

# Qualitative Participant Views about the Impact of Modern Technologies in Classroom Learning in Teacher Education

**Enock Asiimwe**

Lecturer, Department of Education,  
Gaborone University College of Law and Professional Studies, Gaborone, Botswana  
Email: enocka@guc.ac.bw / asiimwe.enock2@gmail.com

**Abstract:** *The article puts into perspective the qualitative participant views about the impact of modern technologies given the dynamics in the current educational development landscape. The research objectives included assessment of the effectiveness of modern technologies in teacher training, as echoed in some of the key thoughts from literature review, and these helped in formulating the methodology, whose approach was qualitative. The population from which the sample was derived, comprised three institutions and the sampling technique used was purposive. Procedures with data collection involved seeking research permit from the apparent ministry, testing of instruments and conducting face to face interviews with the institutions' administrators using an interview guide. The key findings established that the effectiveness of modern technologies on teacher training has not reached the level of satisfaction in teacher education institutions and from the findings, one of the key conclusions was drawn and based on that, several recommendations were made, including recommendation for further studies on the subject to be conducted while accommodating a broader sample drawn from both rural and urban areas, lecturers and instructors to be retrained periodically through workshops and other vital programmes to update their knowledge on the use of modern technologies.*

**Key Words:** *Modern Technologies, Teacher Education Institutions (TEI's), Qualitative data, Classroom learning and 21st century workforce skills.*

## 1. INTRODUCTION:

The 21st century began with mushrooming technologies that are either incorporated or integrated into various sectors ranging from manufacturing industries, agriculture, education and many others. The pace at which these technologies are coming is supersonic to the extent that if a sector fails to embrace these technologies, it definitely translates into that particular sector's demise. For instance, it might mean being separated from the 21st century's reality in terms of its output or outcome (Duncan, 2016; Smith et al., 2017). It is very encouraging nowadays to note that curriculum designers and other educationists often take into account the technologies at their disposal when designing and framing curricula (Prensky, 2003). The 21st century technologies are either incorporated or integrated into education and or classroom learning from pre-school to teacher education and beyond. This is done specifically to satisfy the job market or turning out a high caliber workforce needed in the 21st century, which at all cost needs to be conversant with the modern technology (Banister & Vannatta, 2006; Duncan, 2016). Even though the education sector is generally doing well in the uptake of modern technologies to meet the market demand for skilled and technologically well-equipped graduates, it is sad to note that this is mainly applicable to the developed world (Smith et al., 2017).

In the African continent, however, 85% of the countries still lag behind in terms of uptake of modern technologies in classroom learning (Farell & Isaacs, 2007). This does not mean that African governments are not doing their best to bring technologies to their education systems. Nearly all governments in Africa are trying hard to incorporate technologies into education. According to Save the Children Report (2019), in Uganda, the teacher training institutions have introduced lecturers to modern technologies such as interactive smart board, projectors, Digital Electronic Books (eBooks), simulation technologies, podcasting, students' response system, digital video conferencing, lecture capture apps and other technologies.

In Botswana, the information communication technology (ICT) policy development process was adopted in 2004 known as 'Maitlamo', which came out with the national ICT Policy framework that was revised in 2007. Among others, the policy objective was to "create an enabling environment, universal service and access to information and communication facilities to make Botswana regional hub". On a related perspective, the country's 2016 Vision, which was approved in 1997 articulates as one of its pillars: "towards an informed and educated nation". It is noteworthy that many universities and colleges have computer laboratories, but face the challenge of a high computer -student ratio, and many students do not have personal laptops and iPad.

