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FULL LENGTH ARTICLE

Investigating the Readiness of Pre-Service Teachers Towards Information and Communication Technology (ICT) Integration in Teaching at Federal Universities in North-Eastern Nigeria

Salisu Harisu Usman[1,*] **Muhammed Ubaida Bello**[2] **Ibrahim Hafsat Abubakar**[2]

[1] Department of Science Education, School of Vocational and Technical Education, Abubakar Tatari Ali Polytechnic, Bauchi, Nigeria

[2] Department of Science Education, Directorate of Degree Program, Tatari Ali Polytechnic, Bauchi, Nigeria

Emails: harisusalisu.svte@atapoly.com · ubaidabello99@gmail.com · hafsatibraheem85@gmail.com

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ABSTRACT

This paper investigates the readiness of pre-service teachers towards ICT integration in teaching at federal universities in the North-Eastern Nigeria. A descriptive survey design was adopted for the study. The population of the study consist of 7885 pre-service teachers of Federal Universities in the North-Eastern Nigeria. The sample size is 381 pre-service teachers selected across the Federal Universities in North-Eastern Nigeria using a random sampling technique. 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 checked the suitability and clarity of these items. The Cronbach Alpha reliability coefficient was computed for the instrument (ICT-AAC) which yielded an internal consistency reliability index of 0.82, 0.88 and 0.73 for cluster 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. Findings of the study showed that most of the pre-service teachers have 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' Attitude, Accessibility and ICT Competency. Finally, a number of challenges that might hinder the integration of ICT facilities in teaching were found and recommendations proffered, which include; improvement of pre-service teachers' Access to ICT facilities such as projector, smart/interactive white boards and the software required for the effective use of the boards. This should be aimed at increasing their Competency of the newly acquired or available facilities and how to integrate them in teaching.

Keywords: Pre-service Teachers ▪ Readiness Accessibility ▪ Competency ▪ Attitude ▪ ICT

1. INTRODUCTION

Over the last two decades, the rapid growth of Information and Communication Technology (ICT) has become one of the important issues in education. In this regard, ICT is considered as one of the pillars upon which quality education lies [1]. Integration of ICT in education has revolutionized the methods of teaching and learning as teaching and learning in the ICT driven environment is no longer restricted to the classroom, as students and teachers are now communicating and interacting in the digital lesson outside the classroom [2]. Moreover, the use of ICT in education brings about a

powerful learning environment and transforms the teaching and learning process in which students deal with knowledge in an active, self-directed and constructive way [3].

In view of the importance attached to ICT integration in education, Federal Government of Nigeria acknowledge the importance of using ICT in improving education [4]. And hence, states in the national ICT policy that government shall provide necessary infrastructure and training for the integration of ICT in advancing knowledge and skills. Integration of ICT in teaching is the key to complement and generate support to teachers' professional development and students' learning skills [5]. The challenges for ICT integration in the teaching and learning process is to ensure that pre-service teachers and practicing teachers are well prepared to integrate new ICT tools for teaching [6]. For many teachers, the integration of ICT for classroom instruction has been difficult because there is often little expertise, and teachers are reluctant to take the first step [7]. However, teachers are required to integrate ICT in their daily teaching and replace their traditional methods with modern tools and facilities [8]. Furthermore, the major underlining factor in achieving the goals of the National ICT policy is the Readiness of teachers to integrate ICT in education [9]. The degree of Readiness of pre-service teachers to integrate ICT is measured in terms of their knowledge, skills and Attitude regarding the ICT [10]. Moreover, successful integration of ICT in teaching process is highly dependent on the Readiness of teachers [11].

Studies have shown that ICT Competency is among the factors that influence teachers' integration of ICT in their teaching [12]. [13] viewed computer Competency as an individual's ability to operate a computer system, have a basic understanding of the operating system, use computer application software to perform personal or job-related tasks, use Web browsers and search engines on the Internet to retrieve and store needed information, and communicates with others. 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] Accessibility 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 a key determinant of teachers' ICT integration in teaching [15]. Moreover, Access to technology resources is one of the effective ways to teachers' integration of ICT in teaching [16]. It is therefore, important that teachers should have Access to computers, the internet, hardware and software to increase their knowledge 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 towards ICT whereas, [19] also reported that teachers' Attitude towards ICT is an important factor related to their roles towards effective 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 the North-Eastern Nigeria. Furthermore, studies have been conducted on teachers' Competency, Accessibility and Attitude as factors toward integration of ICT in teaching, none of these studies combines the role of these three variables as a determinant factor toward integration of ICT in teaching.

