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Availability, Accessibility, and Utilization of Intelligent Tutoring System for Instruction Among Secondary School Teachers in Ilorin, Kwara State, Nigeria

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ABSTRACTS

The concept of Intelligent Tutoring System (ITS) is used to describe any computer-based educational systems that provide immediate and personalized instruction and feedback to learners, usually without the intervention from a human teacher. This study examined the availability, accessibility, and utilization of ITS applications for teaching among selected secondary schools in Ilorin, Kwara state. The research was a descriptive type using the survey method. A random sampling technique was used to select 150 teachers from 5 secondary schools in Ilorin, Kwara state. Intelligent tutoring systems are not available to secondary school teachers in the Ilorin metropolis; the reaction of the respondents towards the use of ITS application software for instruction was Positive. From the findings of this study, it was concluded that Teachers do not have access to ITS application for instruction as a result of the availability of ITS instruction application. The implication is that if teachers have access to the ITS application for Instruction it will further foster education security. The study recommends that Government and School administrators should ensure adequate power supply and Internet facilities for easy access and utilization of ITS applications for Instruction in the classroom, also teachers who are not in ICT compliance should be encouraged to study further to meet up with the current technological trends.

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1. INTRODUCTION

Education is an instrument for the development of the natural endowment of the individual and that of society, and it is not new to any race. Every society, irrespective of time or race, has evolved one education system or the other. Education can be defined as the transmission of culture, norms, knowledge, ideas from one generation to another that form a major tool for natural socio-economic growth and development.

Education has been greatly affected by the rapid change in technology which is used in teaching and learning. Information and Communication Technologies (ICT) equip teachers with skills essential for work and life in this 21st century. ICT helps teachers to assess the student academic needs. As technology becomes prevalent and accessible to students of all ages, teachers are encouraged to find innovative and creative ways to incorporate technology into their instructional tasks. With the rapid shift in the way education is delivered to learners, the relevance of ICT for effective instruction cannot be overlooked (Stains & Vickrey, 2017).

National Policy on ICT in Education (2019) defines ICT as the art and applied sciences that deal with data and information. It encompasses all (equipment including computational machinery- computers, hardware, software, firmware, tools, methods, practices, processes, procedures, concepts, principles, and the sciences) that come into play in the conduct of the information activities. ICT is an extended-term for information technology (IT) which focuses on the role of unified communication and integration of telecommunications, computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable us to access, store, transmit, and manipulate information.

To be technologically developed, a nation has to be scientifically literate because of the contributions from science and technology to man and his environment (Moses *et al.*, 2013). The success of technology is the one that is ultimately developed to the evolvement of approaches in the use of ICT. One of the major causes of ICT not reaching ITS application full potential in the foundation stage is the teacher's attitude. Some see it as a potential tool to aid learning whereas others seem to disagree with the use of technology in early years settings (Purnawati *et al.*, 2019).

ICT has the potential to improve all aspects of our social, economic, and cultural life (Palvia *et al.,* 2018). The role of ICT in human development has received growing attention among development practitioners, policymakers, government, and civil society in recent years due to the growing proliferation of the internet, the convergence of information technology, and telecommunications technologies in increasing globalization. Access describes the extent to which a user can easily locate a particular ICT resource for use as well as the degree of accessibility of such resources (Olsson *et al*., 2019).

Nowadays, in this 21st century, the computer plays an important part in education-instruction when implemented. Besides technology has come into our lives and made learning independent and flexible when performed in an effective structure. Also, software that presents students with effective instructional methods is being adopted for teaching and learning purposes. The most important software category with this aim is Intelligent Tutoring System (ITS) which is formed by using computer technologies and Artificial Intelligence.

Computer tutoring is a late development in the long history of tutoring in education. Whereas human tutoring has been used in schools for 2,500 years or for as long as schools have existed. Computer tutoring systems are largely a product of the past half-century. The first generation computer tutors Computer-Aided Tutors have been given the acronym CAI tutors, the second generation tutors are called ITSs (vanLehn, 2011). Since the early 1970s, the field of Intelligent Tutoring Systems (also known as Artificial Intelligence in education) has

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investigated combine research in Artificial Intelligence, Cognitive Science and Education to devise intelligent agents that can act as tutors in CAI.

