Assessment of Teachers' Competence in Utilization of Digital Instructional Tools in Upper Basic Schools in Cross River State, Nigeria

Patrick I. Nwafor, Okeke, Stella Uchechukwu, Ejoh, Abigail Ojong

Department of Social Science Education University of Calabar, Nigeria.
Em**patinwafor@gmail.com**; **Stellaokeke60@gmail.com**; **aejoh@yahoo.com**

ABSTRACT

The purpose of this study is to examine the teachers' competences in the utilization of digital learning tools in upper basic schools in Cross River State. To achieve this purpose, four research questions were raised to be answered in the study. Literature was reviewed, theoretically, empirically, and conceptually according to the variables of the study. The study adopted a descriptive survey research design with a stratified random sampling technique. The sample of the study was made up of 768 teachers across the 18 local government of the state. An instrument titled 'Teachers Competence in Digital Learning Tools Scale (TCDLTS)' was used for data collection. The instrument was validated by experts in Measurement and Evaluation, University of Calabar, Calabar and the reliability of the instrument was established using Cronbach alpha technique and the coefficients of the sub scales ranged from 0.78-0.81 which is an indication that the instrument is reliable for use. The data collection was done by the researchers with the help of 5 research assistants engaged in each the local governments area. The data collected were analysed using simple percentages, bar graphs and other inferential statistical techniques. The result showed that teacher's competence in the utilization of digitalized learning tools such as zoom facilities, google classrooms, and video clips is very low. Similarly, the result showed that there is no significant difference between male and female teachers, but years of teaching and qualification significantly influences teachers' competence in utilizing digital learning tools in upper basic schools in Cross River State. Based on the findings, it was recommended that teachers should be trained on the modern use of technology in teaching and learning to increase students' level of independent learning among others.

Keywords: Competence, Utilization and Digital tools.

INTRODUCTION

The teacher is an important element in the implementation of the educational objectives at any level of education. This is because they deliver the unit of instructions that hat ever objectives that might be set for either the Basic Secondary or Tertiary institution. Therefore, the continuous development of the teacher in areas of competences cannot be over emphasized. According to [1,2,3] teachers, especially, the social studies teachers are constantly challenged by innovations in the teaching models, technology, and educational tools used to develop courses. They are faced ith trending issues that needs their ingenuity to effectively communicate the goals of the subjects to the students [4]. Constant innovation means that continuing professional development is fundamental for social studies teachers who want to remain current in their careers. In terms of competences; [5]

noted that there are projects, that have attempted to describe the known teaching competences. These competencies include innovation capacity and the incorporation of emerging trends in education, including the use of technology. In the last two decades, different technologies have become more available and accessible for teachers, and new digital tools and instructional materials have been developed to support teaching and learning; consequently, governmental initiatives and training programs around the world have been presented to facilitate the introduction of technology in education and to encourage the process of digitalisation in schools (e.g., see the Lifelong Learning Strategy in Estonia 2020 [6], the Good School Reform in Italy [7].

[8] stated that the digital world is increasingly penetrating the education space, with digital technology gradually

being used as a vehicle to deliver educational knowledge and skills in new and innovative ways. -The need for teacher's development in using digital resources as means to bridge the knowledge gap in teaching the topic, tools and equipment is to be emphasized in these modern times. Similarly, technology and innovation have brought tremendous change in the way the students learn; with a global network, newer avenues, are created and thus, technological exposure and adoption amongst students in schools is no longer confined to the classrooms. For the students to take effective advantage of technology, the teachers have to play a key role not just as imparters of knowledge but also as facilitators who will guide the students in using technology for their benefits [9]. According to [10], teachers use digital resources for a variety of purposes and in many ways, including: introduction of students to lessons teaching method, instructional aids, provision of students access to different information, personal learning among others. However, while the availability of hardware and software for education is widespread, the use of these digital tools in the teaching practice, as well as digital competence in general, is still uneven among teachers. The International Computer and Information Literacy Study [11] documented that less than 50% of teachers used technologies frequently in their teaching [12]. The results of the 2018 OECD Teaching and Learning International Survey revealed that teachers reported a high need for training for technology-related skills and that only 43% of teachers felt prepared to use technology in teaching [13]. This situation has raised a lot of concerned on what will have been the factors influencing teachers' use of technology in education. Most studies have revealed the multiple factors interplaying at different levels (e.g., educational systems, schools, teachers). these includes, self-beliefs the level, the availability of and access to digital tools (e.g., school infrastructure, computers for instruction, and internet access) and the quality of the digital infrastructure are necessary prerequisites, but they are not sufficient conditions alone to lead

