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Assessment of Teachers' Level of Information and Communication Technology Skills and their Attitude to Virtual Teaching: Implication for Library and Information Science Teaching

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Abstract
To ensure effective teaching and learning of Library and information science in schools, adequate information, and communication technology skills of teachers are sacrosanct. Thus, this study assessed the level of information and communication technology abilities among secondary school teachers, as well as their attitudes about virtual teaching. In addition, the investigation was intended to see if there is a link between respondents' attitudes about virtual teaching and their ability to use virtual technologies and whether there is a location gap between the study variables. The study's participants are all secondary school teachers in Nigeria's Anambra state public schools. Multi-stage sampling yielded a sample of 489 teachers. The study employed a descriptive and correlational survey research approach. Descriptive statistics, the t-test, and the Pearson Product Moment Correlation Coefficient were used to examine the data. According to the findings of this study, secondary school teachers in Anambra state have a low level of ICT abilities. Teachers' ICT abilities and attitudes toward virtual teaching are influenced by their location. Teachers' ICT abilities have a strong and favourable association with their attitude toward virtual instruction. These findings implicate the teaching of Library and Information Science in the sense that effective teaching of information science can be achieved when teachers demonstrate good abilities and positive attitudes to virtual teaching.

Keywords: Information and communication technology, Library and Information Science, Virtual teaching, Attitude, Teachers' attitude

Introduction

Effective teaching of Library and information science in schools, adequate information, and communication technology is highly dependent on the use of information technology (Mbonu-Adigwe et al., 2021). The use of technology is one phenomenon that has had a significant impact on how education is delivered around the world today (Ugwuanyi et al., 2020a, 2020b, 2020c, 2020d; Ugwuanyi et al., 2019a, 2019b, Ugwuanyi & Okeke, 2020); (Onah et al., 2020); (Ejimuonye et al., 2020a, 2020b). Many research studies have emphasized the importance of technology in various aspects of life (Lazar 2015, and Ghavifekr and Rosdy 2015). Information and communication technology (ICT) makes knowledge transfer easy, convenient, and effective, according to Raja and Nagasubramani (2018). What this means is that when we use modern technology to assist us in any aspect of our lives, including education, our minds tend to work faster. After the development of personal computers in the 1980s, technology began to be used in education in the twentieth century. Computer technology has advanced rapidly in the last two decades, and the wave of digitalization has accelerated with the introduction of the internet. Computers are currently used in businesses, online banking, social networking, and online education. Furthermore, the current generation is a digital native, with technology pervasive in all aspects of their lives. There has been a rise in the use of the internet in recent years by experts in all disciplines of human endeavour, including teachers in the process of imparting knowledge.

Online teaching, e-teaching, online learning, mobile learning, internet learning, and other terms have been used to describe virtual teaching. In a layman's language, virtual teaching is the use of technology to convey knowledge to students. It is an electronically aided method of learning in which the teacher and students communicate via the internet without regard to time or location. This is usually done outside of the traditional classroom, with students accessing the educational curriculum, completing and submitting tasks, and taking tests entirely online. Some experts feel it can be the best substitute for classroom teaching because it addresses the barriers to education (Garrison 2011). According to Eze, Chinedu-Eze, and Bello, (2018) the integration of ICT devices and contemporary communication equipment into the educational system is referred to as mobile learning education. Virtual teaching is a hallmark of remote learning, according to Andreas (2020) and Eze et al. (2018). What people learn how they learn it, and where they learn it has all been significantly impacted by digital technology. Andreas (2020) goes on to argue that technology allows teachers and students to hunt for specific information not only in

textbooks, but also in a variety of formats and at any time and in any location. Eduard and Lucian (2020) stated that e-learning is a new platform for transferring knowledge and skills to students since it is inexpensive, saves time, has a larger reach, and facilitates collaborative learning. Andreas (2020) emphasized the value of technology in facilitating deep learning and allowing schools to better respond to students' different needs. A better way to achieve this is to incorporate e-learning as a compliment to face-to-face teaching.