2. RELATED WORK

The application of ICTs in education has grown steadily in the past few decades in both developing and developed countries. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy [20]. As part of this, schools and other educational institutions which are supposed to prepare 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: Imp1ication 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. Cluster sampling procedure was used to include the pre-service teachers from all the 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 Teachers 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 sample comprised of three hundred and sixteen teachers randomly selected from secondary schools. Both groups of teachers have equal participation in the study. The instrument used for data collection was the ICT use and Performance Survey (ICTPS). The instrument was validated by the expert of educationists. The reliability was computed from the sample of 40 teachers not included in the final sample. The Cronbach Alpha reliability was calculated as 0.950. The finding of the study indicated that teachers' experience has significant impact on the challenges when they use information technology.

3. PROPOSED METHODOLOGY

The methodology adopted for this study is the quantitative method, specifically descriptive survey design. The population of the study consists of all the Seven thousand, Eight

Hundred and Eighty-Five (7885) pre-service teachers of Federal Universities in the 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 successfully completed and returned giving the response rate of 97%. The demographic information was elicited through the part A of the survey. Part B of the instrument consists of items on pre-service teachers' Attitude 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. EXPERIMENTAL SETUP AND DATASETS

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.	24	24	06.30
Technology Education	54	53	13.91
Total	381	368	96.59

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.

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).

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 21st 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 showed 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 respondent 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 facilities Accessibility level as disagree 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 laptop and university ICT centres, 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 internet, online database, faculty e-learning centers, presentation software such as PowerPoint, internet connected laptops and notebooks as shown by the weighted mean values of 4.32, 3.89, 3.94, 4.30, 4.48, 4.10 and 3.96 respectively. But interestingly, the pre-service teachers have Access to internet on their mobile phones despite the fact that they don't have Access to internet connected laptops.

Table 2. Attitude of pre-service teachers towards ICT integration in teaching

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
	Grand Mean	368	1.80	0.79

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 laptop for easy preparation of my assignment.	368	4.32	0.28
3	I have access to non-internet-connected laptop.	368	2.35	0.16
4	I have access to non-internet-connected notebook.	368	3.89	0.73
5	I have access to internet-connected laptop.	368	3.94	0.51
6	I have access to internet-connected notebook.	368	2.30	0.63
7	I have access to 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
	Grand Mean	368	3.54	0.44

On the other hand, the poor state of facilities (e.g irregular power supply and poor internet facilities) discourage them from using ICT as reported in Table 2 above. This indicated that pre-service teachers were of positive attitude towards ICT integration in teaching and were much ready to face the 21st century of the teaching profession with the touch of ICT integration despite lack of Access to some of the ICT facilities.

Table 4 showed 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 agree 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 internet to search for information for their given assignment/homework, store and share files using a storage device like 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,

Table 4. Pre-service Teachers' ICT Competency Level

S/N	Statement	N	M	Std
1	I can use internet to search for information for my assignment/homework.	368	1.56	0.42
2	I can store and share files using a storage device like flash drive and memory.	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 component (printer, scanner, monitor etc.)	368	4.10	0.54
5	I know how to access 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 hard disk to a USB flash drive and vice versa.	368	1.92	0.09
	Grand Mean	368	2.13	0.46

Power Point 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 interactive whiteboard, fix and connect the basic hardware component (System Unit, printer, scanner, monitor) despite the fact that 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 21st century of the teaching profession with the touch of ICT integration despite lack of Access to some of the ICT facilities.

4.1 Research Hypotheses

H01: 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	r	p	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.

H02: 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	r	p	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.

H03: 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	r	p	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.