teachers toward using technology in their classrooms [14]. Others are attitudes, motivations, and perceived self-efficacy teachers' knowledge, skills, and attitudes in influencing teachers' digital technology use [15]. In a Contemporary reality, learning also takes place using mobile devices, connected to wireless communication networks, sensors, and geolocation mechanisms, allowing to form virtual networks between people, objects, and situations. In fact, making use of technology for teaching or learning, using it to extend learning to informal or non-formal environments, implies having skills and being digitally fluent.

Given this reality, digital competence has gained a strong prominence in the educational context in recent times [16]. On the one hand, because the use of technology has become an everyday occurrence; on the other hand, because the professional development of many citizens depends largely (and increasingly) on an efficient and appropriate use of ICT. In this regard, [17] point out that digital competence is one of the key competencies that citizens in general, and teachers specifically, must master in the society of the future. In fact, in Spain, the recent National Plan of Digital Competences [8] identifies the acquisition of Teachers Digital Competencies (hereinafter, TDC) at all educational levels, including the university as one of its main strategic axes, which is aimed at promoting sustainable and inclusive economic growth. The teacher is key in such process of integrating technologies and plays a crucial role in the adoption and implementation of ICT in the classroom, since the transformation and improvement of education will depend, among other aspects, on educational action, which implies that teachers must have effective digital competencies that allow them to integrate and use technologies in a pedagogical way.

Particularly, The EU defines digital competence as: "the safe, critical and responsible use of and interaction with digital technologies for learning, at work and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation

(including programming), security (including digital well-being and cybersecurity related skills), intellectual property issues, problem solving and critical thinking." [10].

[14] further points out that the TDC is a set of knowledge, skills and attitudes necessary for a teacher to make effective use of ICT from its different aspects(technological, informational, multimedia,communicative,collaborative, and ethical), assuming pedagogical-didactic criteria for an effective integration of ICT in their educational practice and, in general, in any formal or non-formal situation. In this regard [15] state that the TDC must be holistic, situated, systemic, trainable and in constant development and, in addition, susceptible to integrate the skills, attitudes and knowledge that teachers require to support the learning of their students as active participants in a digital world. This exponential growth of problems, models and gaps in the competencies of teachers calls for an assessment of the emerging pedagogical practices and thus, the need for this study.

Statement of problem

There is growing need for application of technology in teaching and learning due to its numerous advantages. However, it is observed that most teachers avoid the use of modern technological pattern in instructional delivery as they are still connected to traditional method of instruction. The challenge could lie in knowing how to use technology "to transform learning into a normal act of everyday life, making it so it can be carried out any where. The assumed lack of digital competence among teachers has necessitate a lot of questions on what will have been the non-utilization of digital learning tools. Factors such as self-efficacy, gender, qualification, availability of infrastructure, motivation for utilization, among other have been identified as the reason for non-use of digital instructional tools. The effect is that the best practices that are globally appreciated are bereft in our educational system, for example, during the covid 19, all schools were shut down and there were no instructional activities occurring because we are still tied to the traditional pedagogical method of instructions. The research is poised to assess teachers' competence in the use of digital instructional tools like zoom, google classroom, video clips in instructional practices in secondary schools in Cross River State.

Theoretical framework

The study is anchored on the technology acceptance model (TAM) in education. The Technology Acceptance Model was introduced by Fred D. Davis in 1989 to predict the acceptance of a technology system. The purpose of the model was to understand the determinants of individuals' acceptance of technology and adoption of it in different settings. In the model proposed by [7] the core TAM variables explaining the acceptance of technology are: (i) Perceived Usefulness (PU), i.e., the degree to which a person believes that the use of technology would enhance their job performance; (ii) Perceived Ease of Use (PEU), i.e., the belief that the use of technology is effortless and easy; (iii) Attitude Towards Technology (ATT), i.e., the overall evaluation of technology characterised by positive or negative feelings toward using it. In the original TAM, PEU directly affects PU: the more a technology is perceived as easy to use, the more it is likely to be used. ATT is determined jointly by both PU and PEU, and it directly influences the behavioural intention (BI), i.e., the intention of using technology in one's professional activity; in turn, the BI would lead to effective technology adoption (and then practical, applied use). ATT has a mediating role between beliefs on technology (i.e., PU and PEU) and the BI. The first version of TAM introduced by Davis was revised in later years. The modification of TAM by [16] excluded the attitude construct, based on empirical evidence, because it did not fully mediate the effect of PEU and PU on intention. Due to the limitations of the TAM in terms of explanatory power, a second model (TAM 2) was developed [17], based on the assumption that job goals and consequences of using technology serve as a basis for PU. The relevance of this model to this study is made explicate in the usefulness that teachers attach to the adoption of

technology in facilitating in instructional purposes. Where they perceive the use of a particular technology useful, they go all the way to integrate it in their instructional models in the class.