Nigeria joined other industrialized countries in incorporating e-learning into the education system through the establishment of the National Open University of Nigeria (NOUN) in 2002, in order to avert brain drain and prevent the country's education industry from completely collapsing. This university uses e-learning to offer lectures and provide students with assignments. Many other traditional tertiary and secondary institutions across the country have not fully embraced technology. Secondary schools teachers are either not ICT-compliant or students are disadvantaged in terms of technological devices or computer technology knowledge (Obododike & Okekeokosisi, 2020). Secondary school students are typically exposed to virtual technology during the registration and exams for WASSCE, NECO, UTMB, and NABTEB. It is worth noting that, prior to the coronavirus outbreak, little effort had been made to guaranteeing successful secondary school teaching and learning in Nigeria using virtual teaching. According to Hussian (2020), the Nigerian government stated on March 23, 2020, that all schools in the federation would be temporarily closed to prevent the spread of the disease. To this effect, the conduct of conventional classroom instruction became an improbable means for the continuous delivery of education in many states in the country. This drastically affected the education sector as most states in Nigeria including Anambra state has not been practicing virtual teaching at the secondary education level.

Anambra state, one of the states in the southeast geopolitical zones of Nigeria is made up of urban and rural areas. During the lock-down following the coronavirus pandemic, the state government cooperated with the state-owned Anambra Broadcasting Service (ABS) radio and television station to create "Anambra teaching on-air" in other to help students cope with school closures. The "on-air" instruction is delivered via radio or television broadcast. Through ABS, the state ministry of education hired certain teachers to teach basic courses like Mathematics, English, Physics, Chemistry, Biology, Igbo, Economics, Government, Literature-in-English, and Civic education (Elekwa, 2020). Principals aided in the identification of teachers that have enough ICT skills for "on-air" or "online" teaching in the chosen disciplines in order to achieve this. This demonstrates that not all professors are

computer technology-savvy enough to manage virtual instruction. It is vital to remember that teachers' attitudes regarding e-learning will have a big impact on whether virtual teaching succeeds or fails.

Attitude is something personal and refers to a person's point of view on a particular issue or topic. According to Matteson, Anderson, and Boyden (2016), one's attitude encompasses three aspects: affective, behavioural, and cognitive. Affective refers to how one feels about something, whereas behavioural refers to how one wants to behave in specific ways about it, and cognitive refers to what one believes or knows about it. According to Semerci and Aydin (2018), an individual's attitude is a component that influences their behaviour based on their feelings and thoughts. Kumar and Ratnakar (2016) define attitude as the amount of positive or negative emotion connected with a certain object or idea. Liaw (2004) proposed a classification system to better understand user attitudes about online technology, proposing that attitudes be divided into the ACB model. Liaw's theory was recently supported up by Maio, Haddock, and Verplaken (2018), who stated that three dimensions shape attitudes: affective, cognitive, and behavioral (ACB Model). Anxiety, delight, and self-confidence are the three traits that Spanos and Sofos (2015) used to categorize attitudes toward ICT. On the other side, Cai, Fan, and Du (2017) identify four types of attitude: affection, belief, self-efficacy, and mixed. As a result, there is no commonly acknowledged singular idea of attitude, which makes operationalizing this psychological construct, particularly in the context of technology, considerably more difficult. As a result, one's thoughts regarding information and computer technology can be interpreted as one's attitude toward ICT in this context. One of the most crucial criteria for the successful use of technology in education, according to Sedoyeka (2012), is the correct mindset of individuals involved in technology integration.

Beyond infrastructure and tool availability, numerous factors influence the successful use of technology in education. The most involved person in technology integration is unarguably the teacher. On the concept of teachers' attitude towards ICT, Hernández-Ramos et al (2014) reported that teachers' attitudes toward technology have an effect on their ability to embrace the value of technology and their attempts to incorporate it into their classrooms. Ibe-Bassey (2011) posited that teachers, as instructors and facilitators of a specific educational system, are also crucial in ensuring that ICT is used responsibly and efficiently. Teachers' attitudes toward ICT, according to Cai et al (2017), can be thought of as a multifaceted construct made up of a variety of factors, including the teacher's nervousness or comfort when using technology (personal emotions); the incentive that teachers have in