Through the ICT policy, various areas were identified, and Botswana is challenging herself to address such areas. One such example is the education sector where effort to integrate ICT into education is being spearheaded, encouraging its partners to look at e-learning as one of the possible modes in Botswana (Charu, 2015). The

Government has made tremendous effort to improve the level of investment of educational ICT equipment Software as well as broadband connectivity of schools, refurbishment of computers and training of teachers and administrators on e-learning. This is aimed at imparting them the necessary ICT skills for use in the teaching learning process. The introduction of information communication technology as outlined in the ICT Policy and its application in the education sector, has implications for teacher training in Botswana, which includes: ICT tools and gadgets to be availed to all students during the classroom training and delivery of In-service teacher training to be more oriented towards 21st century technology in education. The application of these technologies could be appreciated in teacher education via implementation of technologically enhanced distance education, instructional technology, advanced ICT in education, virtual classrooms, smart classrooms, online learning, and resource centers in education (Salinas & Crossetti, 2018).

A significant body of research has made it clear that many teachers have been slow to transform the way they teach despite the influx of the 21st century technology into their classrooms (Herold, 2015) and government’s effort in training lecturers and instructors at teacher education institutions to become conversant with the technologies. Most surprisingly, some students are more interested, confident and fluent in the use of dominant technologies than adults duly charged to teach them (Prensky, 2003). This called for an imminent need to carry an investigation and assess the uptake of modern technologies into education and/or classroom learning despite lecturers receiving good training in modern technologies in the 21st century.

The study was guided by the following four specific objectives namely: to assess the effectiveness of modern technologies in teacher training; to evaluate the relationship between modern technologies in enhancing teacher trainees’ performance skills; to analyze the marketability of the highly technologically equipped teacher trainee graduates in both public and private education sectors; and to establish the barriers to the uptake of modern technologies in teacher training institutions in Gaborone, Botswana.

**2. LITERATURE REVIEW:**

**2.1 The Conceptual Framework**

The study based its conceptual framework on the qualitative study with the notion ‘Quality input brings quality output’ in a bid to address the participant objective views on the uptake of modern technologies in classroom learning in teacher education to as indicated in the figure below:

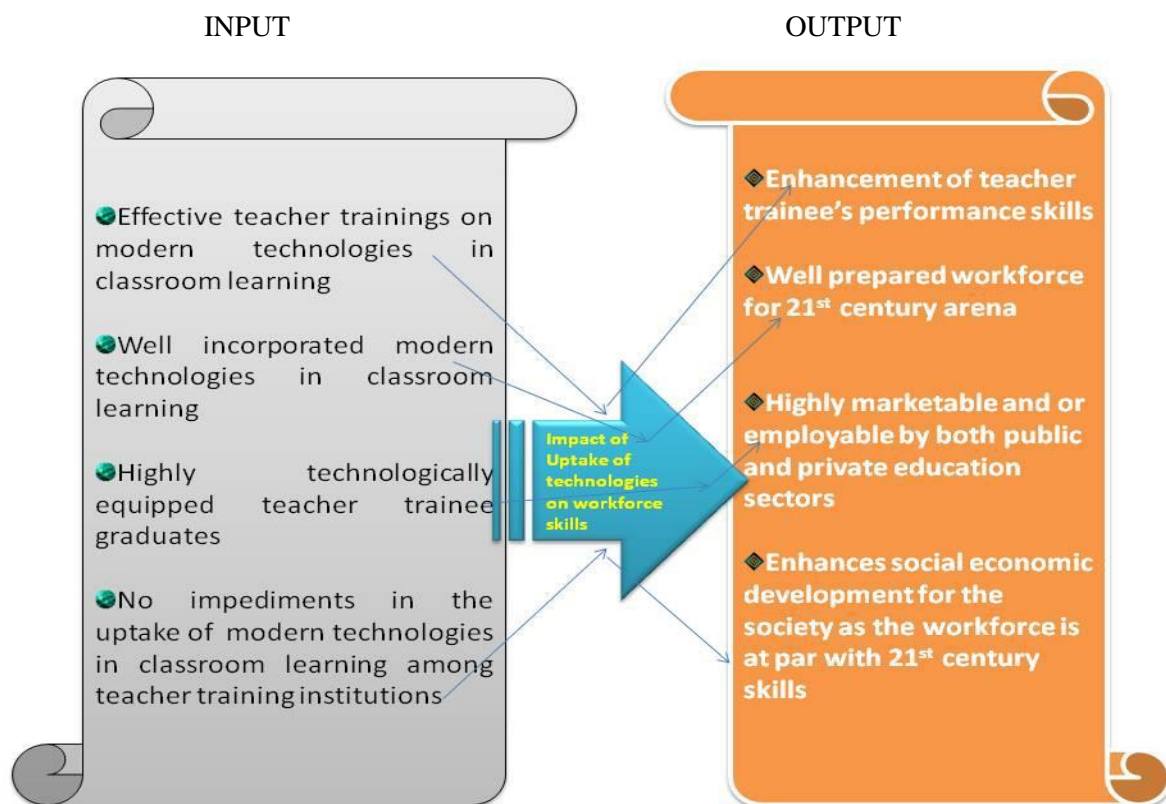


Fig. 1: Conceptual Framework for the Study (Source: Developed by the Researcher)

First, effective teacher training, which the teachers or lecturers get at teacher education institutions always enhances the teachers' performance skills. This is because as the lecturers are conversant with the modern technologies, it is easier for them to use such technologies in classroom teaching, thereby creating a positive attitude in teacher trainees on modern technologies' incorporation in classroom learning. This will, in the long run, translate into high performance skills in the trained teachers.

Secondly, well incorporated modern technologies result into a well-prepared workforce for the 21st century. The more the lecturers use modern technologies, the more the fear of technology use by teacher trainees lessens. This further translates into having highly technological teacher trainee graduates who will meet the requirements of the 21st century adequately trained teacher. Such graduates will be more employable than the graduates who lack exposure to modern technologies especially for classroom learning use. Eventually, if the incorporation of the modern technologies into classroom learning does not face much resistance in teacher education institutions, it will be to the advantage of the society's social-economic development as the graduates with exposure to technologies will be immediately absorbed into the job market for both public and private sectors without creating unemployment.

## **2.2 Effectiveness of the Modern Technologies in Classroom Learning**

Uptake of modern technologies in classroom means the practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources. Uptake emphasizes communication skills and approaches to teaching and learning through the judicious use and integration of diverse media. Uptake of modern technologies has been growing tremendously over the years especially in the just ended decade (Salinas & Crossetti, 2018). Many societies around the world are striving to advance in their educational technologies. Any nation which is very advanced in educational technologies is either ranked higher or gain respect from outside world as well as having great opportunity in selling out its academic reputation as well as the academic output in form of graduates. According to Singh (2011), the uptake of modern technologies in classroom provides educators with tools to try out different designs, so that instead of theories of learning education only, they may begin to develop the science of education. ChanLin (2007) states that "there is a consensus among educators and various social communities that current educational practices need to prepare students to thrive in an ever-changing technological society".

A study carried out in East African countries revealed that African governments are trying their best to expose teachers at teacher training institutions to technologies by sending them to attend various programmes in information technology (Hennessy et al., 2010). The study, however, noted that ICT literacy and confidence levels of teachers seem not to improve despite their numerous appearances in teacher professional development training workshops in ICT (Hennessy et al., 2010).

## **2.3 The Relationship between Modern technologies in Classroom Learning in Enhancing Teacher Trainee's Performance Skills**

Teacher training is the professional education of teachers towards attainment of attitudes, skills and knowledge considered desirable to make them more efficient and effective in their mode of delivering work in accordance with the needs of a society at any point in time (Osuji 2009). It, is therefore, very important to evaluate the technologies that are employed in education as well as classroom learning that promotes teacher training as professional education that enhances performance skills.

Educationists have been probing the relationship between modern technologies in classroom learning and enhancing teacher trainee's performance skills in the 21st Century. For instance, the study by Hannessy et al., (2010) in the afore-mentioned East African countries where a review of ICT in education literature, indicated that literature was silent on the relationship between modern technologies in classroom learning especially and enhancement of teacher trainee's performance skills. In Botswana, the education sector is spearheading the integration of ICT into education, encouraging its partners to look at e-learning as one of the possible modes of delivery in Botswana (Charu, 2015).