Traditional CAI systems support learning by encoding sets of exercises and the associated solutions, and by providing predefined remediation actions when the students' answers do not match the encoding solutions. This form of CAI can be very useful in supporting well-defined drill and practice activities. However, it is difficult to scale to more complex pedagogical activities because the system designer needs to define all relevant problem components, all solutions (correct or incorrect) that the system needs to recognize and all possible relevant pedagogical actions that the tutor may need to take.

Intelligent tutoring systems (ITS) are computer programs that are designed to incorporate techniques from the AI community to provide tutors who know what they teach, who they teach, and how to teach. AI attempts to produce a computer behavior. If performed by a human, would be described as "Intelligent". ITS differs from CAI in a way that ITS predefines neither the possible solutions to a specific problem nor corresponding instructions in response to certain student input. Instead, ITS compares the student's solution with the computer's solution generated in real-time.

ITS as a computer system that has a certain field of subject Knowledge and related teaching knowledge that can individualize the teaching or learning. The system can simulate the teaching activities of teachers or experts according to the students' knowledge, select appropriate teaching strategies to help students acquire new knowledge and solve learning problems. ITS application is a computer system that supports and improves the learning and teaching process in certain domain knowledge, respecting the individuality of learner as in traditional one-to-one tutoring.

The research in the domain of educational software involving AI has been conducted in the name of "Intelligent Computer-Aided Instruction (ICAI). This phrase in turn evolved out of the name "Computer-Aided Instruction" (CAI) often referring to the use of computers in education. Nevertheless, to all intent and purposes, ITS and ICAI are synonymous. Intelligent Tutoring Systems (ITS) is an interdisciplinary field that investigates how to devise educational systems that provide instruction tailored to the needs of individual learners, as many good teachers do. Similarly, to human tutors, an ITS application can make assessments about the knowledge a user has on the subject matter.

ITS provides appropriate feedback and knowledge when it is most critical to the user. ITS applications are designed to interact directly with students and perform many of the instructional functions usually reserved for teachers or tutors, and learning from ITS application was associated with higher outcome scores regardless of the level of schooling. Teachers have been teaching their subjects over the years with the aid of some teaching materials like charts, recommended texts, meter rules, set square, and live materials which could be improvised by the teacher to help effectively teach. A teacher cannot teach beyond his scope of mastery. Teachers of subjects using ICT facilities have been observed to enhance learning.

New and improved teaching aid had continued to emerge among which is intelligent tutoring systems. Teaching aids and instructional materials play a major role in facilitating learning and the importance of teaching and learning had been evident. Using intelligent AI-powered systems can greatly improve the efficiency of many educational institutions, lower their operating costs, give them greater visibility into income and expenses and improve the overall responsiveness of the educational institutions. (AI) Artificial Intelligence would have a low error rate compared to humans. If coded properly, they would have incredible precision, accuracy, and speed. (Ali, 2010).

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Artificial Intelligence (AI) is characterized by computers capable of doing things that may be considered intelligent if done by a human being. Similarly, ITS is a computer program that would be defined as good teaching because ITS design includes cognitive science, which is a combination of computer science, cognitive psychology, and educational research. The beauty of AI systems is that they can adapt quite easily to individual learning-related requirements of a student. As such it can also target instructions that are based on their relative strengths and weaknesses. It also reduces the meaningless work that the teacher has to do now and then. This also means that the learning experience is a lot more meaningful for the students. Intelligent Tutoring Systems can understand the style of learning preferred by students (Ali, 2010).

ITSs can gauge the amount of knowledge that a student already has, all this data and analysis is being used to deliver instructions and support that is created specifically for the students. Artificial Intelligence in education improves the learning experience and provides the following benefits to teachers, students, school administrators, etc. Benefits of AI in education include; personalization, teaching, grading, constructive feedback on course quality, providing meaningful feedback to students, creating a global classroom, making education a lot more interesting than before, and monitoring performance.

