobile phones are also counted among educational technology tools.

Teacher preparation in the 21st century has never been demanding like it is today, because according to Gold (1996), it has sought to engage stakeholders involved in teacher preparation in the world to develop strategies to aid technology use in the classrooms. The level of impact of educational technology on an educational system depends on the context and the stage of educational development, readiness of the economy and availability of seasoned literature in the local context besides other factors (Yackulic & Noonan, 2001).

Addo (2001) agreed with the argument that that ICT is changing how we work, play, learn, travel and govern. Addo further concurred that throughout the world, information and communication technologies are generating a new industrial revolution already as significant and far-reaching as those of the past. Addo further stated "It is a revolution based on information, which is itself the expression of human knowledge. Technological progress now enables us to process, store, retrieve and communicate information in whatever form it may take, unconstrained by distance, time and volume."(p. 144).

BACKGROUND

Teaching is one of the most challenging professions in the society where knowledge is expanding rapidly and modern technologies are demanding teachers to learn how to use educational technologies in teaching. According to Jonassen (1999), while new technologies increase teachers' training needs, they also offer part of the solution to quality teacher production for the 21st century classroom. Information and Communication Technology (ICT) has the potential of providing more flexible and effective ways of professional development for teachers, improve pre- and in-service teacher training, and connect teachers to the global teacher community. The teacher quantity is important to all meaning persons but teacher quality is not just important but also considered essential.

Pupils learn better with the use of educational technology (Haughey & Anderson, 1998; Shutte, 1999). The extent of flexibility, accessibility, increasing communications and interactions in terms of teaching and learning that educational technologies afford make them desirable in preparing quality teachers in the various sub-sectors of the technical and vocational training programmes for Ghana. Today, educational technology has contributed to the teaching and learning efforts and the advantages that come along with it are further strengthened by the contributions of these tools in effective teacher training programmes (Reynolds, 1989).

Advances in computer technology together with the increasing complexity of an evolving global society have had an enormous effect on education and have produced serious contemplation of some manner of educational reform. Of course, it is difficult to talk about educational change without inviting resistance. The education system in Ghana in the first one and half decades after independence had been described as one of the best in Africa (Akyeampong, 2004; World Bank, 2004). However, Akyeampong further points out that in the 1970s the education system began to slip slowly into decline and prompting several commissions of inquiry, notably the Dzobo Education Review of 1973 (formed to determine the causes and way forward for recovery). Thus, the subsequent restructuring that has plagued education ever since are bound to be the source of today's educational cynicism (Akyeampong, 2001; Kelceoglu, 2006).

At the planning stage for integration of educational technology and other eLearning tools in teacher preparation, priority is given to strategizing, initiating, sustaining, monitoring and evaluation. Haddad (2002) was of the view that work sharing and work scheduling needs to be done which could only happen if the key role of all the players in the integration (implementation) process are identified and noted. There are unanticipated changes in knowledge, methodologies, pedagogical issues, students, school culture – all of which a teacher is bound to deal with alone. Haddad further relates that educational technology can break the professional isolation by permitting, among educators, communication, and exchange of information, chat rooms, bulletin boards, discussion forums, and virtual conferences.

The basis of educational technologies that apply in schools in the 21st century in Ghana hangs on two policy documents. The two policies that were identified to affect the design, development, utilization, management, and evaluation of educational technology according to the Ministry of Education (2009) are:

1. the ICT for education policy and
2. ICT for Accelerated Development (ICT4AD).

The methodology courses at the College of Education institutions in Central Region of Ghana have Introduction to ICT as a course. The course on introduction to ICT touches on fundamentals in computing as it relates to knowledge and its application to Microsoft Word and Excel. The content of this course does not focus on integration of technology in teaching and learning at the College of Education level in Ghana (Course Syllabus, 2005). Since technology is