enjoying using the resources with their students (personal interest); and the beliefs that you have learned over your career (personal beliefs). Furthermore, such authors like Liaw and Huang (2006) and Abdullah, Abidin, Luan, Majid, and Atan (2006) believe that if teachers have more positive affective, cognitive, and behavioral attitudes toward technology, such as virtual learning platforms, they will be more willing to incorporate it into their teaching. As a result, the ACB model of teachers' attitudes and expectations towards the usage of developing technologies influence the incorporation of technology in the classrooms. Given the rapid advancement of society and the ongoing transformation of technology, it is very necessary to continue examining the extent of teachers' ICT skills and attitudes towards virtual teaching so as to have a better understanding of how to better integrate new technologies into education. Studies on teachers' level of ICT skills and their attitude in Nigeria had been mainly based in higher institutions (Jegede, Dibu-Ojerinde, & Ilori, 2007., Bamigboye, Bankole, Ajiboye & George, 2013). In addition, Ikwuka et al. (2020) conducted a study in Onitsha North LGA, which is a completely urban area, on teachers' attitudes about using ICT for quality instructional delivery. This study is set to assess (urban and rural) teachers' level of ICT skills and their attitude to online teaching in Anambra state, Nigeria.

The purpose of this study is to determine the level of information and communication technology skills of secondary school teachers in Anambra state, as well as their attitudes to virtual teaching and learning.

Research Question

The following research questions guided the study:

1. What is the level of information and communication technology skills for educational purposes possessed by secondary school teachers?
2. What is the attitude of secondary school teachers to virtual teaching?

Hypotheses

1. There is no statistically significant difference in the mean ICT skills level ratings of teachers from urban and rural locations.
2. There is no significant difference in the mean attitude to virtual teaching ratings of teachers from rural and urban locations.
3. There is no significant relationship between the level of ICT skills for educational purposes possessed by teachers and their attitude to virtual teaching.

Method

The study utilized a descriptive and inferential analytical approach. Six thousand, one hundred and three (6103) teachers in the public secondary schools in Anambra state made up the population of the study. Anambra state is one of the five states in the south-east geo-political zones of Nigeria made up of 21 local Government areas that are classified into six (6) education zones by the state Post Primary Schools Service Commission (PPSSC), namely; Aguata, Awka, Onitsha, Ogidi, Nnewi, and Otuocha. Two education zones were purposively sampled; one from urban and the other from the rural area. The sample size of 489 teachers was randomly drawn from the sampled education zones; 308 from urban and 181 from rural areas. The instrument used for the study was a rating scale constructed by researchers captioned "Teachers Level of ICT Skill and Attitude to Virtual Teaching Scale". The instrument has three sections: A, B, and C. The demographics of the respondents, such as their location, were the focus of Section A. Section B consists of 15 items on the ICT skills level of teachers while section C is made up of 25 items on the attitude of teachers to virtual teaching. Each of the items is in the form of a direct statement to which teachers are required to respond to a four-point scale of "strongly agree", "agree", "disagree" and "strongly disagree". Validity was ensured through perusal by experts. Fifty copies of the instrument were administered to determine its reliability. Coefficient of 0.84 and 0.90 were obtained for the second and third sections respectively using Cronbach alpha.

For the purpose of coding for analysis, the items for sections B and C "Strongly agree", "Agree", "Disagree", "Strongly disagree" were coded 4, 3, 2, 1 respectively. The scales were reversed when the statements are in negative form. The SPSS descriptive and inferential statistics, as well as the Pearson Product Moment Correlation Coefficient, were used to examine the study's data. Mean scores from 2.50 and above were remarked as higher level of ICT skill and positive attitude while mean scores below 2.50 were taken as lower level of ICT skills and negative attitude as the case may be.

Results

Table 1: Mean ratings and standard deviations for secondary school teachers' ICT skills in Anambra State (Overall and by Location)