## **2.4 The Marketability of the Highly Technologically Equipped Teacher Trainee Graduates in both Public and Private Education Sectors**

The uptake of modern technologies in classroom learning should always stand for a wise application of the available human and non-human resources for providing appropriate solution to the educational problems and to improve the processes and products of education (Banister & Vannatta, 2006). Currently, in the teaching profession, the concept of incorporating modern technologies in classroom learning is of highest significance to the teachers as well as learners as its application is transforming education systems all around the world. Curricula are also aligned to educational technologies or just to suit that. Practitioners in educational technology are striving to get new approaches and effective ways of organizing the teaching and learning process through the best possible application of

technological development (Baule, 2007). The benefits of applying these activities on the body of knowledge for successful and ethical implementation rather than routinely tasks or isolated technical skills, is that, the education technology is shaping the world view of the modern education (Baule, 2007; ChanLin, 2007).

## 2.5 Barriers to the Uptake of Modern Technologies in Teacher Training Institutions

The review of literature on the barriers to the uptake of modern technologies in classroom successful learning in teacher training institutions in developed countries are slightly different from those in developing countries (Edmunds & Matzen, 2007; Daye, 2007; Thomas, 2018). They include: lack of genuine software packages; inadequate computers in the classrooms; low speed internet at school campuses; lack of interest to use ICT tools from both teachers and teacher trainees; lack of adequate proper training on ICT; unavailability of the latest technological equipment; lack of expert technical supporting staff members; poor managerial or administrative ICT support, and poor curriculum design that does not support use of ICT.

Botswana is not very different from other developing countries in terms of barriers being faced. Lepokanye & Mogwe (2014) state that, “Botswana is experiencing the exponential growth of the ICT sector, yet it is still lagging behind in enjoying the ICT benefits compared to other countries dominated by ICT usage. Research indicated that it has been attributed partly to financial constraints and easiness to the Botswana society to adopt ICT, due to the lack and or limited knowledge on it. Literature revealed that ICT adaptation is not easy in Botswana due to countless challenges which has hampered its growth and adaptation in the education sector”.

The research gap that has been revealed in the literature is that the Botswana ICT Policy does not indicate to educators and other stakeholders that upon the learners becoming conversant with the 21st century ICT skills, they will become more employable in both public and private sectors. Guma (2013) stresses that, teachers attend to ICT training without acknowledging the role of ICT in their profession with reference to future career opportunities. Guma further argued that human resource managers when recruiting teachers, do not emphasize the significance of technology in the job advertisement and recruitment process.

## 3. METHODOLOGY:

The researcher used qualitative approach guided by research objectives. The qualitative approach was chosen as it explains and promotes insight and understanding of the phenomena through intensive collection of the narrative data (Amin 2005, p.42). The researcher used simple random sampling technique to select three (3) out of six institutions for the qualitative data, and used blindfold techniques to avoid bias. Purposive sampling was used to select institution administrators. The major strength of this technique is that, the researcher chooses the participants that he/she is convinced could provide relevant, credible and important information (Orodha, 2003). However, this technique cannot represent wider population size as it is deliberately selective and biased (Johnson et. al., 2007).

This study qualitatively engaged institution administrators (Principals) and education officer. Prior to data collection, the researcher sought a research permit from the Ministry of Tertiary Education, Science, Research and Technology, Botswana. The permit was beneficial to the study since the researcher’s study title is sensitive. The researcher conducted face to face interviews with the institution administrators using an interview guide. The interview with the education officer was conducted at a later date. During the interviews, the researcher recorded all the responses from the participants using a smart phone and a note book. Ethical issues were taken into consideration to protect the participants. Before participants took part, they were inducted, and permission to participate in the study was solicited through the consent form. Participants were protected using pseudonyms.

