

## Research Article

# Investigating the Readiness of Pre-Service Teachers toward Information and Communication Technology Integration in Teaching at Federal Universities in Northeastern Nigeria

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**Abstract**— This paper investigates the readiness of pre-service teachers towards ICT integration in teaching at federal universities in northeastern Nigeria. The study employed the use of descriptive survey design. The population of the study consists of 7885 pre-service teachers of Federal Universities in northeastern Nigeria. The sample size is 381 pre-service teachers selected across the Federal Universities in northeastern Nigeria using a random sampling procedure. Three Research Questions and Three hypotheses were generated and answered in the study. The instrument for data collection in this study was ICT Attitude, Access and Competency (ICT-AAC). The instrument was validated by four (4) experts who determined the accuracy and suitability of these items. A Cronbach Alfa reliability test was run on the instrument (ICT-AAC) which yielded an internal consistency reliability index of 0.82, 0.88, and 0.73 for clusters A, B, and C respectively, with an overall reliability index of 0.89. The research questions were answered using descriptive statistics and Spearman's correlation coefficient using SPSS version 25. The findings of the study showed that most of the pre-service teachers have a positive attitude towards ICT integration in teaching. It was also found that pre-service teachers have no Access to most of the ICT facilities. It was further confirmed that the pre-service teachers were Competent in manipulating ICT facilities. The study further indicated a significant relationship between pre-service teachers' Attitudes, Accessibility, and ICT Competency. Finally, several challenges that might hinder the integration of ICT facilities in teaching were found and recommendations were proffered, which include; improvement of pre-service teachers' Access to ICT facilities such as projectors, smart/interactive whiteboards, and the software required for the effective use of the boards. This should be aimed at increasing their Competency in the newly acquired or available facilities and how to integrate them into teaching.

**Keywords**— *Pre-service Teachers, Readiness, Accessibility, Competency, Attitude & ICT.*

## 1. Introduction

Over the last two decades, the advancement of Information and Communication Technology (ICT) has transformed every aspect of human endeavor including education. In this regard, ICT is considered one of the instruments for quality education in this era of artificial intelligence [1]. Integration of ICT in education has revolutionized the methods of instruction as teaching and learning in the 21<sup>st</sup> century is no longer limited to the traditional classroom, as students and teachers are now engaging and interacting in virtual classrooms outside the traditional classroom [2]. Moreover, the use of ICT in education provides a powerful learning platform. It revolutionizes the instructional process in which students deal with knowledge in an active, self-directed, and constructive manner [3].

Given the importance of ICT integration in education, the Federal Government of Nigeria acknowledged the vital roles played by ICT in enhancing education [4]. Hence, states in

the national ICT policy that the government shall provide the necessary infrastructure and training for the integration of ICT in advancing knowledge and skills. Integration of ICT in teaching serves as the key to complementing and generating support for teachers' professional development and students' learning abilities [5]. The major challenge faced by integrating ICT in the instructional process is to ensure that both the pre-service teachers and practicing teachers are well equipped to integrate new ICT tools for instructional delivery [6]. For many teachers, the use of ICT for the instructional process has been their major challenge because there is little or no expertise, and teachers are hesitating to take the first step [7]. However, teachers are required to integrate ICT into their daily teaching and replace their traditional methods with modern tools and facilities [8].

Furthermore, the major underlying factor in achieving the goals of the National ICT policy is the Readiness of teachers to integrate ICT into education [9]. The degree of Readiness of pre-service teachers to integrate ICT is measured in terms

of their competencies, skills, and Attitudes toward the use of ICT [10]. Moreover, the successful integration of ICT in the teaching process is highly dependent on the Readiness of teachers [11].

Studies have shown that ICT Competency is one of the factors that influence teachers' integration of ICT in their teaching [12]. [13] viewed computer Competency as an individual's ability to operate digital technology, have a basic knowledge of emerging technologies, use computer application software to perform personal or job-related tasks. This indicated that successful integration of ICT in classrooms depends largely on the pre-service teachers' level of ICT Competency.