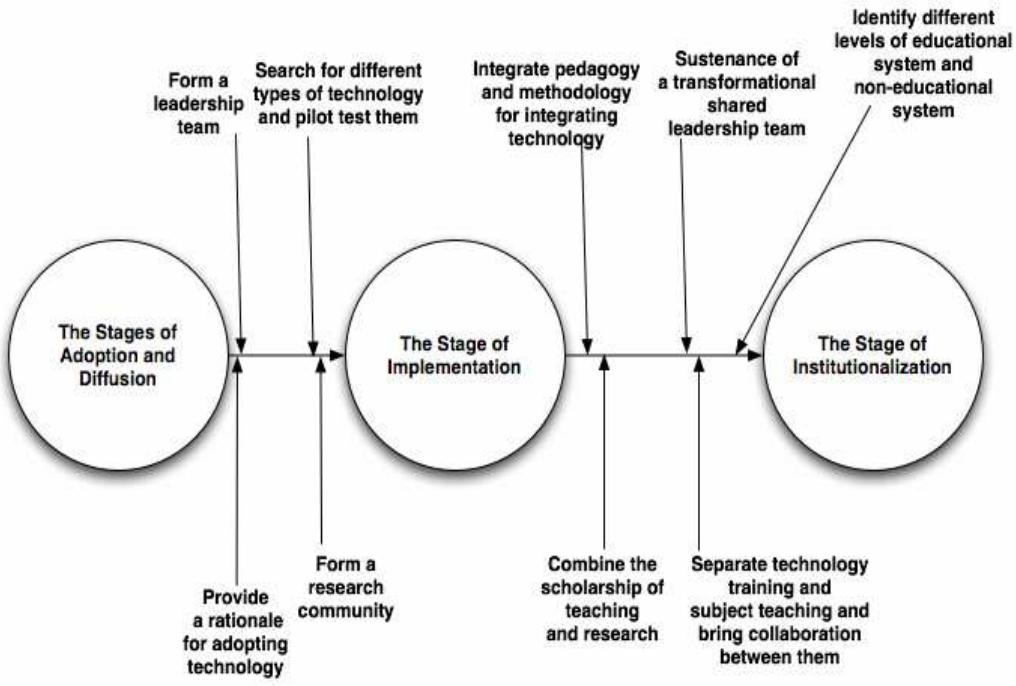
The commitment of Ghana at integrating educational has been expressed in a report to UNESCO (Benneh, 2006). Benneh, the national coordinator of the Teacher Training Initiative for Sub-Saharan Africa (TTISSA) programme, highlighted strategies as the assigned reasons why Ghana Education Service (GES) through the Teacher Education Division should be particular about integrating technology as:

1. New breed of teachers could be produced; that is e – teachers who are well – vested in electronic teaching and learning approaches.
2. New technologies syllabuses can be drawn for teacher professional development
3. A regional online teacher resource base and offline net work for teacher training institutions could be established to share teacher – developed education course wares and innovative pedagogies.
4. Country specific ICT pedagogies and models of different learning environments and teacher – developed e – lesson plans and educational software could be achieved.
5. ICTs as pedagogical tools and educational resources could be used to link pre-service teacher training and in-service teacher professional development.
6. More trained teachers in ICT pedagogies should be produced from colleges to take advantage of e-learning (p. 9-10).

Benneh (2006) stated on the occasion of inauguration of TTISSA that, "(a) More curriculum specialists and technicians need to be trained to provide the range of skills necessary for quality IT-based teaching materials, (b) Educational facilities in schools and community libraries should be made available, (c) There should be a total commitment from governments, communities and other stakeholders in education to support ICT-enhanced Open Distance Learning (ODL) programmes for teachers, (d) There should be Higher Education research support in the use of ICTs in teaching and learning at all educational levels, (e) ICT forms part of TTC (CoE) curriculum. The infrastructure will continually be deployed until each institution has enough of such facilities. Training of curriculum leaders is ICT education is on-going" (p. 9-10).

Notably, the concerns and strategies enumerated by Benneh (2006) did not deviate from ICT4AD policy which spelled out the general strategy of government integrating technology but rather she selected as her focal agenda the teacher preparation aspect. Other researchers point to strategies and actions that could lead to successful ends in integrating teaching technology in the Ghanaian context (Mangasi, 2007, Yidana, 2007). This study, however, is aimed at breaking the grounds for posterity in terms of technology adoption at the Colleges of education in Ghana. The suggested model for educational technology integration follows the framework Figure 1 proposed by Pi-Sue (2004).

