

Pre-Service Teachers' Perceptions of their ICT Integration Preparedness; A Case Study of the University of Kabianga

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ABSTRACT

This study investigated the perceptions of final year pre-service teachers ICT Integration preparedness as they complete their studies. The study sample was obtained from student teachers enrolled for Bachelor of Education programs at the University of Kabianga. The study sought to explore pre-service teachers' perceptions of the potentials of ICT, impact of ICT, usefulness of ICT use in learning, extent of training on ICT integration, self-efficacy in using ICT for teaching and learning and, and intention to integrate ICT in their future instructional practice in relation to their training in the University. The main focus was on their preparedness to integrate ICT in teaching as a trained teacher. The research data was obtained from self-administered online survey questionnaire identified as Pre-Service Teachers' Perceptions of their ICT Integration Preparedness Questionnaire (PTPIIPQ). Estimation of the reliability of the instrument gave a Cronbach Alpha coefficient of 0.783 and therefore found appropriate for use in data collection. This instrument gave data on pre-service teachers perceptions of ICT use and their readiness to use technology as a tool in teaching and learning to help students learn. The online survey was open to all pre-service teachers and consisted of a series of 5-point Likert scale responses that were based around the Technological Pedagogical Content Knowledge (TPACK) framework by Koehler and Mishra (2009). Responses of pre-service teachers pursuing Bachelor of Education were examined and a number of key themes relating to their perceptions identified. The descriptive statistics from an online survey show that perceived potentials of ICT, impact of ICT and usefulness of ICT are key factors influencing the integration of ICT in the classroom in a positive way. This is shown by the overall Strong Positive Perception from pre-service teachers in all these three domains. Furthermore, more than 66% of the pre-service teachers intend to integrate ICT in their teaching and learning. However, their perception on the extent of their training in ICT integration during their course work is somewhat negative. This was further made clear by their self-efficacy which though positive is weak. It was inferred that the pre-service teachers had challenges in using digital tools as a teaching and learning tool in the classroom. Notwithstanding these challenges, pre-service teacher professional development programs should promote stronger curricula that address critical thinking as well as the integration of technology to enable pre-service teachers to become a powerful agent for promoting change in the classroom. The survey data and indicated that the pre-service teachers had a positive perception about the usage of technology which if well nurtured can enhance its effective integration into the teaching and learning process. Overall, the pre-service teachers expressed that there is need to revamp all their teacher education courses by infusing technology use to support their ICT integration preparedness.

Keywords: Pre-service Teachers, Perceptions, ICT integration Preparedness

INTRODUCTION

The significance of preparing future generations for the information age and migration from outdated educational systems into more innovative ones has extensively been accepted by governments around the

world (Yüksel & Kavanoz, 2011). Currently, teachers are handling a group of students who are totally different from the students four decades ago. This requires a deliberate effort from teachers' to integrate technology and associated forms of digital literacy into modern day instruction to enhance students' learning and better prepare them for life and work in the twenty-first century (Hutchinson & Reinking, 2011). Thus, the qualities and roles of a teacher has changed with the emergence of new technology (İşler & Yıldırım, 2018). Moreover, Digital Literacy (DL) is a one of the competencies recommended for educators to be embedded in the Kenyan Competency Based Curriculum (CBC) in preparation of learners for the 21st century skills. This justifies the need for adequate training of pre-service teachers to equip them better with skills and competencies so needed. Continuous professional development is required to keep the teachers updated with the ever-evolving ICT tools and constructivist methodologies (Garet et al., 2001).

The modern society is becoming more and more dependent on digital technologies as a medium for locating information, sharing ideas, communicating and publishing. With an increased presence of technologies in the classroom, teachers must have the confidence and competence to be able to effectively integrate them into their teaching and student learning. Teachers' competency with technologies has been shown to be a strong determinant of their level of technology integration in the classroom (Chen, 2010). Therefore, Pre-service Teachers (PST) should have an opportunity to develop their skills and teaching strategies in their teacher education courses. It is therefore imperative that graduating teachers should be able to demonstrate their ICT proficiency.

Teachers play a crucial role in facilitating learning by creating supportive environments, guiding students' understanding, and ensuring that all students have opportunities to learn and succeed. In the Kenyan Competency-Based Education (CBE), teachers play a crucial role in fostering digital literacy by integrating technology into their teaching and learning practices. Consequently, teachers should be provided with continuous ICT training to enhance their digital literacy and adapt to emerging educational technologies (Blau & Shamir-Inbal, 2017). Amidst the growing usage of technology in the classroom, there is little knowledge on the study of pre-service teachers' perception on their ICT integration preparedness.