Another important variable that is critical to ICT integration in teaching, is the Accessibility to ICT. According to [14] Access to ICT is the ability of teachers and students to possess or hire ICT facilities and take advantage of the available ICT services. Access to ICT is one of the key indicators of teachers' ICT integration in teaching [15]. Moreover, Access to ICT facilities is one of the effective ways for teachers to integrate ICT into teaching [16]. It is, therefore, important that teachers have Access to digital technologies, the internet, hardware, and software to increase their knowledge and skills in ICT.

Attitude is another variable that is critical to the ICT integration in teaching. Teachers' positive Attitude toward computers is considered to be a key factor in fostering ICT integration and the enhancement of quality teaching using computers [17]. [18] reported that among the factors that influence the successful integration of ICT in teaching is the Attitude of pre-service teachers toward ICT whereas, [19] also reported that teachers' Attitude towards the use of ICT is one of the factors related to their roles towards successful use of ICT in teaching.

Although many studies have been conducted on the Readiness of teachers towards ICT integration in teaching, very few looked into the case of pre-service teachers. A gap this study intends to fill. Similarly, no such study was conducted with pre-service teachers of Federal Universities of Technology in northeastern Nigeria. Furthermore, studies have been conducted on teachers' Competency, Accessibility, and Attitude as factors toward integration of ICT in teaching, but none of these studies combines the role of these three variables as a determinant factor towards integration of ICT in teaching.

## 2. Significance of the study

The findings of this research will be significant to teachers' training institutions in the designing of their curriculum implementation process to thoroughly prepare the pre-service teachers to be able to be relevant to the learners in this information age. The findings will also be of great significance to the bodies that design and revise curricula such as the National University Commission (NUC), the National Commission for Colleges of Education (NCCE), and

the National Board for Technical Education (NBTE). The finding would further look into details on whether or not the current curriculum allows teachers to integrate ICT effectively in teaching and learning.

## 3. Review of Related Empirical Studies

The application of ICTs in education has grown in geometry progression in the past few decades in both developing and developed countries. Many Nations considered ICT knowledge as one of the pillars whose impact on transforming 21<sup>st</sup> century education cannot be overstated [20]. As part of this, schools and other educational institutions that are responsible for preparing students to live in "a knowledge society" need to consider ICT integration in their curriculum [21]. According to a study conducted by [22] on the Assessment of Final Year Pre-Service Teachers' Readiness to Use ICT to Teach: Implication for COVID-19 Education in Delta State Nigeria, a descriptive survey design was used for the study, the population of the study was made up of all final year pre-service teachers in the Degree program of the College of Education which comprises (350) students from nine different departments. A cluster sampling procedure was used to include the pre-service teachers from all nine departments. The instrument used for data collection was the Pre-service Teachers' Questionnaire on the Use of Information and Communication Technology to Teach (PTQUICTT). The finding of the study reported that the pre-service teachers were ready to use ICT to teach in terms of their awareness and motivation, positive perception about ICT, and confidence to use ICT to teach. The results further reported that the pre-service teachers have internet access in the various residential locations. However, they did not possess personal computers and laptops and did not perceive that their training offered them enough ICT skills.

In a similar study conducted in Pakistan by [23] on the Teacher's Readiness to Use of ICT in Classrooms and Academic Performance, a descriptive survey design was used for the study, the population of the study was made up of all all-secondary school teachers in Toba Tek Singh District. The instrument used for data collection was the ICT Use and Performance Survey (ICTPS). The instrument was validated by expert educationists. The reliability was computed from the sample of 40 teachers not included in the final sample. The Cronbach Alpha reliability was calculated as.950 The finding of the study indicated that teachers' experience has a significant impact on the challenges when they use information technology.

Another study was conducted by [24] on teachers' readiness for ICT integration in teaching in Malaysia. The finding showed that the knowledge level possessed by teachers in using ICT is moderate as they were only good at using certain applications such as spreadsheets, presentation software, and e-mailing as these are the main applications that are commonly and often used in the teaching profession. A similar study was conducted by [25] on teachers' readiness to integrate ICT into the teaching and learning process in Nigerian secondary schools. The finding showed that Out of

the 232 participants in the junior schools 130 (56%) have below-average knowledge of IT while 102(44%) know average. This study examined the readiness of secondary school teachers in Abeokuta South local government area of Ogun state (as a case study) to integrate information technology into educational instruction. The study found that the majority of the teachers involved in the study had a low level of knowledge about ICT. It was also found that the majority of teachers in the schools have low skills in the use of ICT.