Mostly due to the limits of technological affordances, Intelligent Tutoring Systems are often subject to educational benefits and limitations. The most important hurdle to overcome is the difficulty in authoring courseware used by ITS programs. Historically, the most system had their content "hard-coded" into the ITS software, which had to be done by skilled programmers at great expense. This almost meant that instructors and other subject matter experts were not able to participate directly in the development of the content portions of the systems. The issue of diagnosing wrong answers turns out to be an exceedingly difficult, time-consuming, and expensive problem to solve; it requires tediously connecting by hand a large number of potential wrong answers with specific remedial instruction. (Bill, 2014).

Availability of ITSs in instruction enables students to work to the successful conclusion of problem-solving, Represent student competence as a productive set, communicate the goal structure underlying the problem solving, provide instruction in the problem-solving context, promote an abstract understanding of the problem-solving knowledge, minimize working memory load, provide immediate feedback on errors, adjust the grain size of instruction with learning, facilitate successive approximations to the target skill. ITS can be available at any of the days, even late at night before an exam, provides real-time data to instructors and developers liking to refine teaching methods, ITS application can reduce dependency on human resources, ITSs help students better understand the material by allowing them to first explain what they know, then by catering responses accordingly (Adesope, Nesbit & Liu 2014).

ITS is available at any time, unlike classroom teachers who are available just during school time, ITS application reduces dependency on human resources, it provides immediate feedback to students and provides hints for students until they become proficient in the material they are learning, it provides a one-to-one teaching environment (Ali, 2010). ITS can determine users' mood up to 80% accuracy, there are three types of knowledge an intelligent tutor needs to have to be able to aid student learning; knowledge about the target instructional domain, knowledge about the student, knowledge about the relevant pedagogical strategies.

Jude and Dankoro (2012) opined that the level of accessibility of ICT resources rests on their availability, the study added that poor availability level of technological resources, accessibility will be hindered for instructional purposes. A study carried out by Olsson *et* al., (2019) revealed that only a few technological facilities such as computers, audiotape,

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projectors, and instructional videos were easily accessible to the science teachers while other facilities such as simulations, models, and web-based laboratories were found not too frequently accessed by science teachers.

The utilization of technology in the elementary classroom is becoming increasingly vital in a global society. There are many benefits of using technology as an educational aid. Students' motivation and confidence are increased when technology is integrated into classroom instruction. The utilization of technology in secondary schools is becoming increasingly vital in a global society.

The utilization of ITSs in the classroom is very important to provide an opportunity for students to learn and operate in the technologically advanced age. Teachers in secondary schools are teachers who had undergone some training on their subject area in either a recognized university or any other degree-awarding higher institution in Nigeria. Teachers are expected to teach junior and senior secondary school students and equip them with knowledge and functional skills that will help them pass the senior secondary school certification examination and can apply the skills acquired in solving their daily problems. The importance of ITSs in education as part of ICT resources to be integrated to stimulate learning and improve performance calls for the need to make them available in our various institutions of learning.

Secondary education is one of the most important tools used to foster the creation of worthwhile skills and attitudes needed for national development. National policy on Education (2013) stated that the national education goals which derive from the Nigerian educational philosophy include amongst other things; the acquisition of appropriate skills and the development of mental, physical, and social abilities and competencies as equipment for the individual to live in and contribute to the development of the society. ITS can be used to facilitate learning in desired content by teachers. Not only forming teaching pedagogy and possessing the skills needed in ITSs are expected by teachers, but they are also expected to be able to effectively transmit knowledge using Intelligent Tutors. ITS applications when properly integrated will be able to achieve three main tasks; accurately diagnose a student's knowledge level using principle rather than programmed responses, can decide what to do next, and adapt instruction accordingly and also provide feedback to the students.

It is not enough for teachers to have ICT competencies and be able to teach them to their students. Teachers need to be able to help the students become collaborative, problem-solving, and creative learners through the use of ITS application so that learners will become effective practical problem-solving citizens and members of the workforce. Not only that using these facilities make learning more effective, but they also make learning more enjoyable and innovative.