S/n	Item Statement	Overall Mean (X̄)	Overall SD	Urban Mean (Ẍ)	SD Urban	Rural Mean (Ẍ)	SD Rural
1	I can process documents conveniently with Ms Word	2.76	.79	3.24	.43	2.28	.78
2	I can conveniently work with Ms Excel Spreadsheet	2.20	.81	2.64	.70	1.76	.66
3	I can make presentations with PowerPoint	1.90	.76	2.36	.56	1.44	.65
4	I can use Internet Apps for chatting	2.60	.88	3.56	.51	1.64	.64
5	I often send and receive messages through my email	2.12	.68	2.72	.61	1.52	.65
6	I can do graphic designs with a computer	1.66	.61	2.12	.67	1.20	.50
7	I can perform simulations and games with computers	1.46	.68	1.56	.76	1.36	.57
8	I can research and update my knowledge online	2.04	.86	2.64	.49	1.44	.77
9	I can conveniently use skype and slack for communication and collaboration	1.38	.53	1.48	.51	1.28	.61
10	I can search and obtain information from the internet	2.68	.73	3.24	.52	2.12	.67
11	I cannot give assignments to my students using Google docs	1.96	.45	2.24	.59	1.68	.47
12	I can create tables and insert hyperlinks during word processing	2.00	.70	2.60	.50	1.40	.58
13	I can use my networking skills to communicate with other teachers	2.74	.78	3.32	.62	2.16	.72
14	I can recognise and appreciate the components that make up a computer	3.18	.62	3.32	.69	3.02	.54
15	I can comfortably do video-chatting with my friends and colleagues	2.42	.61	2.60	.57	2.24	.66
	Cluster total	33.1	10.49	39.64	8.73	26.54	8.82
	Cluster mean	2.21	.58	2.64	.58	1.77	.59

Table 1 shows the summary of the result for mean ratings of ICT skills possessed by teachers. Using the cut-off point of 2.50, only five skills were above the cut-off point. These are items 1,4, 10, 13, and 14 that have mean ratings of 3.24, 2.72, 3.24, 3.32 and 3.32 respectively. The item with the lowest mean rating was item 9 *(I conveniently use skype and slack for communication and collaboration)* with mean ratings of 1.48. The cluster means of 2.21 shows that generally, teachers possess low ICT skill. However, pooled standard deviation of 0.58 is low indicating that the respondents are not far from the mean and from one another in their responses. Looking at the mean ratings by location, it was observed that teachers from urban areas have 10 items with mean ratings above cut-off, from 2.60 to 3.34. Urban cluster mean was 2.64 indicating high ICT skills possession. On the other hand, teachers from rural areas have only one item (item 14: *"I can recognise and appreciate the components of a computer")* above the cut-off point. Cluster mean for rural area teachers was 1.77 which

indicates possession of very low ICT skills. The mean difference of 0.87 shows that teachers from urban areas possess more ICT skills than those from rural areas.

Table 2: t-Test of Difference in Mean Ratings of ICT Skills Possessed by Teachers From Urban and Rural Locations

Locations	N	Mean	SD	Df	t	p
Urban	308	2.64	.58	487	16.65	.000***
Rural	181	1.77				

Table 2 displays a t-test summary of the difference in mean ICT competence evaluations between urban and rural teachers. A significant difference in the mean ratings of the two sites was highlighted by the p-value of.000, which is less than.05. The null hypothesis of no difference in mean ratings of ICT skill possession between the two sites was rejected as a result of this finding.

Table 3: Mean Ratings of Attitude to Virtual Teaching of Secondary School Teachers in Anambra State (Overall and by Location)

S/n	Item Statement	Overall Mean (X)	SD	Urban Mean (Ẍ)	SD^{Urb}	Rural Mean (Ẍ)	SD^{Rur}
1.	I see learning the use of computers as important	3.24	.43	3.36	.49	3.12	.33
2.	For me, face to face teaching is better than virtual teaching	1.98	.74	2.68	.63	1.28	.46
3.	The teacher does not have control of the class in virtual teaching	2.10	.61	2.56	.65	1.64	.57
4.	Learning how to use the Internet will enhance my job performance	2.26	.47	2.68	.50	1.84	.47
5.	I feel that parents of my students cannot afford phone or laptops for virtual teaching	1.80	.73	2.36	.49	1.24	.44
6.	Discussions on virtual teaching are uninteresting to me	2.06	.56	2.52	.65	1.60	.50
7.	I see virtual teaching as an importation from European school system	2.30	.89	2.92	.76	1.68	.48
8.	I will find it difficult to learn a new way of teaching	3.14	.40	3.32	.48	2.96	.20
9.	I feel confident in myself when teaching virtually	2.00	.64	2.64	.63	1.36	.49
10.	I am enthusiastic about learning the art of virtual teaching	1.96	.83	2.64	.49	1.28	.46
11.	I feel that virtual teaching makes learning easier for my students	2.00	.85	2.68	.48	1.32	.56