### 3. Methodology

The methodology adopted for this study is the quantitative method, specifically descriptive survey design. The study population consists of all the Seven thousand, Eight Hundred Eighty-Five (7885) pre-service teachers of Federal Universities in North-eastern Nigeria. A sample of 381 pre-service teachers was selected for the study using a Yamane Taro sampling technique. Out of 381 questionnaires administered to the pre-service teachers, 368 questionnaires were completed and returned giving the response rate of 97%. The demographic information was elicited through part A of the survey. Part B of the instrument consists of items on pre-service teachers' Attitudes toward integrating ICT in teaching. Part C of the instrument consists of items on pre-service teachers' level of ICT access for teaching. Part D of the instrument consists of items on pre-service teachers' level of ICT competency. The instrument was validated and had an overall reliability index of 0.934.

### 4. Results

**Table 1:** Distribution of Pre-service Teachers Based on Department

Departments	Questionnaire Administered	Number of Questionnaire Retrieved	Percentage Retrieved
Department of Science Education	92	90	23.62
Vocational & Technical Education	77	74	19.42
Department of Science Education	75	72	18.90
Vocational Education	59	55	14.44
Department of Electrical Edu. Technology	24	24	06.30
Education	54	53	13.91
<b>Total</b>	<b>381</b>	<b>368</b>	<b>96.59</b>

Table 1: presents the distribution of respondents based on department. The result shows that a total of 162 representing (42.52%) of the population are from science education, 74 representing (19.42%) are from Vocational & Technical

Education, 55 representing (14.44%) are from Vocational Education, 24 representing (6.30%) are from the department

of Electrical & Electronic Technology Education while 53 representing (13.91%) are from Department of Technology Education respectively. This percentage showed that the majority of the population is from the Science Education Department.

**Table 2:** Attitude of pre-service teachers towards ict integration in teaching.

**Key:** *N* = number of respondents, *M* = mean, *Std* = Standard Deviation. Thus, the limits for the interpretation are, thus; mean scores 1.00 – 1.49 (Strongly Agreed), 1.50 – 2.49 (Agreed), 2.50 – 3.49 (Neutral), 3.50 – 4.49 (Disagree) and 4.50 – 5.00 (Strongly Disagree).

S/N	Statement	N	M	Std
1	Using ICT makes the subject matter more interesting.	368	1.56	0.82
2	The poor state of facilities (e.g. irregular power supply, poor internet facilities, etc) discourages me from using ICT.	368	1.92	0.79
3	The use of ICT by teachers helps me in my pattern of learning.	368	1.63	0.87
4	ICT is not conducive to my learning because it is not easy to use.	368	1.42	0.94
5	computer helps me understand concepts in more effective ways.	368	1.60	0.81
6	I have a phobia of handling and manipulating ICT facilities.	368	1.51	0.74
7	The use of ICT facilitates easy communication of concepts from teachers to students.	368	1.73	0.89
8	I don't usually feel comfortable using ICT as a tool in my academic activities.	368	1.76	0.96
9	The use of ICT is valuable for me in my learning process.	368	2.24	1.23
10	I rather do my things manually than with a computer.	368	1.92	1.09
<b>Grand Mean</b>		<b>368</b>	<b>1.80</b>	<b>0.79</b>

Table 2 shows the level of pre-service teachers' Attitudes toward ICT integration in teaching. All the Ten (10) Items have mean ratings within the range of 1.50 to 2.49. This means that the pre-service teachers are of positive Attitude towards integration of ICT facilities in teaching. The items have a grand mean of 1.80 which also falls under the mean rating of Agreed.