## 4. FINDINGS AND SUMMARY DISCUSSION

The interviews were conducted with the Institution administrators (Principals) and Education Officer on the four devised themes of the study based on this study’s specific objectives as follows:

### 4.1 Determination of the Effectiveness of Teacher Trainings on the Modern Technologies in Classroom Learning

In order to assess the effectiveness of teacher training on the modern technologies in classroom learning, institution administrators (Principals) and education officer were asked if lecturers are capacitated in terms of modern technologies in education and or classroom learning. The study found that both institution administrators (Principals) and education officer agree that lecturers are well equipped in terms of modern technologies in education and or classroom learning.

*CP 1: “lecturers are equipped even though some of them do not have laptops to practice what they have been trained on including software which they have been introduced to...”*

*EO 1: “Yes all lecturers have at least the basic IT skills for them to be able to use IT in class when teaching”*

This shows that lecturers are well equipped in terms of modern technologies in education and or classroom learning. The institution administrators (Principals) and education officer were further asked if they were satisfied with the training exposure that the lecturers at teacher training institutions get, and in what way the training should be improved. The study established that the lecturers have been given the required exposure to IT for one to apply it in the classroom when delivering learning materials. However, other institution administrators and education officer pointed out that the training in IT which is provided is not enough.

*CP 2: “No enough training is offered and if any it is then not what the lecturers need to know ....there are of struggles in IT here...”*

*EO 2: “well satisfied ...updated equipment needs to be purchased well in time with on their usage.”*

This means that the effectiveness of modern technologies on teacher training and classroom learning has not reached the level of absolute satisfaction in teacher education training colleges in Gaborone.

#### ***4.2 Evaluation of the Relationship between Modern Technologies in Classroom Learning and Enhancing Teacher Trainee’s Performance Skills***

In order to evaluate the relationship, officers were asked to examine the progress of uptake of modern technologies in classroom learning in teacher training institutions in Gaborone. The study found that both institution administrators (Principals) and education officer agree that lecturers are well equipped in terms of using modern technologies in education and or classroom learning.

*CP 3: “the progress is alarming and encouraging with challenges of learning to use them for effective teaching if available”*

*EO 3: “it has not been fully implemented as some teachers are old and not familiar with these technologies...”*

Further, the institution administrators (Principals) and education officer were asked to describe how they view the effectiveness of teacher training on the modern technologies in classroom learning. Both institution administrators (Principals) and education officer indicated that the technologies are not readily available to both lecturers and teacher trainees, and that this would derail effective understanding of technologies and its application.

Institution administrators (Principals) and education officer were also asked to describe the relationship between modern technologies in classroom learning and enhancing teacher trainee’s performance skills from their perspective. The study found that both institution administrators (Principals) and education officer agree that there are modern technologies that can be used to improve lesson delivery in the classroom, and that technology enables teachers to provide individualized, real time feedback to learners.

*CP4: “there are excellent relationship...most especially for professional teachers rather than professional cheaters; those teachers who take teaching as a last resort...”*

The study has, therefore, established that there is a relationship between modern technologies in classroom learning in enhancing teacher trainee’s performance skills.

#### ***4.3 Analysis of the Marketability of the Highly Technologically Equipped Teacher Trainee Graduates in both Public and Private Education Sectors***

In order to analyse the marketability, both the institution administrators (Principals) and education officer were asked to give their views about the marketability of the technologically equipped teacher trainee graduates in public and private education sectors. The institution administrators (Principals) and education officer indicated that the teachers that are equipped technologically are guaranteed of employment and very marketable in both public and private industries:

*CP 5: “they will be marketable with limitations of affordability of new technologies by both public and private institutions”*

*EO 4: “...this is a needed skill today that without it teacher trainees cannot be employed as reliable educators...they need to move with time”.*

This study has, therefore, established that teachers that are trained technologically are guaranteed employment and are marketable in both public and private industries.