The following research questions were raised and answered in this study:

(i) What is the ITS application software available for instruction in secondary schools?
(ii) What is the ITS application software accessible for instruction among secondary school teachers?
(iii) What is the level of ITS software utilization for instruction among secondary school teachers?
(iv) What are the reactions of teachers towards the utilization of ITS instruction application?

The following hypotheses were formulated and tested at a 0.05 level of significance:

(i) Ho1: There is no significant difference between male and female teachers' levels of utilization of ITS instruction application.
(ii) Ho2: There is no significant difference in teachers' reactions toward the utilization of ITS application for instruction based on gender.

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2. METHODS

The study adopted descriptive research design of the survey type. This is because the survey is usually used for a large population. The study was a descriptive research design of the survey type. This method was adopted to gather large information from the respondents. The population for this study comprised all Secondary School Teachers in Ilorin, Kwara State. The sample of this study would be 150 Secondary school Teachers randomly selected from 5 selected schools. Multistage sampling techniques were adopted for this study purposeful, random, and accidental. Purposeful sampling techniques to select the locale, random sampling techniques to select the schools based on the availability of ICT resources, and accidental sampling techniques to administer a questionnaire to the teachers. This further helped the researcher to obtain useful information from the respondents for the study as shown in **Table 1**.

Table 1. Distribution of Respondents According to Gender

Gender of Respondents	Frequency	Percent	Cumulative Percent
Male	86	57.3	57.3
Female	64	42.6	100.0
Total	**150**	**100.0**	

3. RESULTS

The demographic status of respondents by gender was presented in **Table 1**. It showed that male respondents were 86 with 57.3% while 64 (42.6%) were female.

Table 2 shows the educational qualifications of the secondary school teachers, the highest qualification with the highest number of respondents was NCE/ND in education with total respondents of 36(24.0%). Followed by B. Sc/ B. Ed with a total respondent of 36(24.0%), followed by masters in science (M. Sc/M.Ed.) with a total respondent of 29(19.3%). Followed by B. Sc. Ed with a total of respondents of 26(17.3%), followed by B. A with total respondents of 23(15.3%) Ph.D. has the lowest respondents with a respondent of 1(0.66%).

Table 2. Distribution of the respondents by educational qualification.

Qualifications	Frequency	Percentages
B.Sc. /B. Ed.	35	23.3
B. Sc. Ed	26	17.3
B. A	23	15.3
M. Sc/M. Ed.	29	19.3
NCE/ND	36	24.0
PHD	1	0.66
Total	**150**	**100.0**

3.1. Research Question One: What is the ITS Application Software Available for Instruction In Secondary Schools?

The types of ITS type application available for instruction in secondary school in Ilorin were investigated and the results were presented in **Table 3**. Out of the 150 respondents, 5 (0.003%) had Zoosmat while 145 (96.66%) do not have Zoosmat. Assessment is available to 11 (0.007%) but not available to 149 (99.33%). Also, Auto-Tutor is available to 16 (10.66%) but not available to 134 (89.33%). SmartTutor is available to 36 (24.0%) respondents but not

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available to 114 (96.0%) respondents. 6 (4.0%) respondents had Toppr while 144 (96.0%) do not have. REALP is available to 13 (8.66%) respondents and not available to 137 (91.33%) respondents. Active math is available to 8 (5.33%) respondents but not available to 142 (94.6%) respondents. 17 (11.33%) respondents had Alta while 133 (88.66%) respondents do not have Alta. COLLECT-UML is available to 19 (12.66%) but not available to 131(87.33%) respondents.