In general, pre-service teachers describe their Attitude toward ICT integration in teaching as agreeing as evidenced by the grand mean value of 1.80. As to the Fifteen sub-constructs of pre-service teachers Attitude toward ICT integration in teaching, pre-service teachers agreed that Using ICT in the classroom make subject matter more interesting, The use of ICT by teachers help them in their pattern of learning, The poor state of facilities (e.g irregular power supply, poor internet facilities etc) discourage them from using ICT, ICT is not conducive to their learning because it is not easy to use, they have phobia in handling and manipulating ICT facilities, The use of ICT facilitates easy communication of concept from teachers to the students, they don't usually feel

comfortable using ICT as a tool in their academic activities, The use of ICT is valuable for them in their learning process, they rather do their things manually than using a computer, ICT allows them to share ideas with others within and outside classroom, ICT is not conducive to students' learning because it is not easy to use, they prefer ICTs in teaching and learning than traditional approach, Use of ICT motivates them to study outside classroom, and they lose track of time when working with computers as shown by the weighted mean values of 1.56, 1.92, 1.63, 1.42, 1.60, 1.51, 1.73, 1.76, 2.24 and 1.92 respectively.

As can be seen from the summary of the pre-service teachers' Attitude toward ICT integration in teaching in Table 2, it appears that pre-service teachers have a phobia of handling and manipulating ICT facilities, they don't usually feel comfortable using ICT as a tool in their academic activities. But surprisingly, the Use of ICT motivates them to study outside the classroom and they prefer ICTs in teaching and learning to traditional approach even though they don't usually feel comfortable using ICT as a tool in their academic activities. On the other hand, the poor state of ICT facilities (e.g., irregular power supply and poor internet facilities) discourages them from using ICT. It showed that the Attitude of pre-service teachers towards ICT integration in teaching proved that they are ready to face the 21<sup>st</sup> century of the teaching profession with the touch of ICT integration. This result agrees with the findings of [24] who reported that the majority of pre-service teachers accepted the use of ICT for the teaching-learning process and maintained positive attitudes towards integrating ICT.

**Table 3:** Pre-service Teachers ICT facilities Accessibility level

S/N	Statement	N	M	Std
1	I have access to the internet on my mobile phone/laptop for easy preparation of my assignment.	368	2.46	0.34
2	I have access to the internet on my device.	368	4.32	0.28
3	I have access to a non-internet-connected laptop.	368	2.35	0.16
4	I have access to a non-internet-connected notebook.	368	3.89	0.73
5	I have access to an internet-connected laptop.	368	3.94	0.51
6	I have access to an internet-connected notebook.	368	2.30	0.63
7	I have access to an online database in my school for my Assignment.	368	4.48	0.33
8	I have access to the faculty e-learning Centre.	368	4.10	0.74
9	I have access to the faculty computer laboratory.	368	2.96	0.16
10	I have access to the university ICT centers.	368	1.74	0.58
<b>Grand Mean</b>		<b>368</b>	<b>3.54</b>	<b>0.44</b>

Table 3 shows the pre-service teachers' ICT facilities Accessibility level. The results showed that out of Ten (10) items, only Three (3) items fall within the mean rating of agreed, i.e. ranging from 1.50 – 2.49. The remaining eight (8)

items all fall under the mean rating of disagreed, i.e. ranging from 3.50 – 4.49 and the grand mean of respondents on the extents of Accessibilities of ICT facilities is 3.54, which also falls within the mean rating of disagreed.

In general, pre-service teachers describe their ICT facility's Accessibility level as disagreeing as evidenced by the grand mean value of 3.54. As to the Ten sub-constructs of pre-service teachers' ICT facilities Accessibility level, pre-service teachers agreed that they have access to the internet on their mobile Phones, non-internet-connected laptops, and university ICT centers. As shown by the weighted mean values of 2.46, 2.35, and 1.74 respectively.

Furthermore, the pre-service teachers' ICT facilities Accessibility level in Table 3, also showed that pre-service teachers have no Access to the internet, online database, faculty e-learning centers, presentation software such as PowerPoint, internet-connected laptops, and Notepad as shown by the weighted mean values of 4.32, 3.89, 3.94, 4.30, 4.48, 4.10 and 3.96 respectively. Interestingly, the pre-service teachers have Access to the internet on their mobile phones even though they don't have access to internet-connected laptops. On the other hand, the poor state of facilities (e.g. irregular power supply and poor internet facilities) discourages them from using ICT as reported in Table 8 above. This indicated that pre-service teachers had of positive attitude towards ICT integration in teaching and were much ready to face the 21<sup>st</sup> century of the teaching profession with the touch of ICT integration despite lack of Access to some of the ICT facilities.