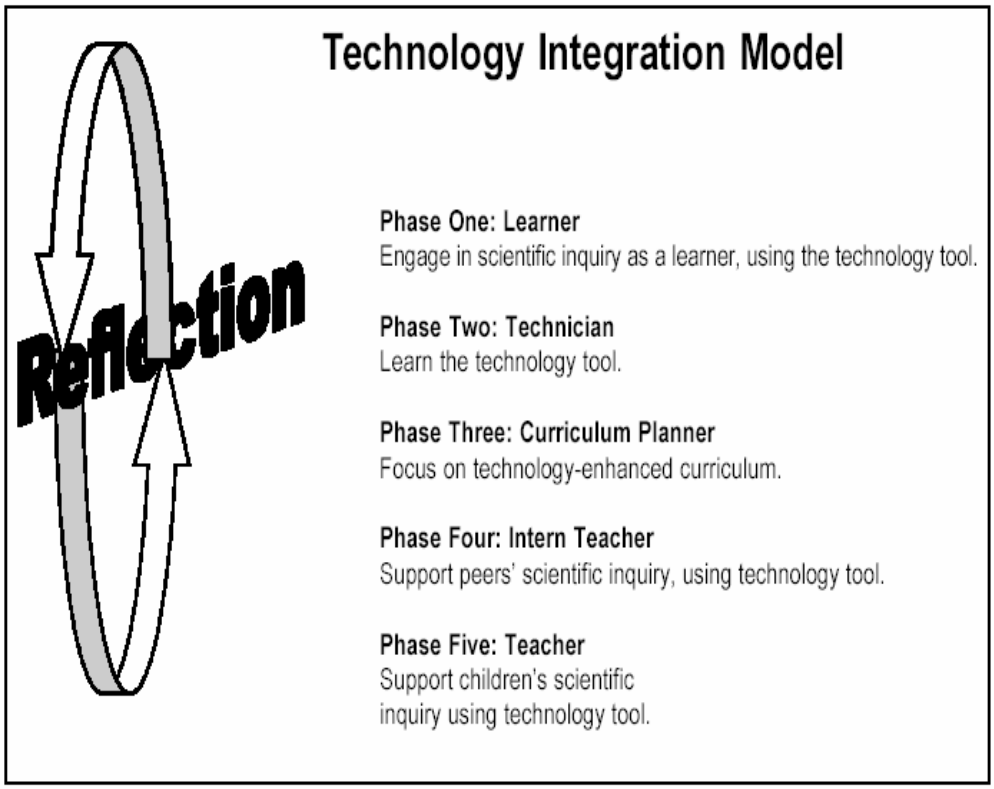
FIGURE 1: FRAMEWORK FOR INTEGRATING TECHNOLOGY IN EDUCATIONAL SETTINGS



Source: Adopted from Pi-Sui (2004: 153).

The comprehensive framework designed by Pi-Sue (2004) supports an educational system grounded in educational technology. In a related strategy, Pi-Sue reflects on a simplified model for the adoption of educational technology. Figure 2 shows the reflection model for educational technology integration proposed by Pi-Sue (2004).

FIGURE 2: TECHNOLOGY INTEGRATION: THE REFLECTIVE MODEL



Source: Adopted from Pi-Sui (2004, p 81).

STATEMENT OF THE PROBLEM

The recent change of minimum requirement for teachers from certificate in teaching to Diploma in Basic Education has increased the depth of details of taught courses in the Ghanaian Colleges of education (Abreh, 2010). The Republic of Ghana produced an ICT for Accelerated Development and ICT for education policies to provide direction for ICT integration in school curriculum. Despite the new provision that the changes in teacher education and training provides there has not been corresponding strategies that provide detail on what integration model that the system provides. In an attempt to understand the variables that work for and those that work against development of models of technology integration, it has become crucial to explore how pre-service teachers in Ghanaian Colleges of education are prepared to make use of these ubiquitous tool for quality education delivery to take place.

METHOD

The study employed descriptive survey research. The survey design was considered apparent for a couple of reasons. In the first place, exploratory data was sought from respondents who work closely with Colleges of education curriculum. Secondly, since the study used descriptive survey the study is unable to uncover other related details in unparallel ways. The research data collection tools were basically questionnaire and interviews. Questionnaires have the potential to collect original data from study participants and additional value of eliciting data through face to face mode. Also, interviews were employed to probe and garner data that collaborate the information collected through questionnaire.