#### ***4.4 Establishment of the Barriers that Impede Uptake of Modern Technologies in Classroom Learning Successfully in Teacher Training Institutions***

In order to establish barriers, both the institution administrators (Principals) and education officer were asked to state the barriers that impede uptake of modern technologies in classroom learning successfully in teacher training institutions in Gaborone. They stated these challenges: lack of resources for both lecturers and teacher trainees e.g. laptops, inadequate IT infrastructure countrywide e.g. slow broadband or networks, inaccessibility and unavailability of IT resources among lecturers and teacher trainees in the rural areas as well as higher costs for purchasing modern technologies and software for lecturers and teacher trainees.

**EO 5:** *“there are many barriers but issues of unavailability of [IT] resources on the user side, lack of adequate knowledge of IT or IT skills, and maintenance of these IT gadgets are major challenges that block uptake of IT in teaching field.”*

**EO 6:** *“Kana this issue ya IT skills is not taken seriously, how could one implement use of IT in classroom learning when the kind of internet provided in our teacher training institution is way too slow to upload or download learning and teaching material”.*

**CP 6:** *“There are a number of barriers that are contributing to slow uptake of IT Modern Technologies into classroom learning in teacher training institution here in Botswana for instance issues to do with acquisition of genuine software packages to be used; inadequate computers in the classrooms; low speed internet at school campuses as well as lack of interest to use ICT tools from both teachers and teacher trainees*

Further, the institution administrators (Principals) and education officer were asked to suggest to the Government or the Ministry of Education what could be done to improve access to the modern technologies in classroom learning. The suggested items were all leaning towards provision of IT resource to teacher training institutions by the government, training teachers in IT adequately, effective monitoring of IT issues and also incorporation of IT seriously into the curriculum.

**CP 7:** *“the government or the ministry must introduce trainings for the teachers on modern technologies and upon completion of these trainings they [teachers] should be provided with latest IT gadgets.”*

**EO 7:** *“the government or the ministry must purchase modern technology for the teachers...it will help.”*

The study further asked the institution administrators (Principals) and education officer about reasons for non-incorporation of modern technologies in classroom learning consequently affecting education sector in the country. Both institution administrators (Principals) and education officer indicated that non-compliance with global educational policies and advancement results into retardation in education growth of a country.

Lastly, the study probed both institution administrators (Principals) and education officer on the negative factors arising from lack of incorporation of modern technologies in classroom learning on the general socio-economic development of Botswana. Both institution administrators (Principals) and education officer indicated that it will enhance poor teaching and learning skills, incompetence of both teachers and the learners and compromised quality of education.

**CP 8:** *“there will be production of non-employable graduates without IT skills that cannot attract the job market.”*

**EO 8:** *“this can greatly affect the marketability of our teacher trainees, thereby creating unnecessary unemployment within teaching field.”*

The study has therefore established that barriers to the uptake of modern technologies in classroom learning in teacher training institutions in Gaborone include: lack of resources for both lecturers and teacher trainees e.g. laptops, inadequate IT infrastructure countrywide e.g. slow broadband or networks, inaccessibility and unavailability of IT resources among lecturers and teacher trainees in the rural areas as well as higher costs for purchasing modern technologies and software for lecturers and teacher trainees. The findings further translate to the fact that these barriers result in poor teaching and learning skills, incompetence of both teachers and the learners and compromised quality of education as well as be production of non-employable graduates without IT skills that cannot attract the job market.

#### 4.5 Discussion:

This study investigated the qualitative participant objective views data on uptake of modern technologies in classroom learning in teacher training institutions in Gaborone, Botswana. The study aimed specifically to assess the effectiveness of modern technologies on classroom learning; to evaluate the relationship between modern technologies in classroom learning in enhancing teacher trainee's performance skills; to analyse the marketability of the highly technologically equipped teacher trainee graduates in both public and private education sectors; and to establish the barriers that impede uptake of modern technologies in classroom learning successfully in teacher training institutions in Gaborone, Botswana.