**Table 4:** Pre-service Teachers ICT Competency level

S/N	statement	N	M	Std
1	I can use the internet to search information regarding my Homework	368	1.56	0.42
2	I can store and share files from my Personal Computer	368	1.92	0.39
3	I can manipulate the basic application software (Office Suite, Google browser, etc.)	368	1.72	0.67
4	I can fix and connect the basic hardware components (printer, scanner, monitor, etc.)	368	4.10	0.54
5	I know how to access the online portal and check information on my academic activities.	368	1.60	0.81
6	I can prepare a spreadsheet to plot a graph for my assignment.	368	1.51	0.74
7	I can store and manipulate data in a spreadsheet program.	368	1.73	0.39
8	I know how to save documents in the desired location.	368	1.76	0.36
9	I can retrieve existing documents from the saved location.	368	2.24	0.23
10	I know about transferring files from a hard disk to a USB flash drive and vice versa.	368	1.92	0.09
<b>Grand Mean</b>		<b>368</b>	<b>2.13</b>	<b>0.46</b>

Table 4 shows the ICT Competency level of pre-service teachers. The results showed that nine (9) items out of all the ten (10) items fall within the mean rating of agreed, i.e., ranging from 1.50-2.49. only one (1) item falls under the mean rating of disagreed, i.e., ranging from 3.50-4.49 and the grand mean of respondents on the Competency level of ICT is 2.13, which also falls within the mean rating of agreed.

In general, pre-service teachers describe their ICT Competency level as agreeing as evidenced by the grand mean value of 2.13. As to the nine (9) sub-constructs of pre-service teachers' ICT Competency level, pre-service teachers agreed that they can use the internet to search for information for their given assignment/homework, store and share files using a storage device like a flash drive and memory card, manipulate the basic application software (e.g office suite, Google browser, etc.), prepare a spreadsheet to plot a graph, store and manipulate data in a spreadsheet program, save documents in the desired location and Create posters and other visual displays in Word, PowerPoint or any other graphic design application as shown by the weighted mean values of 1.56, 1.92, 1.72, 1.60, 1.51, 1.73, 1.76, 2.24 and 1.92 respectively.

Surprisingly, as can be seen from the summary of the pre-service teachers' ICT Competency in Table 4, pre-service teachers cannot manipulate the interactive whiteboard, fix and connect the basic hardware component (System Unit, printer, scanner, monitor) even though they were competent in manipulating application packages. This also indicated that pre-service teachers were Competent in terms of manipulating ICT facilities and ready to face the 21<sup>st</sup> century of the teaching profession with the touch of ICT integration despite lack of Access to some of the ICT facilities.

**Research Hypotheses**

*H<sub>01</sub>: There is no significant relationship between pre-service teachers' ICT competency and their Attitude toward the integration of ICT in Teaching.*

**Table 5:** Test of Significant Correlation between Pre-service Teachers' Attitude toward ICT and their ICT Competency Level.

Variable	N	M	std	Correlation	p-value	Decision
Attitude	368	2.75	0.54	0.73	0.00	Significant
Competency	368	2.46	0.43			

Table 5 presented the results of a test of significant correlation between pre-service teachers' Attitude towards ICT and their ICT Competency level using Spearman's correlation coefficient. The result showed that teachers' Attitude towards ICT is correlated to their ICT Competency level to a varying extent, as shown by the non-zero r- value (r = 0.73, p < 0.01). The nature of the correlation is positive as can be seen from the computed R-value, which means that there is a positive relationship between pre-service teachers' Attitude toward ICT and their ICT Competency level.

*H<sub>02</sub>: There is no significant relationship between Pre-service teacher's Attitude and their ICT accessibility level*

**Table 6:** Test of Significant Correlation between Pre-service Teachers' Attitude toward ICT and their ICT Accessibility Level.

Variable	N	M	std	Correlation	p-value	Decision
Attitude	368	2.75	0.54	0.457	0.00	Significant
Accessibility	368	2.31	0.83			

Table 6 presented the results of a test of significant correlation between pre-service teachers' Attitudes towards ICT and their ICT Accessibility level using the Spearman correlation coefficient. The result showed that teachers' Attitude towards ICT is correlated to their ICT Accessibility level to a varying extent, as shown by the non-zero r- value (r = 0.46, p < 0.01). The nature of the correlation is positive as can be seen from the computed r-value, which indicates that there is a positive relationship between pre-service teachers' Attitude toward ICT and their ICT Accessibility level.