5. RESULTS ANALYSIS AND DISCUSSION

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 the 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 ranging from 0.74-1.23 and the average deviation between the respondents is 0.79 which shows that there is deviation between the respondents on their Attitude towards ICT integration in Teaching. It could also be seen from the table 2 above that pre-service teacher all agreed with items such as they prefer ICTs in teaching and learning than traditional approach, they lose track of time whenever they are working with computer and use of ICT facilitates easy communication of concept from teachers to the students.

Research question two was intended to determine the extents of Accessibilities 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 respondent 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 the ten (10) items ranging from 0.16-0.74 and the average deviation between the respondents is 0.44 which shows that there is no much deviation between the respondents on their extents of Accessibility of ICT facilities for teaching learning purpose. It could also be seen from the table 3 above that pre-service teachers only have access to the ICT facilities (such as: non-internet-connected laptop, internet on my mobile Phone and access to the university ICT centres.), and internet connectivity. This result contradicted with the findings of [24] and that of [25] in their separate studies reported that ICT facilities are available in the universities and 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 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 no 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 component 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 0.05 level of significance. Research hypothesis one was intended to test the significant correlation between pre-service teachers' Attitude towards ICT and their ICT Competency level using 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' Attitude 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' Attitude towards ICT and their ICT Accessibility level using 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 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' Attitude 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 significant between pre-service teachers' ICT Competency and their ICT Accessibility level using 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' Attitude 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.

6. RECOMMENDATION

In view of the findings of this study, the following recommendations were made.

The universities 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 purpose.

The university management, should provide regular power supply and standard internet facilities to encourage pre-service teachers in order to improve effective integration of ICT in teaching. Also, the university management should ensure the most efficient use of network in the university as the pre-service teachers have no Access to internet connected computers.

A regular seminar and workshops should be organized by the Universities management for pre-service teachers on Basic hardware component and maintenance in order to acquire skills on how to fix and connect the basic hardware component (System Unit, printer, scanner, projector, monitor).

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 of the newly acquired or available facilities and how to integrate them in teaching.

REFERENCES

[1] M. Msafiri, D. Kangwa, and L. Cai, "A systematic literature review of ICT integration in secondary education: What Works, What Does Not, and What Next?," Discover Education, vol. 2, no. 1, Nov. 2023.

[2] E. E. Achor, J. Kyado, and S. Ityobee, "Survey of ICT Literacy Levels of Basic Science Teachers and Students in Upper Basic Schools in Benue State Nigeria," SSRN Electronic Journal, Jun. 2020.

[3] J. Portillo, U. Garay, E. Tejada, and N. Bilbao, "Self-Perception of the Digital Competence of Educators during the COVID-19 Pandemic: A Cross-Analysis of Different Educational Stages," Sustainability, vol. 12, no. 23, p. 10128, Dec. 2020.

[4] S. A. Garba and C. A. Alademerin, "Exploring the readiness of Nigerian Colleges of Education toward Pre-service Teacher Preparation for Technology Integration," International Journal of Technology and Inclusive Education, vol. 3, no. 2, pp. 335–343, Dec. 2014.

[5] N. A. Bizami, Z. Tasir, and S. N. Kew, "Innovative pedagogical principles and technological tools capabilities for immersive blended learning: A Systematic Literature Review," Education and Information Technologies, Jul. 2022.

[6] B. K. Wiederhold, "Connecting Through Technology During the Coronavirus Disease 2019 Pandemic: Avoiding 'Zoom Fatigue,'" Cyberpsychology, Behavior, and Social Networking, vol. 23, no. 7, Jun. 2020.

[7] S. Seufert, J. Guggemos, and M. Sailer, "Technology-related knowledge, skills, and attitudes of pre- and in-service teachers: The current situation and emerging trends," Computers in Human Behavior, vol. 115, p. 106552, Feb. 2021.

[8] M. Lucas, P. Bem-Haja, F. Siddiq, A. Moreira, and C. Redecker, "The relation between in-service teachers' digital competence and personal and contextual Factors: What Matters Most?," Computers & Education, vol. 160, p. 104052, Jan. 2021.