Empirical literature

[11] carried out a study on assessment of university teachers on their digital competences. The quantitative methodological approach emphasises the teachers' perception of their digital competences in three dimensions: teachers´ professional and pedagogic competences and learners' competences and involved 118 Portuguese University teachers. The main findings show that the digital competence level of teachers is moderate, and that subdimensions "Guidance", "Analysing Evidence" and "Responsible Use", are the weakest. On the other hand, the subdimension in which teachers perceive to have more competence is "Organisational Communication". The results show the need for teachers to increase their digital competence level through specific training, especially as regards the pedagogical use of technology, in particular more practical, experimental training. Misbah, Humaira, Shamaila, Amna and Mah [11] carried out a study to assess the Professional Digital Competence (PDC) of university teachers of different faculties of International Islamic University Islamabad. This study utilized a quantitative paradigm. The population of the study included 635 teachers (both male and female) of all faculties of International Islamic University Islamabad. A sample of 242 teachers was selected according to Morgan's table. A stratified random sampling technique was used to select the sample. The Researcher collected data Online from all the Departments of International Islamic University Islamabad (IIUI) and the responses were recorded through Google form. The questionnaire was used to collect data and it consisted of 5-point Likert scale which were analysed using mean scores and ANOVA. It is concluded that mostly teachers were not skilful to apply advanced or custom search options to go for the data on internet. It is determined that teachers were not well equipped with all the necessary skills to explore the virtual learning environment effectively. Professional Digital Competence helps in developing the quality of teaching. Prepare and develop the professional competencies and encourage the university teachers to attend training programs.

[17] carried out a study on Can teachers' digital competence influence technology acceptance in vocational education? The study is twofold: to evaluate the fit of the technology acceptance model (TAM) in the context of vocational education, and to examine the relationship between self-assessed teachers' digital competence belief and their acceptance of and intention to use technology in their classroom. Data were collected via a self-administered questionnaire and the responses of 2011 vocational teachers were analysed. Applying structural equation modelling, the results show that the TAM adequately explains teachers' intention to use digital tools in vocational education; further, there are positive and significant relationships between teachers' beliefs about their digital competence and their beliefs about technology ease of use and the perceived usefulness of technology in teaching; this latter, positively correlates with technology use intention. Understanding the factors interplaying with teachers' acceptance of technology and use intention is important for designing teacher training to enhance the successful integration of technology and to foster the connectivity between the different learning locations of vocational education

[3] carried out a study on assessment of high school teachers on their digital competences. The quantitative methodology used emphasises the teachers' perception of their digital competences in three focal dimensions: teachers' professional and pedagogic competences and learners' competences. The findings show that teachers' digital competence level is moderate; the dimensions with the lowest values are "teachers' pedagogic competences" and "learners' competences". Subdimensions Assessment, Empowering Learners and Facilitating Learners' Digital Competence

are the weakest. [8] carried out a study on Demographic determinants of usefulness of e-learning tools among students of public administration. Students in the survey evaluated 13 aspects of e-courses in which they were enrolled. From enrolment documents, additional demographic data were collected (gender, high-school grade, study programme, etc.). A multiple linear regression was used with perceived usefulness as the response variable and the 12 other e-course aspects as predictors. Further, the same regression analysis was performed on different subgroups of students based on demographical data. Findings – The empirical results showed that the general impression regarding the e-courses, their consistency with the face-to-face teaching and the teachers' responsiveness had a significant influence on the students' perception of the usefulness of e-courses. Further analysis based on demographic data revealed several subgroups of students where the perception of usefulness was influenced by different aspects. The teachers' competence in providing feedback and supplementing the tutorial play an important role in higher years of study, while the general impression loses its influence

[8], examined actors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature Charles.. This article reviewed personal, institutional and technological factors that encourage teachers' use of computer technology in teaching and learning processes. Also teacher-level, school-level and system-level factors that prevent teachers from ICT use are reviewed. These barriers include lack of teacher ICT skills; lack of teacher confidence; lack of pedagogical teacher training; l lack of suitable educational software; limited access to ICT; rigid structure of traditional education systems; restrictive curricula, etc. The article concluded that knowing the extent to which these barriers affect individuals and institutions may help in taking a decision on how to tackle them.