In Kenya, teacher preparedness for ICT integration in education is generally at an infant stage, with significant challenges hindering widespread adoption. While some teachers demonstrate intermediate ICT skills and positive perceptions towards integration, many lack adequate training, access to technology, and supportive infrastructure. This leads to limited ICT use in classrooms and sub-optimal teaching outcomes. Lock and Redmond (2010) identified the importance of teacher education programs assisting pre-service teachers in developing not only their technological skills, but in utilizing a range of teaching strategies to integrate ICT into the curriculum. Redmond, Albion & Maroulis (2005) have however found that there is limited modeling by teacher educators and little opportunity for pre-service teachers to practice ICT integration.

The Technological Pedagogical Content Knowledge (TPACK) model as developed by Mishra and Koehler (2006) provides a conceptual framework to understand the knowledge required by pre-service teachers for effective ICT integration in their classrooms. This framework focuses on the knowledge teachers need to effectively integrate technology into their teaching. It's an extension of Shulman's (1986) work on Pedagogical Content Knowledge (PCK), adding Technology Knowledge (TK) to the mix. TPACK consists of three core knowledge components: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technology Knowledge (TK). To date, teacher education programs have tended to focus on the development of pedagogical knowledge, but this is proving inadequate where the use of ICT is needed to develop 21st century teaching and learning skills. TPACK offers guidance in analyzing how the application of technology relates to content and pedagogical knowledge. It acknowledges the complex, dynamic and multifaceted nature of teaching. The framework (Figure 1) explains the knowledge bases, of content knowledge, pedagogical knowledge and technological knowledge, required for effective implementation of ICT into classroom teaching and learning. Schmidt et al., (2009) argues out that authentic integration occurs when teachers are able to negotiate and understand the complexity associated with the intersection of these knowledge bases.

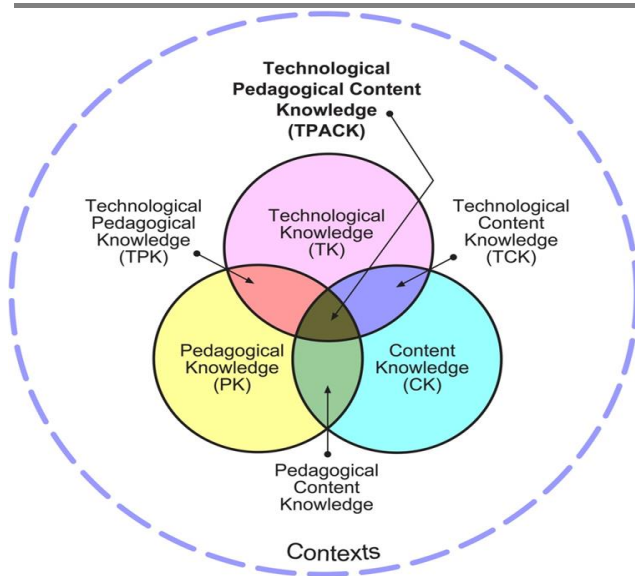


Figure 1: The TPACK framework and its knowledge components (Koehler & Mishra, 2009).

Students' perceived confidence in ICT integration varies, with research suggesting that factors like prior ICT training and self-efficacy play a significant role. While many students demonstrate positive attitudes towards using technology in learning, challenges like lack of adequate resources and support can hinder their confidence. Although the majority of current pre-service teachers have grown up surrounded by technologies, they commence teacher education programs with a diverse range of ICT skills. Consequently, it cannot be assumed that they all have the required skills and so opportunities must be provided to allow them to acquire.

Teachers have the potential to influence the beliefs and values of students, and therefore their competencies and experiences with ICT are important in adapting their pedagogy to meet the dynamic needs of today's learners (Chen, Lim & Tan, 2010). Thus the focus of educational courses should be not only on skill acquisition, but also on a pedagogical approach that prepares them adequately to implement ICT integration. In general, teacher educators recognize the importance of integrating ICT skills, but often this is realized with a single technology course if any. This is inadequate in preparing teachers for the challenges of integration (Hsu & Sharma, 2006). Courses need to be designed so that they build on the skills progressively and support pedagogical development. Although the modeling should ideally occur within curriculum methodology resources, it has been found that teacher educators often lack confidence and competence with their ICT skills (Jones, 2004). Where ICT is used, it may only be used for productivity purposes (Becta, 2007). Also many classes are run by staff who may lack the skills and are not given the necessary professional development. Further to this, not all teaching spaces have adequate access to ICT to enable the modeling to occur.

