Information and Communication Technology as Predictor for Quality Instructional Delivery Approach among Pre-Service Teachers

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A B S T R A C T S

This study investigated Information and Communication Technologies (ICTs) as predictors for quality instructional delivery among teaching practice undergraduates in Oyo state. A descriptive survey research design was used for the study and the population was 1286 teaching practice undergraduates at Kola Daisi University. The sample size of 291 was determined using Krejcie and Morgan sampling table. A five-point rating scale questionnaire validated by experts was used for data collection. The measurement of the internal consistency method was used to establish the reliability of the instrument and the application of Cronbach Alpha yielded reliability coefficients of 0.97 and 0.87 for the two sections and overall reliability of 0.90. Frequency tables and Pearson product-moment correlation were used to answer research questions. ICT usage among teaching practice undergraduates is high; the level of quality instructional delivery among teaching practice students is high while there was a significant relationship between the two variables. Based on the findings, teaching practice students and polytechnic lecturers should be more equipped with ICT facilities to aid more in their teaching experiences. It was, therefore, recommended that management and various stakeholders should be sensitized to provide schools with the required infrastructural ICT facilities to enhance effective educational service delivery through quality teaching and learning.

A R T I C L E   I N F O

1. INTRODUCTION

The acronym of Information and Communication Technology (ICT) has pervaded the human space across all fields of disciplines and it has contributed to the advancement of interaction, communication, etc. in all spheres of human endeavor. Li (2022) viewed ICT as an inevitable result of the rapid development of information technology. ICT, as a covering concept, refers to the process of communication and application of related technologies to project societal norms, economy, and culture (Ishar *et al.,* 2020). The expanding coverage of ICT within the context of human-technology interaction has spread across all functional roles with the application of technologies like computers, internet, satellite networks, television, radio, and whole lots of emerging technologies to daily activities (Dong, 2021; Dwiana *et al.,* 2022). Information and communication technology (ICT) has ushered in a global shift from analog to digital operations in all realms of human endeavor, allowing a wide range of tasks to be completed quickly, easily, and precisely.

The contributions have received a lot of attention that ICT is being used by a wide range of countries, organizations, and institutions. To carry out and make easy day-to-day business, current telephones, fax machines, and computers are used. Networks of computer communication can be formed via the internet. Information and communication technology (ICT) has a significant impact on a variety of domains and adds to economic knowledge and human resource development. However, the same technology is now causing huge discrepancies between industrialized and poor countries, known as the "digital divide." Taking advantage of ICT's ability to promote and enhance teaching-learning is one of the rationales for pushing its use in schools. ICT is intended to improve creative classroom techniques such as student-centered learning, activity-based learning, inquiry learning, and collaborative learning, among others (Ranjan, 2013).

The use of information and communication technology (ICT) is supposed to improve and facilitate student learning. Data logging systems, for example, can aid science investigations by gathering, processing, and interpreting data, as well as promoting student comprehension through speedy data processing and visual data representation. Through investigation, these ICTs are supposed to increase students' comprehension of scientific, and theoretical knowledge, and technique. Additionally, general computer tools such as word processors, spreadsheets, presentations, and graphic software can be used to assist students in processing and organizing information (Ghavifekr *et al.,* 2014).

However, research in industrialized countries shows that taking advantage of ICT's potential is not as simple as it was imagined in the 1980s. Significant time spent developing pedagogy as well as an ICT skill is required for the majority of teachers to be able to make the most of ICT in the classroom. In the practice of a teacher's day-to-day activities, ICT can be regarded to have played a central and useful role. Students may benefit if teachers are digitally savvy and knowledgeable about how to use ICT in their lesson plans. Schools use a broad range of information and communication technology to communicate, generate, transfer, retain, and manage data (ICTs). Blogging, videography, spreadsheets, animations, presentation software, and web 2.0 are just a few of the many technologies that fall under the umbrella of Information and Communication Technology. Most businesses nowadays rely on information and communication technology, or ICT, for their success (Hermans *et al.,* 2008; Arciosa, 2022). Computers first appeared in schools in the early 1980s, and many educators believe that ICT will play a significant part in the educational experience of future generations (Umoren, 2006). Teaching and student learning may be considerably improved by the use of different technology instruments in educational environments technologies (Oviawe & Oshio,

2011). according to Daves, have the potential to improve teaching throughout the curriculum and facilitate more effective collaboration between students and instructors (Jadhav *et al.,* 2022). Recent years have seen a significant increase in the amount of published material highlighting the advantages of incorporating ICT into educational settings. Teachers, students, and administrators are the three main groups in a school that gain the most from using information and communication technology.