In all, 128 of the 140 tutors in the Central Region colleges participated in the study. The opinions of these total participants were sought on some variables that are believed to impact on the curriculum's permissiveness for educational technology integration. Additionally, six (6) tutors were selected from the three colleges (two tutors per college) who are known for integrating technology in their teaching. The data gathered has been summarized under Table 1. Descriptive research involves describing an issue, event, or situation (Gall, Borg, & Gall, 1996), however ethical considerations requires that actual names of study subject are not exposed and as such, pseudonym were employed to introduce the responses gathered from the interviewees.

RESULTS AND DISCUSSIONS

The Research Question dwelt on how the curriculum for pre-service teachers' preparation permits the integration of educational technology at the Colleges of education level in the Central Region of Ghana. Table 1 depicts the use of educational technology in their professional practice by 127 of the 128 tutors in the Central Region colleges.

TABLE 1: RESPONDENTS' USE OF EDUCATIONAL TECHNOLOGIES

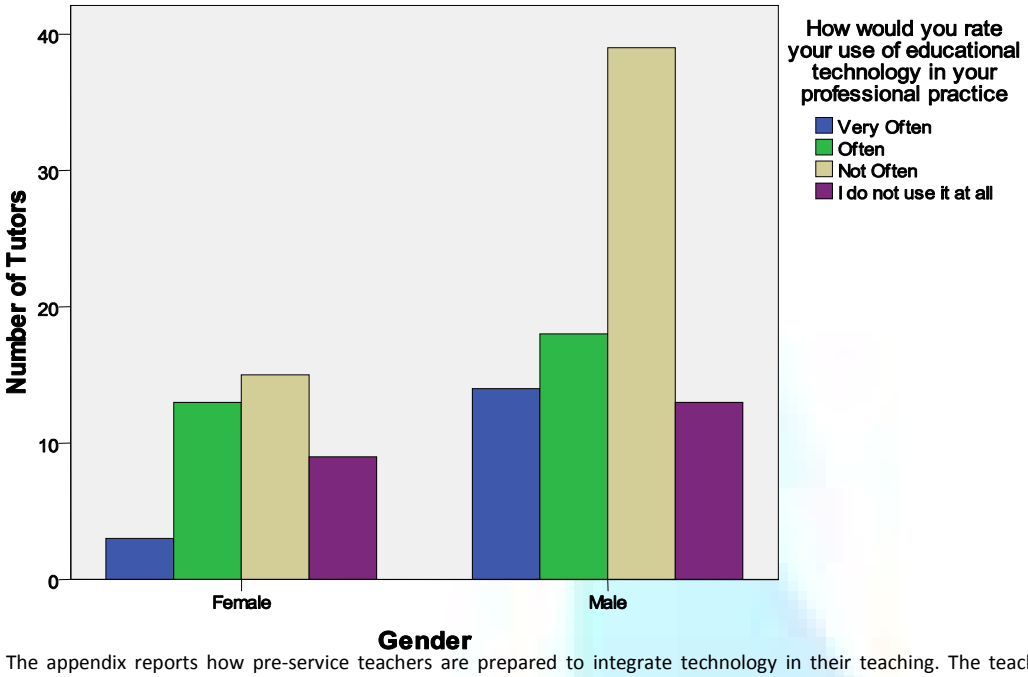
Rate of Use	Number of respondents (N)	Percentages (%)
Very Often	17	13.4
Often	33	26.0
Not Often	54	42.5
I do not use it at all	23	18.1
Total	**127**	**100.0**

Source: Field Data, 2010

Most (42.5%) respondents rated themselves as those who do not use educational technologies often. Furthermore, 60.6% stated that they either did not use ET often or not at all. Nonetheless, it could be inferred from the Table 13 that a cumulative proportion (81.9%) of the respondents use educational technologies although at different rate of usage. The use of educational technology was also reported on by age, and sex.

The Figure 3 shows the use of educational technology by teacher educators in Central Region Colleges of education by gender. Among the male users of educational technology those who fell in the "*often*" and "*not often*" categories outweighed those in the "*very often*" category. A similar pattern emerged for the females but the proportion of female tutors in the region was less compared to their male counterpart. Overall, the males were more frequent users in terms of user strength compared to females.

FIGURE 3: GENDER AND EXTENT OF USE OF EDUCATIONAL TECHNOLOGY



The appendix reports how pre-service teachers are prepared to integrate technology in their teaching. The teacher educators reported varying degree of agreement on whether they model technology use to the teacher trainees. However, the study exposed that at least more than half (52%) the number of study participants agreed that they use educational technology in the day-to-day modeling of technology integration.