Pre-service teacher's sense of preparedness are affected by access, skills and attitudes to ICT, knowledge, ICT experiences, time and the workload in their teacher education programs (Dexter & Riedel, 2003; Teo, Lee & Chai, 2008). Their recognition and understanding of the benefits of technologies to improve student learning further influence their intentions and persistence regarding its integration into teaching (Anderson, Groulx & Maninger, 2011). Given these variables, Anderson and Maninger (2007) suggest that the role of teacher education is to provide well-designed programs that can build a foundation on which pre-service teachers can demonstrate effective ICT integration.

Technology's role in the classroom has shifted dramatically over the years. Today's educators are under great pressure to provide 21st century students with a quality education based on 21st century standards. Those standards include providing students with the technological and informational skills needed to compete in an ever-changing, technology-driven world (Harris, 2016). Therefore, to prepare pre-service teachers for this shift in classroom instructional practice is vital for teacher preparation programs to enable them better integrate technology in their curriculum, instruction, and assessments throughout the course of the program. Jonassen (2003) identified the need for technology integration to occur within the teacher preparation program in order to enhance the skills future educators need to reach students in the 21st century classroom. Unfortunately, the

rapid technological advancements have outpaced pre-service teachers' abilities to keep up with the improvements (West & Graham, 2007); and researchers continue to report pre-service teachers as feeling inadequately prepared to use technology for instructional purposes (Hew & Brush, 2007).

Based literature review, the researcher justified the need to investigate pre-service teachers' perceived levels of preparedness to effectively integrate technology upon completing their preparation program requirements. This research provided additional insight into pre-service teachers' views on their preparation programs, thereby shining light on areas where improvements could be made to better prepare future pre-service teachers. Thus, the purpose of this research is to explore pre-service teachers' perception of their ICT integration in teaching preparedness at the University of Kabianga, Kenya.

Research Objective

To explore the perception of pre-service teachers' ICT integration preparedness.

Research Questions

Four research questions were addressed in this study:

- i. What are the pre-service teachers' perceptions of the potentials of ICT in teaching and learning?
- ii. What is the pre-service teachers' perception of the impact ICT use in teaching and learning?
- iii. What is the pre-service teachers' perception of the usefulness of ICT use in learning?
- iv. What is the pre-service teachers' perception of their training on ICT use in learning?
- v. What is the pre-service teachers' perception of their self-efficacy in using ICT for learning?
- vi. What are pre-service teachers' intention to integrate ICT in their teaching?

Problem Statement

Rapid advancement in Technology has proven one of the few dynamics of the early 21st century, providing educators with the challenge and opportunity of preparing digital citizens in a global setting. It requires educators to rethink on the type of learning necessary in the 21st century if student teachers are to leverage on this to meet the ever changing approaches to teaching and learning. While existing teaching learning activities and delivery systems are unsatisfactory and are not suitable for the age of 21st Century, one would wonder whether pre-service teachers in the university and teacher training colleges are adequately prepared to use technology in their teaching after their training. The modern day students are unique, especially with regard to technology. It will be a disaster in waiting if teachers themselves will remain digital immigrants while their students' are digital natives. There appears to be a gap in literature on pre-service Teachers' knowledge and preparedness for ICT integration in teaching in the School of Education at the University of Kabianga Kenya as they complete their studies and move out to the world of work. Little literature is found on pre-service teachers perception on their preparedness for ICT integration in teaching in the School of Education. This study therefore sought to fill this gap thus adding more information to existing literature on pre-service teachers perception on their preparedness for ICT integration in teaching.

METHODOLOGY

Research Design

Descriptive survey research design was adopted in the study to collect data from respondents guided by the six objectives of the study. The target population of the study comprised of all fourth year Bachelor of Education, regular students during the 2022/2023 academic year in the University of Kabianga. Simple random sampling through random response to electronic questionnaire gave rise to a sample size of 278 respondents for the study from an accessible population of 1306.