Encouraging students to learn the use of ICT resources in the teaching process can help teachers deliver high-quality instruction, according to the UNESCO report on ICT. ICT advancements are helping to close the gaps in education resource allocation between urban and rural areas. Simultaneously, it is a terrific opportunity for rural teachers to get more educational resources to improve their teaching quality. González & Dejuan (2021) claims that ICT technology can help students improve their listening skills. It also allows them to provide timely feedback after each class. Furthermore, the use of ICT in the classroom might make it easier for instructors to plan classes. For example, using ICT tools like PowerPoint, Google Classroom, and interactive whiteboards will make it easier for teachers to prepare for class. At the same time, Google Classroom, ZOOM, and Tencent Video have emerged as the primary platforms for students to take classes, particularly during the epidemic crisis (Shu *et al.,* 2020). All of these provide technical assistance to teachers to help them teach more successfully.

The use of ICT in education necessitates an ideological shift. Using ICT in the classroom necessitates a shift in mindset from teacher-centered to student-centered (Akinoso, 2023). Self-directed learning is the most common method of utilizing ICT to learn. Because all of the students have access to a computer, the teacher is unable to monitor everyone's dynamic engagement. This is, without a doubt, an exam for students. Students must be able to study alone and maintain tight self-control to avoid distractions from the online world, such as pornographic websites and games when using ICT (Bolaji & Jimoh, 2023). As a result, ICT can assist pupils in improving their abilities to learn on their own. Furthermore research, most students, particularly young pupils, still require the assistance of others when utilizing ICT gadgets. During the pandemic, however, professors were unable to individually guide students since they were not there. This means that pupils must learn to learn independently if they want to master ICT abilities. Otherwise, the quality of online courses will suffer. As a result, the usage of ICT aids in the development of pupils' ability to learn independently.

ICT has been more successfully employed in teaching, learning, and evaluation as a potent tool for educational innovations and reforms. The combination of ICT with education is beneficial to teachers' professional growth. Teachers should perform regular training on the latest educational technologies to better master and operate ICT equipment. As a result, it is beneficial to teacher team building for school leaders. ICT can also provide technical help for digital management systems at the same time.

Instructors, equipment, and facilities such as classrooms, laboratories, libraries, and computer labs all have a role in the end product that a school produces, and defective outputs may emerge when either the teachers or the instructional delivery and evaluation processes are wrong. Ijaduola (2010) claims that literature has been noticed to allow many modern technical gadgets. The internet and CD-Roms are particularly successful in classroom interactions when they come to delivering educational information via computer-based teaching, computer-based learning, and other methods. Computers, the internet, interactive videodiscs, and other innovative technical gadgets are only a few examples (Felder & Brent, 2004). For instance, students might benefit by coming up with solutions to issues that emerge in the classroom. ICTs in education may be defined as the use of fast-evolving technology such as desktop computers, CD-ROMS, and DVDs as well as notebook computers, digital cameras,

and the internet. For example, you'll find programs for working with digital libraries, video conferencing, email, and spreadsheets, just to mention a few of the resources available. ICTs have a positive impact on educational outcomes for students, according to research (Ziden *et al.,* 2011).

Computers and other forms of information and communication technology have made it easier to teach students in the classroom (Agbulu & Ademu, 2010). Educators have become better at managing learning materials, experiences, and information across a range of ICT media because of the expansion of ICTs, according to Yusuf (2007) and Yusuf (2011). Students may access their professors' lecture notes online or on CDs, flash discs, and memory cards, as well as on alternative storage devices including USB drives. A large classroom is unnecessary if students have access to the above-mentioned information and communication technology skills. Computer-assisted education and computer-based training are among some of the most successful educational technologies available today, including personal computers, the internet, CD-ROMs, and interactive videos.

The quality of a learning institution's product is influenced by the quality of the inputs (such as instructors and equipment), the process (such as the delivery and evaluation of education), and the process itself (such as how instruction is provided) (such as grades and test scores). The final product can not meet expectations if even one of these components is lacking (Ijaduola, 2010). Modern technology gadgets, such as computers, the internet, CD-ROMs, and interactive videodiscs, are very successful in classroom interactions for the delivery of educational information through computer-based teaching and computer-based learning.