No.	Item						
12.	Virtual teaching will make students lazy	2.22	.84	2.92	.40	1.52	.51
13.	Virtual teaching is for seminars and workshops	1.67	.82	1.80	.50	1.54	.52
14.	With virtual teaching, acts of indiscipline by students cannot be corrected	1.80	.54	2.24	.44	1.36	.49
15.	With virtual teaching, many students may skip classes	2.46	.67	3.00	.41	1.92	.40
16.	Virtual teaching will reduce the quality of knowledge achieved	2.66	.63	3.08	.40	2.24	.52
17.	It will be difficult for me to acquire virtual teaching skills	1.72	.81	2.24	.78	1.20	.41
18.	Virtual teaching is a threat to teacher employment	2.00	.67	2.20	.76	1.80	.50
19.	Virtual teaching requires expensive technical support	1.38	.57	1.24	.52	1.52	.59
20.	Interacting with computer is often frustrating	2.50	.74	3.12	.33	1.88	.44
21.	Virtual teaching improves teachers' efficiency	2.24	.89	2.92	.57	1.56	.58
22.	I prefer using computers to prepare my lessons	1.68	.52	2.20	.81	1.76	.44
23.	Communication through electronic mail is annoying	2.32	.80	3.20	.64	1.44	.51
24.	I like to accomplish things by hand rather than using a computer	2.00	.72	2.48	.51	1.52	.59
25.	I am discouraged to learn virtual teaching because of unsteady power supply	1.30	.46	1.24	.44	1.36	.49
	Cluster total	51.46	15.99	65.16	13.84	41.49	11.95
	Cluster mean	2.14	.53	2.61	.55	1.66	.48

Table 3 shows the summary of the result for mean ratings of the attitude of teachers to virtual teaching. For the overall mean ratings, only four skills were above the cut-off point, which are items 1, 8, 16, and 20 with mean ratings of 3.24, 3.14, 2.66, and 2.50 respectively. The item with the lowest mean rating was item 25 *(I am discouraged to learn virtual teaching because of unsteady power supply)* with mean rating of 1.30. The cluster mean for the overall attitude to virtual teaching was 2.14 which indicates that generally, the teachers have a negative attitude to virtual teaching. Pooled standard deviation was 0.53 which was low revealing that the respondents are not far from the mean and from one another in their responses. Looking at mean ratings by location, it was observed that teachers from urban areas have 16 items with mean ratings above the cut-off point, ranging from 3.36 to 2.52,

while nine of the items were below 2.50. Urban cluster mean was 2.61 indicating a positive attitude to virtual teaching. On the other hand, teachers from rural areas have only two items (item 1 and 8) above the cut-off point. Cluster mean for rural area teachers was 1.66 portraying a negative attitude to virtual teaching.

Table 4: t-test of Mean Ratings of Attitude to Virtual teaching for Teachers From Urban and Rural Locations

Locations	N	Mean	SD	df	t	p
Urban	308	2.61	.53	487	20.17	.000***
Rural	181	1.68				

In order to discover whether the difference in the mean ratings of teachers' attitudes to virtual teaching is significant, a t-test analysis was run. There was a significant difference in the mean attitude ratings of teachers from urban and rural settings, as shown in Table 4. This clearly shows that while teachers from urban areas have a positive attitude to virtual teaching, those from rural areas have a negative attitude.

Table 5: Pearson r of the Relationship of Level of ICT Skills of Teachers and Their Attitude to Virtual Teaching

		ICT SKILL	ATTITUDE
ICT SKILL	Pearson Correlation	1	.688**
	Sig. (2-tailed)		.000
	N	489	489
ATTITUDE	Pearson Correlation	.688**	1
	Sig. (2-tailed)	.000	
	N	489	489

**. Correlation is significant at the 0.01 level (2-tailed)

Result on Table 5 shows that the correlation coefficient between the level of ICT skills possessed by teachers and their attitude to virtual teaching was 0.69. This result means that there exists a high positive relationship between the level of ICT skills possessed by teachers and their attitude to virtual teaching. The coefficient of determination (r^2) associated with the correlation coefficient of 0.69 was 0.49 i.e. $(0.69)^2$. This indicates that 49% of the variation in

teachers' attitude to virtual teaching is attributed to the level of ICT skills they possess. This is an indication that 51% (the coefficient of alienation) of the variation in teachers' attitude to virtual teaching could be explained by factors other than their ICT skills level.