An electronic questionnaire designed by the researcher referred to as Pre-Service Teachers' Perceptions of their ICT Integration Preparedness Questionnaire (PTPIIPQ) was used in data collection. This instrument was

created with the help of google forms and shared via social media to obtain data voluntarily from willing respondents. The eQuestionnaire contained 5 items on demographic data and 35 items on 5-point Likert scale distributed across six domains as shown in Table 1. These 35 items required the respondents to give their honest opinion on their perception on ICT integration preparedness as they graduate and move out to the world of work.

Validity and Reliability of Survey Tool

The validity of the instrument was ensured by a close scrutiny by ICT experts and experts from the Department of Curriculum Instruction and Educational Media (CIEM). The instrument was piloted so as to determine its reliability by administering it to 20 respondents from Maasai Mara University and therefore not part of the Study. The results of the pilot test gave a Cronbach Alpha coefficient of 0.783 and therefore found appropriate for use in data collection. A confirmatory test analysis was performed to check the reliability of the items in the tool and the consistency of each domain under investigation. Table 1 shows the findings from data collected.

Table 1: Cronbach Alpha Reliability Test for items in each Domain

Domain/Variable	No of Items	Cronbach Alpha
Potentials of ICT	8	0.852
Impact ICT use	7	0.761
Usefulness of ICT	5	0.722
Training on ICT use	5	0.882
Self-efficacy in using ICT	5	0.759
Intention to integrate ICT	5	0.724
Overall	35	0.783

Each domain had a Cronbach Alpha greater than the minimum threshold of 0.70, indicating high reliability of the survey tool used. This suggests that the items within each variable have a high level of internal consistency, making them reliable measures for assessing the respective constructs outlined in the study (Pallant, 2020). The data collected electronically was analyzed using frequency distribution tables, mean and standard deviation with boundary limits shown in Table 2.

Table 2: Boundary Limits for Students Responses

Response	Category	Point	Boundary Limit
Strongly Agree (SA)	Strong Positive Perception (SPP)	5	3.50-5.00
Agree (A)	Weak Positive Perception (WPP)	4	3.10-3.40
Disagree (D)	Weak negative Perception (WNP)	2	2.10-3.00
Strongly Disagree (SD)	Strong Negative Perception (SNP)	1	1.00-2.00

This study focused on pre-service teachers who are studying to be secondary school teachers. Data was collected through an online survey using an electronic questionnaire constructed via google forms. Pre-service teachers were invited through a link to complete the online survey that sought to investigate the perception of pre-service teacher education students on their ICT Integration preparedness. There were 278 students who completed sufficient questions in the survey to provide useful information.

RESULTS AND DISCUSSION

The Department of Curriculum Instruction and Educational Media (CIEM) from the School of Education and Social Studies (SEASS) University of Kabianga provided background information for the cohort of students being in the last semester of their fourth year of study. There were a number of questions that related to the pre-service teachers perceptions of the potentials of ICT, impacts ICT, usefulness of ICT use in learning, extent of training on ICT integration, self-efficacy in using ICT for teaching and learning and their intention to integrate ICT in their field of work. The responses to each of those categories were combined to give an overall mean and these are reported in the tables beginning with the demographic data.

Demographic Data

The participants were 278 student teachers in their final year of teacher preparation. Student teachers in their third year are at a crucial stage in their ICT teaching competencies development, and they can provide focused insights into key training strategies linked to learning to teach with technology. The demographic data collected are shown in Table 3.

Table 3: Survey Participant Distribution by Sex, Age and Area of Specialization

Questionnaire Item No.	Variable		Total Frequency	%
1.	Gender Female	Female	116	41.73
		Male	162	58.27
2.	Age	16 -20 years old	22	7.91
		21 - 25 years old	190	68.35
		26 - 30 years old	59	21.22
		Above 31 years old	7	2.52
3.	Subject area of Specialization	Social Science Subjects	150	53.96
		Science Subjects	128	46.04
4.	Sponsor	Self	5	1.80
		Government	273	98.20
5.	ICT Training	Trained	212	76.26
		Not yet Trained	66	23.74

Out of the total number of participants, 116 (41.73%) were females and 162 (58.27%) were males. A gender-sensitive approach is important in understanding the existing gender differences in ICT training experiences (Weidlich & Kalz, 2023). The second item sought to find out the age group; 22(7.91%) were from 16 to 20 years old, 190 (68.35%) from 21 to 25 years old, 59 (21.22%) were from 26 to 30 years while 7 (2.52%) were 31 years old and above. A total of 150 (53.96%) were from social science subjects while 128 (46.04%) were specialized in natural science subjects. Majority of the students 273 (98.20%) were Government sponsored while a few 5 (1.80%) were self-sponsored. The fifth item sought to find out whether the pre-service teachers had prior ICT training and the findings indicate that majority 212 (76.26%) have undergone training while 66 (23.74%) have not trained.