Furthermore, e-teacher is available to 25 (16.66%) respondents but not available to 125(83.38) respondents. Hi5 is also available to 621 (44.0%) respondents but not available to 791 (56.0%). 1028 (72.8%) respondents had LinkedIn but 384(27.2%) do not have LinkedIn online collaborative tools. Bebo is available to only 456 (32.3%) respondents but not available to 956 (67.7%) respondents. Friendster is also available to 503 (35.6%) respondents but not available to 909 (64.4%) respondents. Orkut is available to 411 (29.1%) respondents but not available to 1001 (70.9%) respondents. MySpace is available to 868 (61.5%) respondents but not available to 544 (38.5%) respondents. Blogger.com is available to 884 (62.6%) respondents but not available to 528 (37.4%) respondents. Ning is available to 500 (35.4%) respondents but not available to 912 (64.6%) respondents. Twoo is available to 482 (34.1%) respondents but not available to 930 (65.9%) respondents. Also, Slideshare is available to 658 (46.6%) respondents but not available to 754 (53.4%) respondents. Others follow suit On the whole, it can be established from the findings that intelligent tutoring systems are not available to secondary school teachers in Kwara State.

Table 3. Available ITS application software available for instruction.

S/N	Questionnaire Item	N	Available%	N	Not Available%
1	Zosmat	5	0.03%	145	96.66%
2	Assistment	11	0.07%	149	99.33%
3	AutoTutor	16	10.66%	134	89.33%
4	e Teacher	25	16.66%	125	83.33%
5	Toppr	6	4.00%	144	96.00%
6	Alta	17	11.33%	133	88.66%
7	Why2-Atlas	23	15.33%	127	84.66%
8	Methodology	35	23.33%	115	76.66%
9	Realise IT	18	36.00%	132	88.00%
10	REALP	13	8.66%	137	91.33%
11	ActiveMath	8	5.33%	142	94.60%
12	SmartTutor	36	24.0%	114	96.00%
13	EER-Tutor	24	16.00%	126	84.00%
14	ESC101-ITS	29	19.33%	121	80.66%
15	COLLECT-UML	19	12.66%	131	87.33%

3.2. Research Question Two: What are the ITS Application Software Accessible for Instruction Among Secondary Schools Teachers?

Analysis of ITS application software accessible for instruction among secondary schools teachers is presented in **Table 4** with a grand mean score of 0.43. The majority of the secondary school teachers do not have access to any of the ITS. Based on the dichotomous scale of 0.50, the results revealed that secondary school teachers do not have access to ITS since the grand mean value is less than the bench dichotomous value. Research question 3 investigates the level of ITS utilization for instruction among secondary schools teachers.

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Table 4. Distribution by mean**.**

S/N	Items	Sum	Mean	Std. Deviation
1	Zosmat	150	.17	.015
2	Assistment	150	.30	.046
3	AutoTutor	150	.44	.074
4	e Teacher	150	.35	.048
5	Toppr	150	.49	.07
6	Alta	150	.35	.047
7	Why2-Atlas	150	.20	.050
8	Methodology	150	.14	.043
9	Realise IT	150	.31	.048
10	REALP	150	.39	.049
11	ActiveMath	150	.24	.037
12	SmartTutor	150	.33	.054
13	EER-Tutor	150	.45	.073
14	ESC101-ITS	150	.32	.076
15	COLLECT-UML	150	.25	.036
	Grand mean		**0.43**	

3.3. Research Question Three: What is The Level of Its Application Software Utilization For Instruction Among Secondary Schools Teachers?

Table 5 reveals clearly that item 6 has the highest mean value of 0.32, meaning that using the ITS application allows me to achieve my lesson objectives.

Table 5. ITS application software accessible for instruction among secondary schools teachers.

S/N	Items	Sum	Mean	Std. Deviation
1	I make use of Assistant to arouse students' interest	150	0.00	.00
2	I can access ITS application using my computer	150	0.05	.21
3	Using Realise -IT for instruction saves time	150	0.28	.20
4	Using ITS application allows me achieve my lesson objectives	150	0.32	.09
5	ITS application is really necessary in teaching my subject	150	0.26	.04
6	ITS application when utilised for instruction, it stimulates learning	150	0.32	.18
7	I make use of Smart Tutor for instruction in the classroom	150	0.00	.08
8	Giving instruction using ITS application does not require highly developed skills and strategies	150	0.29	.14
9	I enjoy using ITS application to arouse learners' interest	150	0.19	.07
10	I make use of eTeacher for my teacher	150	.15	.05
	Grand Mean		0.20	