Research question

The following research questions were raised for the study

   i. What are the competences of teachers in utilizing instructional tools in upper basic secondary schools?
   ii. How do teachers differ in terms of gender on their competences in utilizing instructional tools in upper basic secondary schools?
   iii. How do teachers differ in terms of years of experience on their competences in utilizing instructional tools in upper basic secondary schools?
   iv. How do teachers differ in terms of qualification on their competences in utilizing instructional tools in upper basic secondary schools?

Statement of hypothesis

The hypothesis is stated as followed

   i. Teachers' competences in utilizing instructional tools in upper basic secondary schools is not significantly high
   ii. There is no significant differences between make and female teachers on their competences in utilizing instructional tools in upper basic secondary schools.
   iii. There is no significant influence of years of experience on teachers' competences in utilizing instructional tools in upper basic secondary schools.
   iv. There is no significant influence of educational qualification on teachers' competences in utilizing instructional tools in upper basic secondary schools.

METHODOLOGY

The study adopted a survey research design. The design was found appropriate since the study involved a large ser of respondents and only a representative sample will be used with which the findings can be generalized. The study adopts a stratified random sampling technique to select the sample.

The sample of the study was made up of 768 teachers across the 18 local government of the state. An instrument titled 'Teachers Competence in Digital Instructional Tools Scale (TCDITS)' was used for data collection. The instrument was made up of two parts; Part A and Part B. Part A was to elicit demographic information while part B was designed to elicit information on the competences to utilize digital instructional tools. The instrument was validated by experts in Measurement and Evaluation, University of Calabar, Calabar and the reliability of the instrument was established using Cronbach alpha technique and the coefficients of the sub scales ranged from 0.78-0.81 wwhich is an indication that the instrument is reliable for use. The data collection was done by the researchers with the help of 5 teachers engaged in each of the local governments area. The data collected were analysed using simple percentages, bar graphs and other inferential statistical statistics. The result is presented below

Presentation of result

Research question one

What are the competences of teachers in utilizing instructional tools in upper basic secondary schools? The variable in this research question is competences of teachers in utilizing instructional tools, measured continuously. To answer research question, simple percentages were used, and the result is presented in Table 1.

Table 1

Simple percentages analysis of competences of teachers in utilizing instructional tools

S/N	Items : how competent are you in the use of the following	HC	MC	SC	NC	Remarks
1	Zoom technology	143	155	341	129	Not competent
	Animoto	186	224	156	202	Not competent
3	WeVideo	256	225	101	186	Competent
4	Mobile apps	325	145	210	88	Competent
5	Google classrooms	124	158	168	318	Competent
6	google form	236	148	156	228	Not competent
7	VoiceThread	230	158	178	202	Not competent
8	iBrainstorm	203	111	236	218	Not competent
9	Pixton	105	148	139	376	Not competent
10	Video clips	255	145	187	181	Competent
11	Edpuzzle	159	101	144	364	Competent
		2222 (26.30%)	1721 (20.37%)	2016 (23.86%)	2492 (29.50%)	Not competent