Data Analysis

The second part of the questionnaire consisted of 35 items on a 5-point Likert scale that ranges from 1(Strongly Disagree) to 5 (Strongly Agree), distributed in constructs: perceived potentials of ICT use in learning (items 6 to 13), perceived impact of ICT use in learning (items 14 to 20), perceived usefulness of ICT in teaching (items 21 to 25), perceived extent of training offered by the University on ICT integration (items 26 to 30), perceived self-efficacy in using ICT for learning (items 31 to 35), and pre-service teachers' intention to integrate ICT in teaching (items 36 to 40).

a) Perceived Potentials of ICT use in Teaching and Learning

ICT use in education holds a significant potential to increase student learning interest and motivation by making learning more interactive, engaging, and accessible to all. This is achieved through various means, including personalized learning experiences, improved access to resources, and the ability to engage with content in diverse formats, ultimately leading to increased student engagement and a more dynamic learning environment. The first objective of the study sought to collect data on pre-service teachers' perceptions of the potentials of ICT in teaching and learning. The responses are shown in Table 4.

Table 4. Perceived Potentials of ICT use in Teaching and Learning (n= 278)

Item No	Statement	Frequency of Responses				AVG X/5
		SD	D	A	SA	
6.	Learning using ICT is interesting	17	68	98	95	3.67
7.	I enjoy learning by using ICT	30	67	96	85	3.50
8.	It's fun to learn using ICT	38	72	85	83	3.37
9.	I like reading digital texts than printed texts	37	69	85	87	3.42
10.	I love learning ICT skills	30	59	80	109	3.64
11.	I'm more enthusiastic to learn with ICT	33	76	86	83	3.40
12.	ICT use increases my motivation to learn	31	76	85	86	3.43
13.	I never get bored learning through ICT	27	73	80	97	3.52
	Domain % Average	11	25	31	33	**3.50

****Strong Positive Perception (SPP)**

The findings in Table 4 indicate that the majority of the participants had a positive perception of the potentials of ICT use to increase the interest and motivation of learners in class during lessons. 64% of them agreed and strongly agreed with statements designating the potentials of ICT use to increase students' learning interest and motivation in the questionnaire (Table 4). The obtained mean score ($X = 3.50$) indicates that the participants' perception of the potentials of ICT use to increase their interest and motivation. This is a strong positive perception. This finding confirms Prensky's (2001) view that one of the most strategic ways to boost students' interest in learning is by presenting interesting activities and media to them. These findings were substantiated by a study carried out by Rodríguez-Jiménez et al., (2023), which demonstrated improvements in students' performance, motivation, and problem-solving skills when ICT was integrated into the classroom. These results also confirm some research findings revealing that ICT use increases learners' motivation that develops their engagement (Chen et al, 2014). Additionally, Mamolo (2022) argues that ICT integration into lessons enhances students engagement in their work due to the diverse opportunities for interactive and enjoyable teaching methods.

b) Perceived Impact of ICT use in Teaching and Learning

Perceived impact of ICT use in teaching and learning include increased engagement, personalized learning, improved access to information, and enhanced collaboration. While some studies suggest small or even negative impacts on learning outcomes, many emphasize the positive role of ICT in transforming the teaching and learning processes, making them more engaging, effective, and student-centered. Responses from participants on their perceived impact of ICT use in teaching and learning are indicated in Table 5.

Table 5. Perceived Impact of ICT use in Teaching and Learning (n= 278)

Item No.	Statement	Frequency of Responses				AVG X/5
		SD	D	A	SA	
14.	ICT use enhances learning	13	40	117	108	3.96
15.	ICT helps in acquisition of new knowledge	20	41	112	105	3.87
16.	ICT helps in learning new skills	23	45	107	103	3.80
17.	ICT use makes learning more involving	16	52	114	96	3.80
18.	ICT use makes learning easier	31	40	107	100	3.74
19.	ICT use has a positive effect on learning	28	38	104	108	3.81
20.	ICT use makes me more active	18	42	109	109	3.90
	Domain % Average	8	15	40	37	**3.84

****Strong Positive Perception (SPP)**

Table 5 displays that the majority of the participants had a positive perception on the impact of ICT use in teaching and learning. About 77% of them agreed and strongly agreed with the statements defining impact of

ICT in teaching and learning. The mean score ($X = 3.84$) obtained indicates that the participants' perception on the impact of ICT use in teaching and learning is high here in referred to as .