The school is without a doubt one of the most significant variables in determining how technology is integrated into education. To fully integrate ICT into the classroom, Geng *et al.* (2019) state that a productive learning environment is necessary. In addition, the degree of cooperation and satisfaction among the teaching staff is one of the factors for deciding whether or not a school is appropriate for ICT integration. School leaders must have a deep grasp of information and communications technology, as well as the ability to teach their staff how to use it (Tian *et al.,* 2020). All members of the faculty, particularly student teachers, prepare themselves well in advance for the introduction of ICT. One of the most critical issues that schools, particularly those in rural regions, are presently confronting is a lack of suitable ICT equipment and internet access. A single computer in the administrative building of one of Oyo's higher institutions has internet connectivity; however, this access may be limited. There is a high student-to-computer ratio even in classrooms that utilize computers. In addition, the construction of ICT facilities in schools is influenced by parental initiative or community pressure (Finger & Trinidad, 2002). Increasingly, students and teachers alike find themselves frustrated by technological challenges that disturb the teaching and learning process in many institutions. Teachers will be unable to use the computer if there is a lack of technical support and no repair is available (Jamieson *et al.,* 2013). As a result, teachers will avoid utilizing computers in their classrooms because they are concerned about the malfunctioning equipment. Türel and Johnson (2012) showed that teachers confront substantial difficulties while trying to overcome technical barriers throughout their study. A bad connection, a malware attack, or a malfunctioning printer is all examples of this kind of issue. Research questions (RQ) are:

(i)   What is the level of ICT usage among TP undergraduates in Oyo state?

(ii)   What is the level of quality Instructional delivery among TP undergraduates in Oyo state?

(iii)   What is the relationship between ICTs and quality Instructional delivery among TP undergraduates in Oyo state?

2. METHODS

This paper adopts a descriptive survey design. The population of this study is 1,286 drawn from year three undergraduates currently in Teaching Practice from two programs (Computer science and Statistics) from the faculty of the School of Applied Science and Technology, Kola Daisi University. The sample size for this study is made up of 291 teaching practice undergraduates using Krejcie and Morgan sampling table while a stratified random sampling technique was used for the study. The instrument used was a questionnaire tagged "Information and Communication Technology as Predictor for Quality Instructional Delivery Approach (ICTPQIDA)". It was required for the respondents that they choose one of the four (4) alternatives that were presented on a four-point rating scale that included the terms strongly agree (SA), agree (A), disagree (D), and strongly disagree (SD). There were 295 copies of the questionnaire handed out, and 280 were collected for further examination. The test of reliability was conducted using the test-retest approach, which produced reliability coefficients of 0.97 and 0.87 respectively.

My school's Head of Department wrote a letter of introduction that was sent to the Registrar of each institution I applied to. The responders were given the instruments on the day that had been designated by the administration of the school as being appropriate for the exercise during their regularly scheduled class times. During the administration of the study and the gathering of the instruments, we had assistance from two research assistants. In the process of evaluating the data that was obtained, a basic percentage was used for the demographic data of the respondents alongside RQ 1 and RQ 2, and Pearson Product Moment Correlation (PPMC) was utilized to answer RQ 3.

3. RESULTS

This section presents the results of data obtained from the respondents in percentages and inferential. As shown in **Table 1,** 83 males (29.6%) and 197 females (70.4%) participated in this study. In the age category, below 20 years appeared to be the majority 147 (52.5%), followed by 20 years and above 133 (47.5%). This table further revealed the various religions of the respondents. Muslims are 173(61.8%), followed by Christians (38.2%) respectively.

Table 1. Demographic information of the respondents of teaching practice undergraduates.

Bio-Data	Frequency	Percentage (%)
Gender		
Male	83	29.6
Female	197	70.4
Total	**280**	**100.0**
Age Range		
Below 20 years	147	52.5
Above 20 years	133	47.5
Total	**280**	**100**
Religion		
Muslim	173	61.8
Christian	107	38.2
Total	**280**	**100**

3.1. What is the level of ICT usage among teaching practice undergraduates in Oyo state?

As shown in **Table 2**, 1.8% of the respondents had a very low use of ICT, this was followed by 20.0% of the respondents that experienced a mild use of the ICT. In addition, 78.9% of the respondents experienced a high level of ICT usage experience.

Table 2. Frequency counts and percentages of the extent of Usage of ICT among teaching practice undergraduates in Oyo State, Nigeria.

Level of ICT Usage	Frequency	Percent
Low	5	1.8
Mild	56	20.0
High	219	78.2
Total	**280**	**100.0**

3.2. What is the level of quality Instructional delivery among TP undergraduates in Oyo state?

As shown in **Table 3**, it was discovered that 10(3.6%) of the respondents had a very low level of quality instructional delivery. 74 (26.4%) of the respondents had a mild quality of instructional delivery while 196 (70%) of the respondents experienced a high-quality instructional delivery experience.

Table 3. Frequency counts and percentages of the level of quality instructional delivery among teaching practice undergraduates in Oyo State, Nigeria.

Level of Quality Instructional Delivery	Frequency	Percent
Low	10	3.6
Mild	74	26.4
High	196	70
Total	**280**	**100.0**

3.3. What is the relationship between the use of ICT and quality instructional delivery among teaching practice undergraduates in Oyo state, Nigeria?