HC= Highly competent, MC=Moderately Competent,; SC=Somehow competent , NC=Not competent
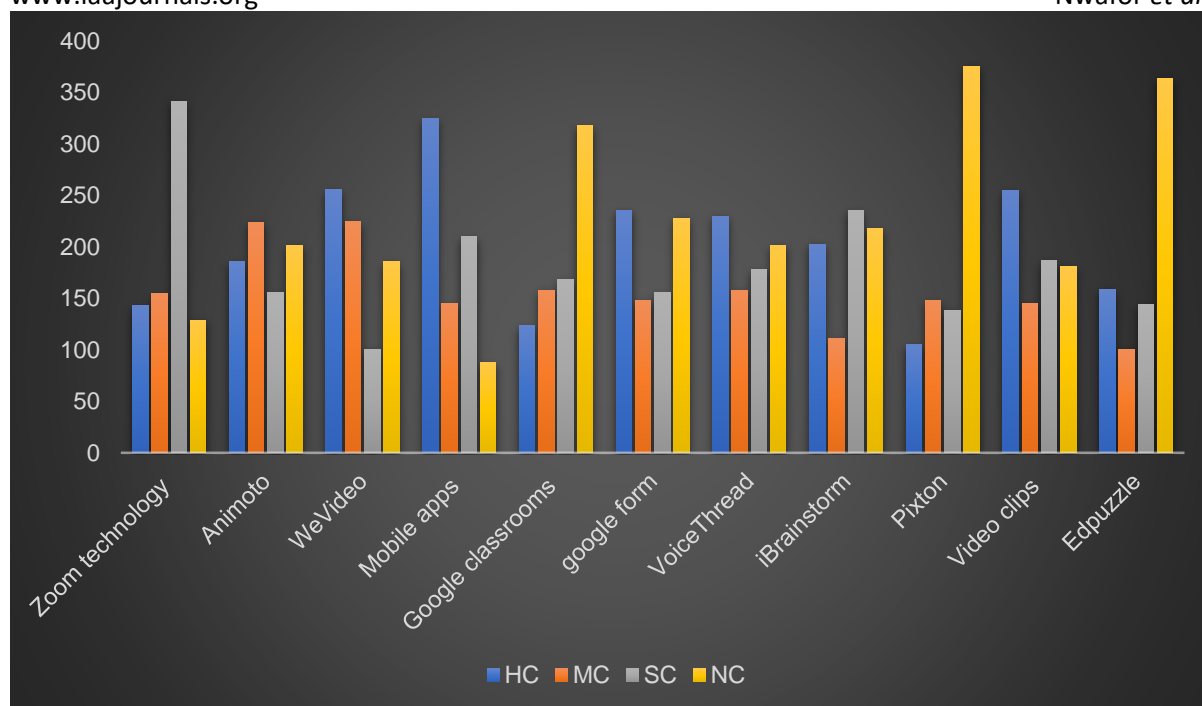
Fig 1 Bar graph showing respondents responses to extent of teachers competences in utilization of digital instructional tools

The result in Table 1 and Figure 1 showed that on aggregate, 2222 respondents representing 26.30% noted that they are high competent in the use of the instructional tools in secondary school. 1721 representing 20.37% noted that they are moderately competent in the use of the instructional tools in secondary school, 2026 representing 23.86% noted that they are somewhat competent in the use of the instructional tools in secondary school while 2492 respondents representing 29.50% noted that they ae not competent in in the use of the instructional tools in secondary school. Summarily, 46.67 % noted that they are competent in utilizing digital instructional tools hile 53.33% noted that they are not competent This implies that teachers in upper basic schools are not competent in the use of digital instructional.

Hypothesis testing

Hypothesis one

Teachers' competences in utilizing instructional tools in upper basic secondary schools is not significantly high. The variable in this hypothesis is teachers' competences in utilizing digital instructional tool, measured continuously. To test this hypothesis, one sample t-test was use and the result as presented in Table 2 showed that (t=1.89, p>.05) Since p(.467) is greater than p(.05), this implies that teachers' competences in utilizing digital instructional tool is significantly low. Thus, the null hypothesis s retained, and the alternate hypothesis retained

Table 2

One sample t-test on the extent of teacher's competences in utilizing digital tools

Variable	N	Mean	Std. Dev	df	t-cal	Sig
Teachers Competence in utilizing digital tools	768	16.5703	7.77538	767	1.89	.467.

Hypothesis two

There is no significant differences between make and female teachers on their competences in utilizing instructional tools in upper basic secondary schools. The independent variable is gender categories as male and female while the pendent variable is competences in utilizing digital instructional tool, measured continuously. To test this hypothesis, independent t-test was used, and the result is presented in Table 3. The result on Table 3 showed that (t=1.81, p>.05). Since p(,786) is greater than p(.05), this

implies that the null hypothesis that stated that there is no significant differences between make and female teachers   on their competences in utilizing instructional tools in upper basic secondary schools is retained. Thus, the null hypothesis is retained, and the alternate hypothesis rejected.