This finding confirms the findings by Adewoye and Salau (2021) on the impact of ICT on teaching and learning that ICTs offer great opportunity to solve existing teaching and learning problems. In addition, a study by Adegbite, (2017) showed that there is significant effect of impact of ICT in Teaching. Eslamian and Khade, (2017) concludes that ICT has a significant effect on student academic achievement. This reveals that ICT integration into the class not only increases learners' proficiency of basic skills in reading, writing, and numeracy but also develops their learning achievement and motivation.

c) Perceived Usefulness of ICT in Teaching and Learning

The perceived usefulness of ICT in education refers to the value and benefits that teachers and students anticipate or experience when integrating technology into teaching and learning. This perception is a key factor influencing the adoption and implementation of ICT in educational settings. Table 6 shows the responses from participants on Perceived usefulness of ICT in teaching and learning.

Table 6. Perceived Usefulness of ICT in Teaching and Learning (n= 278)

No	Statement	Frequency of Responses				AVG X/5
		SD	D	A	SA	
21.	ICT brings out importance of technology in life	16	47	108	107	3.87
22.	ICT makes me learn more actively	11	54	107	106	3.87
23.	ICT helps and inspires me to express myself	17	44	102	115	3.91
24.	ICT developes communication & collaboration skills	13	44	104	117	3.96
25.	ICT helps me become an independent learner	10	48	114	106	3.93
	Domain % Average	5	17	38	40	**3.91

****Strong Positive Perception (SPP)**

In this study ICT usefulness refers to the benefits offered by ICT integration in teaching and learning in an attempt to develop knowledge, skills, and values that students need for their future. ICT educational values go beyond the benefits provided by ICT through teaching and learning because teaching and learning is an integral part of education. Table 6 shows that the majority of the participants had a positive perception of the usefulness of ICT in teaching and learning. More than 78% of the respondents agreed and strongly agreed with the 5 statements defining the values of ICT in teaching and learning. The mean score obtained ($X = 3.91$) indicates that the participants' perception of ICT educational values is high.

These finding agrees with Kreutz and Rhodin's (2016) which showed that ICT use is effective in aligning educational practice with the conditions and needs of 21st Century students. It also supports Salomon & Schrum's (2007) notion that ICT use helps develop learners' proficiency in using technology, and this proficiency is highly needed to adapt to an ever-changing society and work market. ICT integration brings a change to the teaching methods used by teachers from the traditional teacher-centered approaches to heuristic styles. This change makes classrooms interactive as learners get the opportunity to manipulate technology adding to their creativity and thinking skills needed in the 21st Century (Mwangi & Mutua, 2014). Additionally, the finding confirms the study results of Frydrychova and Poulouva (2014) revealing that ICT use does not only increase students' autonomy but also develops their interactive and collaborative learning skills.

d) Perceived Extent of Training by the University on ICT integration

The level of training offered by universities on ICT integration typically includes integrating ICT as a unit within various courses to provide a foundation for ICT integration in teaching and learning. This training aims to equip future educators with necessary ICT skills and may extend to in-service training for teachers. The training often covers various approaches to ICT development, including emerging, applying, integrating, and transforming approaches.

Teachers generally perceive ICT training positively, recognizing its potential to enhance teaching effectiveness and student engagement. However, successful integration often face challenges related to adequacy of training programs. Table 7 shows the results obtained from questionnaire items on the level of training offered to teachers.