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This was noted to be followed by the mean score of 0.29 against the statement that giving instruction using ITS application does not require highly developed skills and strategies. The respondents also believed that Using Realise -IT for instruction saves time having a mean score of 0.28. Furthermore, it was revealed that ITS application is really necessary for teaching my subject with a mean score of 0.26. This was closely followed by a mean score of 3.19 against the statement that I enjoy using ITS application to arouse learners' interest. However, item 10 which revealed that I make use of eTeacher for my teacher had a mean score of 0.15.

On the general note, the grand mean score for the level of ITS application software utilization for instruction among secondary schools teachers were 0.20. Using 2.5 as the bench mark, it could be deduced that level of ITS application software utilisation for instruction among secondary schools teachers was very low.

3.4. Research Question Four: What are the Reaction of Teachers Towards the Utilisation of ITS Application for Instruction?

Table 6 reveals clearly that item 1 has the highest mean value of 3.97, meaning that using ITS application gives room for effective instruction. This was noted to be followed by the mean score of 3.70 against the statement that the respondents wish that ITS application be introduced at all levels of education. The respondents also believed that ITS application arouses students' interest to learn better having a mean score of 3.74. Furthermore, it was revealed that the respondents will recommend ITS application to other teachers in other schools with a mean score of 3.61. This was closely followed by a mean score of 3.50 against the statement ITS application allows teachers to get immediate feedback from learners. However, item 10 revealed that the respondents will make use of ITS application to improves teachers' technical skills with a mean score of 3.39.

Table 6. Distribution by mean.

S/N	Items	Sum	Mean	Std0. Deviation
1	The use of ITS application gives room for effective instruction	150	3.97	0.72
2	I wish that ITS application be introduced at all levels of education	150	3.70	0.71
3	I will be willing to give a workshop on ITS application to my colleagues in other schools	150	3.44	0.60
4	ITS application is one of the best teaching aids.	150	3.35	0.49
5	ITS application is really necessary in teaching my subject	150	2.99	0.54
6	ITS application gives room for individualised learning	150	2.65	0.48
7	ITS application allows teachers to get immediate feedback from learners	150	3.50	0.58
8	ITS application arouses students' interest to learn better	150	3.74	0.64
9	I will recommend ITS application to other teachers in other schools	150	3.61	0.57
10	ITS application improves teachers' technical skills	150	3.39	0.55
	Grand Mean		**3.64**	

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On the general note, the grand mean score for the reaction of the respondents towards the use of ITS application software for instruction was 3.64. Using 2.5 as the benchmark, it could be deduced that reaction of the respondents towards the use of ITS application software for instruction was Positive.

3.5. Ho_1: There is No Significant Difference Between Male and Female Teachers' Levels of Utilization of ITS Instruction Application.

Table 7 shows that t (98) = 0.392, p = 0.352. This means that the stated null hypothesis was accepted. This was as a result of the t-value of 0.392 resulting in a 0.352 significance value which was greater than the 0.05 alpha value. By implication, the stated null hypothesis was established thus: there was no significant difference between male and female secondary school teachers' use of ITS application software for instruction.

Table 7. Significant difference between male and female teachers' level of utilization of ITS instruction application.

Gender	No	X	SD	Df	T	Sig. (2-tailed)
Male	86	2.71	0.584	148	0.932	0.352
Female	64	2.64	0.62			
Total	150	2.62				

3.6. Ho_2: There is no significant difference in teacher's reaction toward the utilisation of ITS application for instruction based on gender.

Table 8 shows that t (148) = 0.832, p = 0.452. This means that the stated null hypothesis was accepted. This was as a result of the t-value of 0.832 resulting in a 0.452 significance value which was greater than the 0.05 alpha value. By implication, the stated null hypothesis was established thus: there was no significant difference between male and female secondary school teachers' reaction towards the use of ITS application software for instruction.