*H<sub>03</sub>: There is no significant relationship between Pre-service teachers' Attitude and their ICT Accessibility level.*

**Table 7:** Test of Significant Correlation between Pre-service Teachers' ICT Competency and their Accessibility Level.

Variable	N	M	std	Correlation	p-value	Decision
Competency	368	2.46	0.43	0.55	0.00	Significant
Accessibility	368	2.31	0.83			

Table 7 presented the results of a test of significant correlation between pre-service teachers' ICT Competency and their ICT Accessibility level using the Spearman correlation coefficient.

The result showed that pre-service teachers' ICT Competency is correlated to their ICT Accessibility level to a varying extent, as shown by the non-zero r- value (r = 0.55, p < 0.01). The nature of the correlation is positive as can be seen from the computed r-value, which means that there is a positive relationship between pre-service teachers' ICT Competency and their ICT Accessibility level.

**Discussion of Results**

The study was carried out to investigate the Readiness of Pre-Service Teachers Towards Information and Communication Technology (ICT) Integration in Teaching at Federal Universities in North-Eastern Nigeria.

Research question one was intended to determine the Attitude of pre-service teachers of Federal Universities in North-eastern Nigeria as a factor toward Readiness to integrate ICT in teaching. The results showed that all the ten (10) items have a mean rating ranging from 1.50 – 2.49 and the grand mean of respondents on their Attitude towards ICT integration in teaching is 1.80, which also falls within the mean rating of agreed, this means that pre-service teachers in Federal Universities of Technology in the North-eastern Nigeria are of the positive Attitude towards ICT integration in teaching. The table also revealed that the standard deviation of all the ten (10) items ranged from 0.74-1.23 and the average deviation between the respondents is 0.79 which shows that there is a deviation between the respondents on

their Attitude towards ICT integration in Teaching. It could also be seen from Table 2 above that pre-service teachers all agreed with items such as they prefer ICTs in teaching and learning to traditional approach, they lose track of time whenever they are working with a computer, and use of ICT facilitates easy communication of concept from teachers to the students.

Research question two was intended to determine the extent of accessibility of ICT facilities among pre-service teachers of Federal Universities in the North-eastern Nigeria as a factor toward Readiness to integrate ICT in their teaching. The results showed that out of the ten (10) items, only five (5) items fall within the mean rating of agreed, i.e. ranging from 1.50 – 2.49. The remaining five (5) items all fall under the mean rating of disagreed, i.e. ranging from 3.50 – 4.49 and the grand mean of respondents on the extents of Accessibilities of ICT facilities is 3.54, which also falls within the mean rating of disagreed. This means that the pre-service teachers in Federal Universities of Technology have no access to most of the ICT facilities for teaching learning purpose. The table also reported that the standard deviation of all ten (10) items ranged from 0.16-0.74 and the average deviation between the respondents is 0.44 which shows that there is not much deviation between the respondents on their extent of Accessibility of ICT facilities for teaching-learning purposes. It could also be seen from Table 3 above that pre-service teachers only have access to the ICT facilities (such as non-internet-connected laptops, internet on my mobile phone, and access to the university ICT centers.), and internet connectivity. This result contradicted the findings of [26] and [27] in their separate studies reported that ICT facilities are available in the universities and a large number of students have access to the ICT facilities.

Research question three was intended to determine the Competency level of pre-service teachers of Federal Universities in the North-eastern Nigeria as a factor toward Readiness to integrate ICT in teaching. The results showed that nine (9) items out of the ten (10) items fall within the mean rating of agreed, i.e., ranging from 1.50-2.49. only one (1) item falls under the mean rating of disagreed, i.e., ranging from 3.50-4.49 and the grand mean of the respondent on the Competency level of ICT is 2.13, which also falls within the mean rating of agreed, this means that most of pre-service teachers at Federal Universities in North-eastern Nigeria are ICT competent. The table also found that the standard deviation of all the ten (10) items ranging from 0.09-0.95 and the average deviation between the respondents is 0.46 which shows that there is not much deviation between the respondents on their level of ICT Competency. It could also be seen from the table that pre-service teachers are only incompetent in the area (such as: using interactive whiteboard in the classroom for lesson delivery, fixing and connecting the basic hardware components such as printer, scanner, monitor etc.).