Table 7. Perceived Extent of Training offered by the University on ICT integration (n= 278)

No	Statement	Frequency of Responses				AVG X/5
		SD	D	A	SA	
26.	I was trained adequately on ICT integration in T/L	70	105	47	56	2.69
27.	University has adequate ICT infrastructure	44	101	72	61	3.02
28.	Our lecturers were confident in ICT integration	70	74	72	62	2.94
29.	Reliable internet connectivity was available	20	64	101	93	3.66
30.	Our university library has enough ICT space	99	95	61	23	2.33
	Domain % Average	22	32	25	21	2.93

Weak Negative Perception (WNP)

The data in Table 7 shows that 54% of the pre-service teachers disagree and strongly disagree that they have received adequate training on ICT integration while 46% feel that they have been trained sufficiently. The overall mean score obtained ($X = 2.93$) indicates that the participants' perception of ICT educational values is negative. Although pre-service teachers agree that there is adequate ICT infrastructure in the university and that the internet connectivity is satisfactory, majority of them feel that their training was not sufficient enough to give them confidence. Inadequate space in the ict resource room in the library limits them for getting more practice. Moreover, lack of confidence and enthusiasm from the lecturers leaves pre-service teachers with no role model to emulate.

In this regard, pre-service teachers should be provided with adequate training on the way they are expected to teach with ICT (Baki, 2006). The main purpose of such training is to influence pre-service teachers' willingness and skill to use ICT in their future lessons (Anderson & Maninger, 2007). Adequate and effective training of pre-service teachers in ICT is a major concern for both the general public and educational stakeholders. Shaukat (2006) asserts that rigorous training is necessary for teachers before they can accept ICT and integrate it in their teaching and learning. Training assist them to advance their interests, knowledge, and skills as well as their comprehension of different degrees of integration of ICT in teaching and learning. Teacher related training programs help teachers develop positive attitudes toward computers (Hew & Brush, 2007). Miller (2008) asserts that a necessary condition for successfully integrating technology in the classroom is effective technological training. This can best be done during their programs in the university right from their early years so as to enable them appreciate the place of ICT integration in teaching as proposed TPACK model which proposes three core knowledge components: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technology Knowledge (TK).

e) Perception of Pre-service Teachers' Self-Efficacy in Using ICT for learning

Self-efficacy is an individual's belief in their ability to successfully perform a specific task or achieve a desired outcome. It's a belief about one's capabilities to organize and execute the actions needed to manage prospective situations attaining designated types of performances (Bandura, 1986). In learning it plays an essential role because pre-service teachers' self-efficacy affects their choices of activities, effort invested, persistence, interests, and achievements. The studies of Wan et al. (2008) and Yang and Cheng (2009) revealed that students' capabilities to accomplish ICT related tasks positively correlated with their ICT self-efficacy. In a bid to find out pre-service teachers perceptions of their ICT integration preparedness, respondents were expected to give the perception of their self-efficacy in using ICT in the world of work. The results are shown in Table 8.

Table 8. Perceived Self-Efficacy in Using ICT for Learning (n= 278)

No	Statement	Frequency of Responses				AVG X/5
		SD	D	A	SA	
31.	I use ICT in learning competently	32	79	95	72	3.35
32.	I can use ICT easily without struggle	73	45	100	60	3.11
33.	I'm never worried or distressed to use ICT	28	102	100	48	3.14
34.	I believe in my ability to use ICT in T/L	48	71	84	75	3.24
35.	I am proficient in ICT use in teaching	43	94	91	50	3.04
	Domain % Average	16	28	34	22	*3.18

*Weak Positive Perception (WPP)

Table 8 shows that the participants' perception of their self-efficacy in using ICT in learning activities is positive. More than 56% of them agreed and strongly agreed with the 5 statements describing self-efficacy in ICT use in learning while 44% disagreed and strongly disagreed. The mean score ($X = 3.07$) indicates that the participants' perception of their self-efficacy in using ICT in learning is a weak positive one.

The findings of this study are somewhat similar to the findings of Redmond and Lock (2019). From the current study, it was evident that self-efficacy beliefs of pre-service teachers and their perceptions toward TPACK were positive (Redmond & Lock, 2019). Pre-service teachers' perception of technological knowledge is adequate as they also believe that their efficacy regarding the use of TPACK is like a learning need that can be ongoing and will develop from time to time.

f) Pre-service Teachers' Intention to integrate ICT in Teaching and Learning

Integrating ICT in teaching and learning involves intentionally and thoughtfully incorporating technology into educational practices to enhance student learning and engagement. This integration goes beyond simply using technology; it's about using it purposefully to improve teaching strategies and create more engaging learning environments for students.

Pre-service teachers generally express a positive intention to integrate ICT in their future teaching, often seeing it as beneficial for student learning and their own professional development. However, their actual integration may vary based on factors like perceived usefulness, ease of use, and their own ICT skills and beliefs.