Table 8. Significant difference between male and female teachers' reaction towards the utilization of its instruction application.

Gender	No	X	SD	Df	T	Sig. (2-tailed)
Male	86	2.61	0.524	148	0.832	0.452
Female	64	2.54	0.52			
Total	150	2.62				

4. DISCUSSION

The availability of intelligent tutoring systems for secondary school teachers was investigated using research question one. The percentage score established that most of the intelligent tutoring systems are not available for secondary school teachers for teaching in the Ilorin metropolis. Intelligent Tutoring Systems are not readily available for teaching in Imo State the author further revealed that in developing countries like Nigeria, such problems as identified in the educational system include but not limited to the following: Lack of equipment, overcrowding of learning environment, Lack of skilled Man Power, epileptic power supply, constantly evolving educational policies hinder the availability of ITS in Nigeria Secondary Schools.

The study also confirms the previous study whose study revealed that the use of information and communication technology is still at an early age of development and

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implementation. The author further noted that while the pace was slow in other instances, in some there was a faster absorption rate to the extent of some schools developing electronic content for their teaching and learning. Other research proved that lack of infrastructure facilities is one of the many causes of poor integration of ITSs in schools. Hence, there is a dearth of study to contradict this present finding.

Secondary school teachers' access to intelligent tutoring systems was examined using research question 2. The result of the percentage score established that secondary school teachers do not have access to ITS. The lack of basic ICT skills was mitigated by having already set up computers and peer support. Internet users in South Africa faces serious hurdle setting up their devices for internet access and required a combination of tutorials and user group to reach web application.

Secondary school teacher's reaction towards the use of ITS for teaching was examined using research question 4 and hypothesis 2. The results of the mean score indicate that teacher's attitude towards the intelligent tutoring systems was positive. Also, the result of the hypothesis formulated indicated that no significant differences exist between male and female teachers' reactions towards the use of ITS for teaching in the Ilorin metropolis. This finding contradicts the findings of Kleen and Glock, (2004) whose study revealed that males had more favorable attitudes toward computers than female students. This is because male students manifested their desire to change traditional learning methods with better information and communication technology. The findings of this study also contradict the previous findings of Hwang and Lee, (2018) found that females exhibited negative attitudes towards computers. There are dearths of studies to support this finding.

The influence of gender on the level of utilization of Intelligent tutoring systems was examined using hypothesis 2. This finding indicates no significant difference between male and female secondary school teachers' use of ITS application software for instruction. These whose findings indicates that females possessed less experience of computer usage than males. The findings also contradict the previous findings who reported that college male students held similar efficacy beliefs for traditional male occupations whereas female students had high efficacy beliefs for positions traditionally held by women but low self-efficacy for positions traditionally held by men. These findings consistently showed that boys were more likely to be engaged in extracurricular activities with computers, such as using a computer at home and play computer games. It is also indicated that stereotypical male images found in computing magazines acted as deterrents for female involvement in technologies. Gender and ICT interact in complex ways but in the aggregate, females are much less likely to participate in ICT courses, careers, and leadership. That gender inequity persists both in access to and experience of learning opportunities with ICT.

5. CONCLUSION

The result obtained from the data gathered and analyzed in this study indicated that the majority of the teachers do not have access to ITS for teaching as a result of the unavailability of the tools for teaching. The study also showed that there was no significant difference in male and female secondary school teachers in their utilization of ITS for teaching. The study showed that there was no gender barrier or gap as far as the usage of ITS is concerned. Based on the findings and conclusion of this study, the following recommendations were made:

(i) Male and female teachers are to redirect their focus on the utilization of ITS for teaching.
(ii) All teachers should be encouraging the utilization of ITS for academic purposes not to allow hindering their concentration in the classroom.

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(iii) School administrators should ensure adequate power supply and internet facility for easy access and utilization of ITS for teaching.
(iv) Secondary school teachers should also help themselves by utilizing the ITS majorly for teaching as improper use could lead to distraction, which in return affects their teaching.

6. AUTHORS' NOTE

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

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