Table 3

Independent t-test analysis of the differences between make and female teachers   on their competences in utilizing instructional tools

Dependent variable	Gender	N	Mean	Std. Deviation	df	t-cal	Sig
Teachers Competence	Male	358	18.2793	9.52339	766	1.81	.786
	Female	410	15.0780	5.42418			

Hypothesis three

There is no significant influence of years of experience on teachers' competences in utilizing instructional tools in upper basic secondary schools. The independent variable is years of experience categories as below 5, 5-10yrs and 11-above yrs. while the pendent variable is competences in utilizing digital instructional tool, measured continuously. To test this hypothesis, One Way Analysis of Variance (ANOVA) was used, and the result is presented in Table 4. The result on Table 4 showed that (F=6.692*, p<.05). Since p(,000) is less than p(.05), this implies that the null hypothesis that stated that there is a significant influence of years of experience on teachers competences in utilizing instructional tools in upper basic secondary schools is rejected. Thus, the null hypothesis is rejected, and the alternate hypothesis retained.

Table 4

One ay analysis of variance (ANOVA) on the influence of years of experience on teachers' competences in utilizing instructional tools

Variable	N	Mean	Std. Deviation
0-5yr	488	19.6230	5.42001
6-10yrs	204	15.4510	6.64976
11-above	76	16.2368	8.25324
Total	768	16.5703	7.77538

Source of variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	797.334	2	398.667	6.692*	.001
Within Groups	45572.870	765	59.572		
Total	46370.203	767			

*=significant at .05

Hypothesis 4

There is no significant influence of educational qualification on teachers' competences in utilizing instructional tools in upper basic secondary schools. The independent variable is educational qualification as NCE, B.Ed/B.Sc and M.Ed/M,Sc/Ph.D while the pendent variable is competences in utilizing digital instructional tool, measured continuously. To test this hypothesis, One Way Analysis of Variance (ANOVA) was used, and the result is presented in Table 5. The result on Table 5 showed that (F=46.007, p<.05). Since p (,000) is less than p (.05), this implies that the null hypothesis that stated that there is a significant influence of educational qualification on teachers' competences in utilizing instructional tools in upper basic secondary schools is rejected. Thus, the null hypothesis is rejected, and the alternate hypothesis retained.

Table 5
One ay analysis of variance (ANOVA) on the influence of educational qualification on teachers' competences in utilizing instructional tools

Variable	N	Mean	Std. Deviation		
NCE	280	11.3536	3.73300		
B. ED/B.SC	282	17.2553	7.66181		
M.ED/Ph.D	181	18.8564	8.74037		
Total	743	16.3540	7.81369		
Source of variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5010.027	2	2505.014	46.007	.000
Within Groups	40291.879	740	54.448		
Total	45301.906	742			

*= significant at .05 level

DISCUSSION OF FINDINGS

The result of the first hypothesis showed that teaches competences in the utilization of digital instructional tools in upper secondary school is low. This could probably be since the trend in the curriculum of teachers in Cross River State is still very analogue, it could also be seen the result that teachers ae only competent in handling mobile phone applications hich could be just WhatsApp and emails. Thus, this is very poor as secondary schools in our area are not aligning with global best practices of digitalizing educational system. No wander it is common to even see teacher struggle to use android phones. The result also showed that male teachers do not differ in the utilization of digital instructional tools in upper secondary school. This is because, they are exposed to the sane ork environment, motivation and probably training. Therefore, they are not used to these modern facilities that are used in instruction. They rely heavily on the use of the traditional board and assignment pattern for their instruction. The findings are in line with that of [9] that carried out a study on Demographic determinants of usefulness of e-learning tools among students of public administration. Students in the survey evaluated 13 aspects of e-courses in which they were enrolled. The empirical results showed that the general impression regarding the e-courses, their consistency with the face-to-face teaching and the teachers' responsiveness had a significant influence on the students' perception of the usefulness of e-courses. Further analysis based on demographic data revealed several subgroups of students where the perception of usefulness was influenced by different aspects. The teachers' competence in providing feedback and supplementing the tutorial play an important role in higher years of study, while the general impression loses its influence Similarly, the result also showed that years of experience influence teaches competences in the utilization of digital instructional tools. The reasons cannot be farfetched. This is because the young teachers in the teaching profession are better in the utilization of these tools because of the innovations that are already embedded in the teacher education curriculum. They are exposed to a lot of innovative techniques hich those who are older may not have been exposed to. However, the problems might be the same probably due to lack of facilities, lack of training and poor skills in the utilization of those digital instructional tools by the older and the younger teachers. The findings were in line with that of [8] examined actors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. These barriers include lack of teacher ICT skills; lack of teacher confidence; lack of pedagogical teacher training; lack of suitable educational software; limited access to ICT; rigid structure of traditional education systems; restrictive curricula, poor qualification etc. The article concluded that knowing the extent to which these barriers affect

individuals and institutions may help in taking a decision on how to tackle them.