Tabel 9. Pre-service Teachers' Intention to integrate ICT in Teaching and Learning (n= 278)

No	Statement	Frequency of Responses				AVG X/5
		SD	D	A	SA	
36.	ICT integration should be the norm	14	49	103	112	3.89
37.	I will be using ICT integration in all my lessons	35	81	92	70	3.29
38.	I have acquired necessary tools for integration	42	72	92	72	3.29
39.	I am motivated to see students learn through ICT	20	64	101	93	3.66
40.	Looking forward to teach in an ICT environment	31	68	81	98	3.53
	Domain % Average	10	24	34	32	**3.54

**Strong Positive Perception (SPP)

It can be seen from the data above that generally the pre-service teachers believed that ICT would be very useful for them in their teaching and that their students would find it useful for learning. The data in Table 9 shows that the respondents had a Strong Positive Perception ($X=3.54$). Technology use is an inevitable direction of pre-service teachers' professional development using deep integration of information technology and education (Tondeur et al., 2018). To train the main force of the future teaching practice, teachers' educational institutions should invest on considerable time and energy to improve pre-service teachers' ICT competencies (Tondeur et al., 2018). In a study of 16,439 pre-service teachers in 20 teacher education

institutions, Wang et al. (2021) found that although post-graduation pre-service teachers improved their ICT competencies, they still entered the real classroom with teacher-centered technology integration, using technology as a tool for information or knowledge transfer rather than as a cognitive partner for students (Huang & Teo, 2021).

This finding concurs with Teo et al. (2016) who argued that it had a significant effect on intention only when the system was mandatory for teachers or those who lacked teaching experience. In China, the Confucian culture and collectivism of respecting teachers are deeply rooted (Huang & Teo, 2020), making pre-service teachers pay heed to the teachings of teacher educators and value the views and opinions of those around them.

Summary of major findings

In a bid to respond to the main objective of the study regarding to the perception of pre-service teachers' on their ICT integration preparedness, Table 10 gives a summary of the statistics on the major findings of each domain as received from the respondents.

Table 10. Table of Major Findings per Domain

Srl. No	Domain	Frequency of Responses				AVG X/5
		SD	D	A	SA	
A.	Potentials of ICT use in Teaching and Learning	11	25	31	33	**3.50
B.	Impact of ICT use in Teaching and Learning	8	15	40	37	**3.84
C.	Usefulness of ICT in Teaching and Learning	5	17	38	40	**3.91
D.	University Training on ICT integration	22	32	25	21	2.93
E.	Self-Efficacy in Using ICT in T/L	16	28	34	22	*3.18
F.	Intention to integrate ICT in T/L	10	24	34	32	**3.54
	Average	12	24	33	31	**3.52

****Strong Positive Perception (SPP)**

The results in Table 10 summarizes the major findings of the study as follows:

- The pre-service teachers' have a **Strong Positive Perception** on the potentials of ICT in teaching and learning
- The pre-service teachers' have a **Strong Positive Perception** on the impact ICT use in teaching and learning
- The pre-service teachers' have **Strong Positive Perception** on the usefulness of ICT use in learning
- The pre-service teachers' had a **Weak Negative Perception** on their training on ICT use in learning.
- The pre-service teachers' had a **Weak Positive Perception** on their self-efficacy in using ICT for learning
- The pre-service teachers' had a **Strong Positive Perception** in their intention to integrate ICT in the teaching and learning process
- Overall, pre-service teachers' had a **Strong Positive Perception** in their ICT integration preparedness in the teaching and learning process.

CONCLUSION

From this study perceived potentials of ICT, impact of ICT and usefulness of ICT, emerged as key factors influencing the integration of ICT in the classroom in a positive way. The pre-service teachers recognized the potential, impact and usefulness of ICT in teaching and learning, but were not as confident in their ability to implement it as shown by their Weak Negative Perception (X=2.93) on training and Weak Positive Perception (X=3.18) on their self-efficacy in ICT use. It is worth noting that although pre-service teachers are not confident in ICT integration, they still have a strong positive perception of their intention to integrate ICT in their teaching. This study supports the importance of the adequate training to enable pre-service teachers acquire competencies thus enhancing their self-efficacy in ICT use in the classroom. The university training were reported by the pre-service teachers to have had little effect on preparedness to implement ICT

integration in their teaching. This study therefore recommends the infusion of ICT integration in all the professional courses throughout their studies from the beginning.

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