Besides modeling, the tutors related in item 2 of the Appendix that they show trainees how to use educational technologies. The majority of the tutors (48.0%) "*disagreed"* about putting in such efforts. Nevertheless, 55 (43.3%) *"agreed"* that they engage their trainees on how to use and a further 11 (8.7%) registered their indecision on the item. That item was followed by yet another (Item 3) on whether they model a positive attitude towards the use of educational technology in the teaching endeavour. Most of the respondents 80 (64.0%) *"agreed*" that they model positive attitude toward use of educational technology, also 33 (25.8%) "*disagreed*" that they model positive attitude whereas the remaining 12 (9.6%) said that they are" *undecided".*

The tutors were asked whether they feel competent to model use of educational technology to their trainees. Item 4 revealed that 40 (32.3%) tutors" *disagreed*" about their competence in modeling educational technology use to their trainees. Secondly, 65 (52.4%) "*agreed"* that they feel competent to model use of educational technology to their trainees while the remaining 19 (15.3%) were "*not sure to agree"* or *"disagree".*

Item 5 also revealed the perceptions of the tutors on the extent of adequacy that the training teachers receive is to enable them integrate educational technology during their practice. Most (53.5%) tutors "*agreed"* while the proportion who" *disagreed*" were 33.1% and the remainder of the 127 respondents (13.3%) said that they were "*undecided"* over the issue of adequacy of the training to aid educational technology integration in schools. reveal

Item 6 reflects the tutors' perceptions that students are taught how to use educational technology. Almost ¾ "*disagree*" with this statement in contrast to their report regarding their own teaching of educational technology previously reported in Item 2 of the Appendix. Item 7 supports respondents' use of methodology classes to integrate technology. Apart from the respondents who "*disagreed"* (representing 19.7%) and the 19 (15.0%) who were "*undecided"* the rest, 83 (65.4%) of the 127 respondents indicated their agreement with the use of methodology classes to expose students to ways in which educational technology can be used as teaching tools.

One explanation for this seeming inconsistency between Items 2 and 6 may lie in the responses to Item 8 which shows that most tutors (61.1%) "*agreed"* that there were courses designed specifically to teach trainees how to integrate educational technology in their classes. However, the remaining respondents were not in agreement that their colleges have specific courses designed to teach trainees how to use educational technology in their classes. These represent 22.2% who *"disagreed"* and 16.7% who were "*undecided".*

Item 10 made it evident that students generally are not required to use projectors for class presentations. Whereas, 74 (58.7%) "*disagreed",* 23 (18.3%) indicated that they were "*undecided"* and a further 29 (23.0%) *"agreed"* that they require their students to use projectors for classroom presentation. In Item 11 respondents said that they encourage their trainee teachers to use educational technology in the form of the internet (e.g., e-mail, blog) to communicate with tutors and peers. The majority of the respondents, 77 (61.1%) *"agreed"* that they encourage their teachers to communicate by means of internet technologies.

In Item 12, 38 (29.9%) of the respondents *"agreed"* that during teaching practice they require teachers to use computer to prepare lessons, whereas 24 (18.9%) were "*undecided",* but, 65 (51.2%) representing the biggest proportion of respondents *"disagreed".* Further, in Item 13, 67 (52.8%) respondents did not ask teachers to use computers to complete classroom related activities like record keeping. Also, 24 (18.9%) tutors were "*undecided"* and the 36 (28.3%) tutors said that they *"agree"* that during teaching practice, they ask their students to use computers to complete classroom related activities (e.g., keep records, presentations)

Six faculties at the Colleges of education in Central Region were engaged on a structured interview which revealed that the integration of educational technology into the teaching curriculum is not mandatory, as it is not grounded in the syllabus. However, five out the six interviewees (80%) pointed out that, they are very much prepared to integrate educational technology in the teaching and learning process in the college. Despite the assertion of the five, *Alice* related the extent to which she integrates technology in teaching, she says,

I present lessons with PowerPoint and also teach students [trainees] how to go online to harvest resources for their lessons (personal communication, 5th April, 2010).