Discussion

Globally, ICT skills possession by teachers is an essential ingredient of the teaching-learning pedagogy. The current study assessed secondary school teachers' level of ICT skills possession and their attitude towards virtual teaching. In assessing teachers' ICT skill level, the study revealed that generally teachers in Anambra state, Nigeria have a low level of ICT skills. Looking at the result from a location point, it was observed that teachers in urban areas have high ICT skills while those from rural areas possess very low ICT skills. This finding corroborates with Ikwuka et al (2020), who discovered that secondary school teachers in Onitsha (urban) in Anambra state, Nigeria possess high ICT skills. It will be interesting to note that the only item that rural area teachers scored above the cut-off mark was item 14 *(I can recognise and appreciate the components that make up a computer)*. This may mean that their possession of ICT skills is still at the basic level. The t-test result also showed that there is a significant difference in mean ICT skill possession ratings between urban and rural teachers, favouring urban teachers. The disparity in ICT capabilities between urban and rural areas could be due to the availability of virtual teaching facilities, which may be more prevalent in urban areas.

Furthermore, the findings revealed that generally, secondary school teachers in Anambra state have a negative attitude to virtual teaching. Agbola (2016), Oladimeju, Adeyanju & Fakorede (2018) disagree with this assertion because their findings showed that the attitude of Nigerian teachers to use of ICT was relatively positive. A look at location mean ratings showed that teachers from urban areas have a positive attitude to online teaching in contrast to the attitude of rural area teachers who displayed a negative attitude.

This result was also in consonance with Ikwuka et al. (2020) who conducted their research at Onitsha North LGA, which is an urban area. The t-test of the difference in mean ratings between the two locations revealed a significant difference in favour of teachers from urban areas. According to the Pearson study, there is a strong positive association between having ICT abilities and having a positive attitude toward virtual teaching. This is in corroboration with the findings of Naser, Leong, & Fong, (2010) whose results revealed that research respondents with "high" technological competence are the ones that are most likely to manifest a positive attitude towards online teaching. The findings support those of Krishnakumar and Kumar (2011), as well as Karaca, Can, and Yildirim (2013), who identified a link between computer exposure and e-learning attitudes. In other words, there was a strong positive relationship between teachers' ICT usage and their attitudes.

Implication for Library and Information Science Teaching

The findings revealed that teachers have a low level of ICT skills. It was further found that ICT skills correlate positively with teachers' attitudes. These findings implicate the teaching of Library and Information Science. This implies that with a low level of ICT skills of teachers, effective teaching of Library and Information Science cannot be achieved. This implies that teachers should be trained to acquire adequate ICT skills for effective teaching of Library and Information Science.

Conclusion

Finally, the study's findings revealed that secondary school teachers in Anambra state have a low degree of ICT capabilities. Teachers' ICT abilities and attitudes toward virtual teaching are influenced by their location. It is worth taking note that teachers from rural areas are still at the basic level of computer appreciation. Teachers' ICT abilities have a high and positive relationship with their attitude to virtual teaching.

Recommendations

Based on the findings, the researchers recommend that:

1. Intensive training in ICT skills possession be organised for teachers in Anambra state (especially those from rural areas who seem not to have acquired any ICT skills) through workshops and seminars to enhance their ICT skills.

2. Government, through the Ministry of education, should provide virtual teaching facilities in secondary schools.

3. More ICT personnel will be hired to instruct teachers (at the school level) on how to transfer subject matter or content to an electronic format.

4. School administrators to raise funds through PTA, local community, and Old Boys/Girls association and use the funds to provide power and ICT facilities for their schools.

5. School administrators should during Parents' Teachers Association (PTA) meetings make ICT skill acquisition a topic of discussion. This will help to educate the parents on issues concerning ICT and virtual teaching.

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