CONCLUSION AND RECOMMENDATION

Based on the findings of the study, it was concluded that teachers' competences in the utilization of digital instructional tools is very low and that there are no gender differences in their competences in the utilization of these digital tools among teachers. However, years of teaching experiences and educational qualification influences teachers' competences in the utilization of digital instructional tools. Based on these conclusions, it was recommended that teachers should be trained and retrained in the use of these tools to aid students assisted learning. That the teacher education curriculum should be restructured to include areas of digitalization of the classroom and the techniques that are currently used in modern classroom settings. Similarly, facilities that will aid teacher use of these tools should be provided to aid teaching and learning.

REFERENCES

1. Aleksander A., Stovnik, D., Nina T.(2017). Demographic determinants of usefulness of e-learning tools among students of public administration The current issue and full text archive of this journal is available on Emerald Insight at: www.emeraldinsight.com/1741-5659.htm

2. Antonietti , C., Alberto and Francesca , A. C.(2022) Can teachers' digital competence influence technology acceptance in vocational education? Computers in Human Behavior 132 (2) 107-117

3. Bingimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science and Technology Education, 5*(3), 235–245.https://doi.org/10.12973/ejmste/ 75275

4. Cabero, J.. (2021). Digital competences of educators in Health Sciences: Their relationship with some variables. *Educación Médica, 22*(2), 94–98. https:// doi. org/ 10. 1016/j. edumed. 2020. 11. 014

5. Charles , B. (2012,) Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. International Journal of Education and Development using Information and Communication Technology (IJEDICT),. 8 (1) 136-155

6. Daniel, R., Palacios, U., Barreras, O and Pascual, K. (2019) Pedagogical strategies to promote mediated learning experiences in vulnerable contexts. Universitas of Psychologica. V 17(5), P 1-13

7. Dias-Trindade , S. and Moreira, J. (2020) Assessment of university teachers on their digital competences. Evaluación a profesores de secundaria sobre sus competencias digitales. doi: 10.11144/Javeriana.m13.ahst

8. Duran, M. (2019). *Competencia Digital del Profesorado Universitario: Diseño y Validación de un Instrumento para la Certificación*. Murcia. Universidad de Murcia-Escuela Internacional de

9. Eady, A. and Lockyer, M. (2013) Preparation and professional Development of Teacher Educators in Tanzania: Current practices and prospects. Journal of education and practice. V8(8). P136-145

10. Fraillon, J., Ainley, J., Schulz, W., Duckworth, D., & Friedman, T. (2019). *IEA international computer and information literacy study 2018 assessment framework*. SpringerNature.https://doi.org/10.1007/978-3-030-19389-8

11. Misbah,A. Humaira, R. Shamaila, R., Amna, U. and Mah, K. (2022) Assess the Professional Digital Competence (PDC) of university teachers of different faculties of

International Islamic University Islamabad. *Proceedings of the 28th International Conference on Computers in Education* (pp. 591–601). Asia-Pacific Society for Computers in Education

12. OECD. (2019). *TALIS 2018 results (volume I): Teachers and school leaders as Lifelong learners.* OECD Publishing.https://doi.org/10.17 87/1d0bc92a-en

13. Sarramona, A. (2015) A critical assessment of potential measurement biases in the technology acceptance model: three experiments. *International journal of human-computer studies, 45*(1), 19–45. https://doi.org/10.1006/ijhc.199 6.0040 Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of

14. Tejada, J., & Pozos, K. (2018). Nuevos escenarios y competencias digitales docentes: Hacia la profesionalizacion docente con TIC. *Profesorado, Revista De Curriculum y Formación Del Profesorado, 22*(1), 25–51.

15. Thokozani, E. Sylvia, T.and Moses, O. (2019) Digital teaching competence of university teachers: A systematic review of the literature. *IEEE R evista Iberoamericana De Tecnologías Del Aprendizaje, 15*(4), 399–406. https:// doi. org/ 10. 1109/ RITA. 2020. 30332 25

16. Venkatesh, V. (1996). A model of the antecedents of perceived ease of use: Development and test. *Decision Sciences, 27*(3), 451–481.

17. Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Science, 39*(2), 273–312.