Firstly the study has found that there is a relationship between effectiveness of modern technologies on classroom teaching and teacher Training. This is in agreement with the findings of Salinas and Crossetti (2018) who stated that uptake of modern technologies in classroom has been growing tremendously over the years and that it is even striving for many societies around the world to advance in their educational technologies. This study has, therefore, established that lecturers at teacher education institutions are critical players in the relationship between effective teacher training on the modern technologies in education and the application of such technologies in classroom learning such as: failure of lecturers to incorporate modern technologies in their teaching due to lack of training in such technologies; teacher training institutions' failure to provide lecturers with modern technologies to be used in classroom learning and also the government's failure to fund adequately the incorporation of ICT into classroom efforts. These factors have also been noted by Singh (2011) who highlighted that for success of effective uptake of modern technologies; lecturers, teacher training institutions and governments have to come together in advancing the agenda.

This study has further revealed that most teachers have no ICT skills, hence it is difficult for them to use modern technologies in classroom learning and also teacher trainees are not interested in modern technologies being used during classroom learning. ChanLin (2007) argued that there is not enough training offered to lecturers and if any it is then not what the lecturers need to know. This is contrary to what principals and education officer indicated that lecturers in Gaborone teacher training institutions are all well trained. This study established that the effectiveness of teacher trainings on the modern technologies in classroom learning has not reached the level of absolute satisfaction in teacher education institutions (TEI's) in Gaborone.

The study has found that there is a statistically significant relationship between uptake of modern technologies in teacher training institutions and marketability of such graduates. This is in agreement with a cross-sectional study that was conducted in Japan and established that the use of technologies in education enhances high performance among teachers (Kohei, 2014). Banister & Vannatta (2006) further indicated that uptake of modern technologies in classroom learning stands for a wise application of the available human and non-human resources for providing appropriate solution to the educational problems and to improve the processes and products of education.

The current study has found that employers in both public and private sectors require teacher trainee graduates who are conversant with modern technologies; teacher trainee graduates with good exposure to modern technologies are more marketable than teachers who do not know how to use a projector; a teacher's CV that indicates his/her ability to use modern technologies in classroom learning is more attractive to recruiters than a CV which is silent on the use of modern technologies in classroom learning; teacher trainee graduates who have skills in modern technologies face employers or recruiters with confidence hence always picked for the job and also both private and public institutions require teacher trainee graduates with modern technology skills capability. Another study in Germany indicated that teachers who have ICT knowledge are five times more employable than the teachers in the same field who have no knowledge of ICT in their resume (Klopper, 2014). The study has found that there is a high marketability for well technologically equipped teacher trainee graduates in both public and private education sectors.

Finally, the study has established that there is a number of barriers impeding the successful uptake of modern technologies in classroom learning in teacher training institutions in Gaborone that range from poor internet connections to lack of proper and adequate ICT training for the teaching staff.

#### 5. CONCLUSION:

This study investigated the qualitative participant views on uptake of modern technologies in classroom learning in teacher training institutions in Gaborone, Botswana. The study aimed specifically to assess the effectiveness of modern technologies in classroom learning in teacher training; to evaluate the relationship between modern technologies in classroom learning and enhancing teacher trainee's performance skills; to confirm or disconfirm the marketability and employability of the technologically equipped teacher trainee graduates in both public and private education sectors; and to establish the barriers that impede uptake of modern technologies in successful classroom learning in teacher training institutions in Gaborone, Botswana. The study has established that the effectiveness of modern technologies in classroom learning has not reached the level of absolute satisfaction, Secondly, the study has found that there is a relationship between modern technologies in classroom learning and the

teacher trainee's performance skills, the study has established that there is a high marketability for well technologically equipped teacher trainee graduates in both public and private education sectors and finally, the study has established that there are a number of barriers that are impeding the successful uptake of modern technologies in classroom learning in teacher education institutions that ranges from poor internet connections to lack of proper and adequate ICT training for the teaching staff.