[9] R. Hämäläinen, K. Nissinen, J. Mannonen, J. Lämsä, K. Leino, and M. Taajamo, "Understanding teaching professionals' digital competence: What do PIAAC and TALIS reveal about technology-related skills, attitudes, and knowledge?," Computers in Human Behavior, vol. 117, p. 106672, Apr. 2021.

[10] E. C. Mbazu, B. D. Oladokun, and J. D. Mohammed, "Awareness, Adoption and Perception of Lecturers toward the Use of Information and Communication Technology (ICT) in Nigeria," Howard Journal of Communications, pp. 1–17, Dec. 2023.

[11] S. B. Dias, S. J. Hadjileontiadou, J. A. Diniz, and L. J. Hadjileontiadis, "Computer-based concept mapping combined with learning management system use: An Explorative Study under the self- and collaborative-mode," Computers & Education, vol. 107, pp. 127–146, Apr. 2017.

[12] J. E. Lawrence and U. A. Tar, "Factors that influence teachers' adoption and integration of ICT in teaching/learning process," Educational Media International, vol. 55, no. 1, pp. 79–105, Jan. 2018.

[13] A. O. Ibrahim, A. A. Titilayo, Y. Suleiman, and M. A. Ishola, "Information and Communication Technology (ICT) Utilization: A Veritable Tool for Academic Staff Effectiveness in Nigerian Polytechnics," Humanities and Social Sciences: Latvia, vol. 28, no. 2, pp. 101–118, 2020.

[14] E. Ab, Hartati Maskur, and Roshila Abdul Mutalib, "The Use of ChatGPT Applications in Learning: Impact on Understanding and Student Engagement in TVET Institutions," Malaysian Journal of Information and Communication Technology (MyJICT), pp. 78–87, Dec. 2023.

[15] N. A. U. Alkali, "Utilization of Information and Communication Technology (ICT) in Teaching among Teachers in Selected Public Senior Secondary Schools in Katsina Senatorial Zone, Nigeria," The International Journal of Business & Management, vol. 7, no. 12, Dec. 2019.

[16] H. Sharif-Nia et al., "E-learning Acceptance: The Mediating Role of Student Computer Competency in the Relationship Between the Instructor and the Educational Content," Teaching and Learning in Nursing, Aug. 2023.

[17] S. Dipl, A. Pfeifer, and O. Kunina-Habenicht, "Multiple facets of self-rated digital competencies of pre-service teachers: A pilot study on the nomological network, empirical structure, and gender differences," Frontiers in Education, vol. 7, Dec. 2022.

[18] J. König, D. J. Jäger-Biela, and N. Glutsch, "Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany," European Journal of Teacher Education, vol. 43, no. 4, pp. 1–15, Aug. 2020.

[19] B. C. E. Oguguo et al., "Assessment of ICT Skills Relevant for Effective Learning Possessed by Undergraduate Students at University of Nigeria," International Journal of Higher Education, vol. 9, no. 4, p. 206, Jun. 2020.

[20] M. Levinsson, A. Norlund, and D. Beach, "Teacher Educators in Neoliberal Times: A Phenomenological Self-Study," Phenomenology & Practice, vol. 14, no. 1, pp. 7–23, Jun. 2020.

[21] B. A. J. Egede, "Student Teachers' Readiness to Use Information and Communication Technology (ICT) to teach: Exploring the Influence of Gender," Academia Letters, Mar. 2021.

[22] S. Timotheou et al., "Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review," Education and Information Technologies, vol. 28, no. 28, Nov. 2022.

[23] H. Mohammadi, "Investigating users' perspectives on e-learning: An integration of TAM and IS success model," Computers in Human Behavior, vol. 45, pp. 359–374, Apr. 2015.

[24] N. Edem, "Utilization of Information Technology Facilities for Research by Undergraduate Students in Nigerian Tertiary Institutions," Information and Knowledge Management, vol. 5, no. 10, pp. 81–87, Jan. 2015.

[25] M. M. Zalat, M. S. Hamed, and S. A. Bolbol, "The experiences, challenges, and acceptance of e-learning as a tool for teaching during the COVID-19 pandemic among university medical staff," PLOS ONE, vol. 16, no. 3, p. e0248758, Mar. 2021.