Research question four was intended to determine the relationship between pre-service teachers' Attitude, ICT Accessibility, and their Competency level. This research

question was answered by formulating and testing 3 null hypotheses at a 0.05 level of significance. Research hypothesis one was intended to test the significant correlation between pre-service teachers' Attitudes toward ICT and their ICT Competency level using the Spearman correlation coefficient. The result showed that teachers' Attitude towards ICT is correlated to their ICT Competency level to a varying extent, as shown by the non-zero r- value ( $r = 0.73$ ,  $p < 0.01$ ). The nature of correlation is positive as can be seen from the computed r-value, which means that the higher the Attitude of pre-service, the higher their Competency level and vice versa. The degree of magnitude of the correlation is high as can be seen from the r-value of 0.73. This means a high correlation between pre-service teachers' Attitudes towards ICT integration and their ICT Competency level. A comparison of the computed r-value and critical value shows that the computed r-value exceeded the critical value, giving the researcher a reason to reject the null hypothesis.

Research hypothesis Two was intended to test the significant correlation between pre-service teachers' Attitudes toward ICT and their ICT Accessibility level using the Spearman correlation coefficient. The result showed that teachers' Attitude towards ICT is correlated to their ICT Accessibility level to a varying extent, as shown by the non-zero r- value ( $r = 0.46$ ,  $p < 0.01$ ). The nature of the correlation is positive as can be seen from the computed R-value, which indicated that the higher the Attitude of pre-service teachers, the higher their Accessibility level and vice versa. The degree of magnitude of the correlation is moderate as can be seen from the r-value of 0.46. This indicated a moderate correlation between pre-service teachers' Attitudes towards ICT integration and their ICT Accessibility level. A comparison of the computed r-value and critical value shows that the computed r-value exceeded the critical value, this also gave the researcher a reason to reject the null hypothesis.

Research hypothesis Three was intended to test the significance between pre-service teachers' ICT Competency and their ICT Accessibility level using the Spearman correlation coefficient. The result showed that pre-service teachers' ICT Competency is correlated to their ICT Accessibility level to a varying extent, as shown by the non-zero r- value ( $r = 0.55$ ,  $p < 0.01$ ). The nature of correlation is positive as can be seen from the computed R-value, which means that the higher the Attitude of pre-service are, the higher their Competency level and vice versa. The degree of magnitude of the correlation is moderate as can be seen from the r-value of 0.46. This indicated a moderate correlation between pre-service teachers' Attitudes towards ICT integration and their ICT Accessibility level. A comparison of the computed r-value and critical value shows that the computed r-value exceeded the critical value, giving the researcher a reason to reject the null hypothesis.

### Recommendations

Given the findings of this study, the following recommendations were made.

1. The university management should provide pre-service teachers Access to ICT facilities (such as faculty e-

learning center, interactive smart board, internet-connected laptops, online database, and presentation software) for teaching purposes.

2. The university management should provide regular power supply and standard internet facilities to encourage pre-service teachers to improve the effective integration of ICT in teaching. Also, the university management should ensure the most efficient use of the network in the university as the pre-service teachers have no Access to internet-connected computers.
3. A Regular seminar and workshops should be organized by the university's management for pre-service teachers on Basic hardware components and maintenance to acquire skills on how to fix and connect the basic hardware components (System Unit, printer, scanner, projector, monitor).
4. The universities should organize an annual ICT training program for pre-service to expose them to the available ICT teaching facilities in the universities. This should be aimed at increasing their Competency in the newly acquired or available facilities and how to integrate them into teaching.

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#### Authors Contribution:

The author has accepted responsibility for the entire content of this manuscript and consented to its submission to the journal, reviewed all the results, and approved the final version of the manuscript.

#### Availability of data and material

The datasets generated and analyzed during the current study are not publicly available but will be provided by the corresponding author upon reasonable request.

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#### Conflict of Interest:

I hereby declare that I have no known any competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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