A Pearson product-moment correlation was used to provide an answer to the third research question. The result obtained is shown in **Table 4** revealed that the computed mean and standard deviation values of the significant relationship between ICT usage and quality instructional delivery were (41.975, 5.013) and (21.296, 2.813) respectively. The result shows that there is a significant relationship between ICT usage and quality instructional delivery among teaching practice undergraduates in Oyo state ($r=0.540$, $df=198$, $p<0.05$). ICT usage is a predictor of quality instructional delivery. Therefore, ICT usage is significantly related to quality instructional delivery among teaching practice undergraduates in Oyo state.

Table 4. Summary of Pearson Product Moment Correlation relationship between usage of ICT and quality instructional delivery among teaching practice undergraduates in Oyo State.

Variable	N	Mean	SD	DF	R	Sig (2-tailed)	Remark
Usage of ICT	280	41.975	5.013	278	0.643	0.000	Significant
Quality Instructional Delivery	280	21.296	2.813				

*Correlation is significant at the 0.001 level (2-tailed)

4. DISCUSSION

The findings of the first research question show that teaching practice undergraduates in Oyo are using a substantial quantity of ICT. Ghavifekr & Rosdy (2015) did a study and their results are consistent with this conclusion. For this study, we are interested in learning more about how teachers see the benefits of adopting ICT in the classroom. A random sample of 101 teachers from 10 public secondary schools in the Malaysian city of Kuala Lumpur was asked to participate in a survey. We used SPSS (version 21) to analyze the data acquired in this quantitative study and derive both descriptive and inferential results. Using ICT in the classroom is advantageous to both teachers and students, according to the research. Technology-based teaching and learning might be more successful if teachers are appropriately prepared with ICT tools and facilities, according to the results of the study. Professional development training programs for teachers were also shown to have a significant impact on the degree of learning that students experience (Bolaji & Adeoye, 2022).

There was a high degree of quality instructional delivery among students receiving teaching practice, according to the results of the second research question Teachers at Onitsha North Secondary Schools in Anambra State, Nigeria, were asked by Obiageli and colleagues about their views about the effective use of information and communication technology (ICT) in the classroom. 845 students from 16 public secondary schools in the Onitsha North Local Government Area participated in the study, which used a descriptive survey research approach to gather data. It was just a matter of time until they all opened their doors to students. Randomly selected from eight secondary schools, the sample contains 233 instructors. The sample includes 25 male teachers and 208 female teachers. A self-administered questionnaire was utilized to answer the study question. Both the mean and the standard deviation were taken into account. The hypothesis was tested using the Z-test. Student teachers were found to be adept at using information and communications technology (ICT), according to the results (ICT). In addition to utilizing Microsoft Word and Excel to produce lecture notes, students were found to be proficient in data processing, internet network access, and sorting data, such as students' arithmetic results.

Finally, we want to know whether or not students in Oyo state's teaching practice programs are much more likely to employ information and communication technologies (ICTs) in the delivery of high-quality education. The findings of Singh & Jabeen (2018) on "ICT for Delivering Quality Teaching-Learning Process" support this conclusion. Smart courses, pre-programmed learning, interactive CDs, and DVDs are all examples of information and communications technology (ICT) that may be used by teachers to help them effectively and efficiently pass on knowledge in the classroom. Learners may now access a wide range of information at their convenience through a variety of web-based tools, such as virtual labs, e-learning, and digital libraries. The internet is a good place to find these materials. As a result, classrooms become more pleasant and welcoming, which improves the overall quality of teaching and learning in the classroom.

5. CONCLUSION

If we do not recognize the importance of information and communications technology (ICT) in the country's economic development in the 21st century, we will not be able to guarantee that our teachings are both efficient and effective. The educational industry has yet to recognize the enormous benefits that may be gained if information and communication technology are effectively integrated into instruction at all levels. When the use of ICT is perfectly integrated into teaching, it cannot only make the delivery of instruction more

efficient and effective but also improve learning and provide several other benefits. Nigeria's educational system will certainly take on a new look and rank among the world's most technologically advanced nations if the various plans for ICT integration on paper are implemented. These conclusions and suggestions are based on what we learned from the study:

(i) LCDs, multimedia projectors and interactive whiteboards, speakers, and desktop and laptop computers with UPS systems and internet connectivity are just a few examples of the types of technology that management should make available to employees to make them more productive.

(ii) Management and various stakeholders should be sensitized to provide public secondary schools with the required infrastructural ICT facilities to enhance effective educational service delivery through quality teaching and learning.

(iii) ICT resources should be made more readily available at polytechnics by their administrators, who should make every effort to do so. As a result, the program's training and education will be of higher quality since instructors and students will both be motivated to make greater use of these resources.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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