Felix, Charles and *Dan* related that they integrate only educational technologies with which they are familiar. Moreover, apart from *Alice*, the remaining five tutors told the researcher that they are aware of the software to use depending on the study objectives. *Alice,* however, indicated that, she goes to the internet to look for the type of software to use. All the interviewees were able to give evidence of how to conduct a search on the internet.

The interviewees said that it was not crucial at the time they received training at the university on the use of computers and the internet for communication. The tutors further pointed out that it was not critical to use computers for conducting assignments and class presentations. The interview responses provided activities that interviewees make use of the computer. The common use of computers was for surfing the internet, storage of data files, secretarial duties and research purposes. However, other uses include social uses (like watching TV, videos, music), presentation of lessons, and lesson note preparation.

It could be inferred from the data in the Appendix and the structured interviews conducted on the six tutors that educational technology is not getting the attention it deserves because is not mandatory in the teacher training syllabi. Studies conducted by renowned educational technologist seem to suggest that

there are enormous benefits to could be gleaned from using educational technology in the 21st century classrooms which by extension means using technology in educating and training of the teachers who occupy these classrooms (Baylor & Ritchie, 2002, and Di Benedetto, 2005; Russell, Bebell, O'Dwyer, & O'Connor, 2003:).

CONCLUSIONS

The role of teacher educators in preparing teachers to be functional in the 21st century classrooms cannot be overemphasized. Especially, the situation exposed by the data gathered from teacher educators in the Central Region makes it parameters of which areas in pre-service teacher preparation needs much attention using the educational technology lense. The findings of this study imply that little or nothing is done to teach teacher candidates how to integrate technology in classroom practice. The fact that respondents were giving conflicting responses only indicates much needs to done in translating the awareness that these teacher educators have (Abreh, 2010) into useful modeling and other user strategies that could best fit the needs of the teacher educators at first stage and pre-service teachers at the ultimate stage.

RECOMMENDATIONS

It was consequently recommended that policy makers, researchers, curricula developers and other policy publics must take advantage of the high awareness of the usefulness of educational technology to proliferate this ubiquitous tool to education's advantage. Further, pre-service teachers could better be prepared to integrate technology if their teacher educators themselves are groomed through content knowledge and practice in the use of such technologies in their teaching. A systemic model for teacher professional development in the use of educational technology should be designed and implemented.

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APPENDIX

RESPONDENTS' BY HOW THEY PREPARE PRE-SERVICE TEACHERS TO INTEGRATE EDUCATIONAL TECHNOLOGY

Preparing Pre-Service Teachers to Integrate Educational Technology	Response type		
	Disagreement N (%)	Indecision N (%)	Agreement N (%)
1)In my teaching, I model ways in which educational technologies can be used as teaching tools	49 (38.6)	12 (9.4)	66 (52.0)
2)I show my students how to use educational technology in their classes	61 (48.0)	11 (8.7)	55 (43.3)
3)I model a positive attitude towards the use of educational technology	33 (25.8)	12 (9.6)	80 (64.0)
4)I feel competent to model the use of educational technology to my students	40 (32.3)	19 (15.3)	65 (52.4)
5)The training students receive at my college adequately prepares them to teach with educational technology during their practice as teachers	42 (33.1)	17 (13.3)	68 (53.5)
6) Students in my college are taught how to teach using educational technologies	21 (16.5)	12 (9.4)	94 (74.0)
7) Methodology classes expose students to ways in which educational technology can be used as teaching tools	25 (19.7)	19 (15.0)	83 (65.4)
8) At my college, there are courses specifically designed to teach students how to integrate educational technology in their classes	28 (22.2)	21 (16.7)	77 (61.1)
9) I require my students to make use of computers to complete course assignments	34 (27.2)	12 (9.6)	79 (63.2)
10) My students are required to use projectors for class presentations	74 (58.7)	23 (18.3)	29 (23.0)
11) I encourage my students to use the internet (e.g., e-mail, blog) to communicate with tutors and peers.	33 (26.6)	14 (11.3)	77 (62.1)
12) During teaching practice, I require my students to use computers to prepare their lessons	65 (51.2)	24 (18.9)	38 (29.9)
13) During teaching practice, I ask my students to use computers to complete classroom related activities (e.g., keep records, presentations)	67 (52.8)	24 (18.9)	36 (28.3)

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With sincere regards

Thanking you profoundly

Academically yours

Sd/-

Co-ordinator