## 6. RECOMMENDATIONS:

Based on the findings of the study, the researcher recommends that;

The ministry of higher education, science, research and technology should ensure that lecturers in both public and private institutions of higher learning should train teacher trainees on the use of modern technologies in the classroom.

The lecturers and instructors should be retrained periodically through workshops and other vital programmes to update their knowledge on the use of modern technologies so as to remain productive and relevant to the dynamics in 21st century education landscape.

The government and the directors of the privately-owned institutions should equip the classroom and computer laboratories with modern technology facilities to facilitate classroom learning.

The 'curriculum reviewers' and 'curriculum implementers' should accommodate the integration of the modern technologies in teacher education curriculum to meet the demands of the 21st century workforce skills in teacher education.

## REFERENCES:

1. Ahuja, R. (2001). *Research methods*. New Delhi: Nice Printing Press.
2. Amin, E. (2005). *Social science research: Concepts, methodology and analysis*. Kampala: Makerere University.
3. Bailey, K. D. (1978). *Methods of social research* (3ed. ed.). New York: The Free Press.
4. Banister, S., & Vannatta, R. (2006). Beginning with a baseline: Insuring productive technology integration in teacher education. *Journal of Technology and Teacher Education*, 14(1), 209-235.
5. Baule, S. (2007). The components of successful technologies. *Teacher Librarian*, 34(5), 16-18.
6. Botswana Information and Communication Technology Policy 2004 revised in 2007
7. ChanLin (2007). *Innovations in Education and Teaching International*. London: Vol. 44 (1), 45- 56.
8. Charu, J. (2015, January 8). Botswana commits to spreading ICT in schools. *The Pan Africa's Business Technology Daily News*. <https://www.biztechafrica.com/article/botswana-commits-spreading-ict-schools/9472/>
9. Creswell, J. W. (2000). *Research design. Qualitative and Quantitative Approach*. Thousand Oaks: Sage Publications.
10. Daye L., (2007) *Understanding Current and Emerging Technology Trends*. Vol. 22(2), 65-68.
11. Edmunds, J., & Matzen, N. (2007). Technology as a catalyst for change: The role of professional development. *Journal of Research on Technology in Education*, 39(4), 417-430. Edyburn.
12. Guma, A., Haolader, F. A., & Mohammad, K. (2013, August). The role of ICT to make teaching-learning effective in higher institutions of learning in Uganda. *International Journal of Innovative Research in Science, Engineering and Technology*, 2(8). ISSN: 2319-8753
13. Kothari, R. (2003). *Research Methodology methods and Techniques* (8th ed.). New Delhi: New Delhi International Ltd. Publishers.
14. Lokopanye, M. C., & Mogwe, A. (2014). Information communication technology adoption in higher education Botswana: A case of Botho University. *International Journal of Advanced Computer science and applications*, Vol. 5(8)
15. Mugenda, A., & Mugenda, O. (1999). *Research methods. Quantitative and Qualitative approach*. Nairobi: Acts Press.
16. Newby, L. S., Hite J. M., Hite J. S & Mugimu C. B (2012). *Technology and education: ICT in Ugandan secondary schools*. Springer Science and Business Media, LLC 2012. doi:10.1007/s10639-011-9180-x
17. Prensky, M. (2003). *Overcoming educators' digital immigrant accents: A rebuttal*. The Technology Source. Retrieved from <http://ts.mivu.org/default.asp?show=article&id=2013>.
18. Save the Children, (2019), *Mapping EdTech in Uganda*. Save the children report. Retrieved from <https://www.reliefweb.int/sites/reliefweb.int/files/resources/72791.pdf>
19. Walton, N. (2013). *What is research ethics*. Research ethics.ca. Retrieved from Retrieved from; <https://researchethics.ca/what-is-research-ethics/>
20. Wangusa, T. (2007). *Essentials of reasearch methodology*. Kampala: Bow and Arrow Publishers.