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SCIENCE TEACHERS' PERCEPTIONS ON AVAILABILITY AND UTILIZATION OF ICT RESOURCES IN SECONDARY SCHOOLS IN JALINGO EDUCATION ZONE, TARABA STATE, NIGERIA

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ABSTRACT

The purpose of the study was to investigate science teachers' perceptions on availability and utilization of ICT resources in secondary schools, in Jalingo Education Zone, Taraba State, Nigeria. Nine research questions guided the study. The study adopted the descriptive survey design. The population of the study comprised 1,084 teachers and 76 principals/Vice principals. A sample of 232 students was selected through simple random sampling. The instrument for data collection was a self-constructed questionnaire. The instrument was validated by three experts and pilot tested using Cronbach Alpha correlation co-efficient and it yielded a reliability co-efficient of 0.83. The data collected from the administered questionnaire was analysed using mean, standard deviation and Pearson Moment Correlation. The findings revealed that there is low level of availability and utilization of ICT resources for science teaching.The findings revealed that availability and utilization of ICT resources have high impact on students' academic achievement.The findings revealed that there is a low level of utilization of ICT resources by both male and female science teachers; andexperienced and inexperienced science teachers. The findings also revealed that there is a high and positive relationship between availability and utilization of ICT resources among science teachers; but an insignificant positive relationship between availability and utilization of ICT resources based on gender and teaching experience. It was recommended amongst others that government and school administrators should make adequate ICT tools and ensure more ICT utilization is encouraged at the secondary school level irrespective of science teachers' gender and teaching experience.

Keywords: Availability, Utilization, ICT resources, Science teachers, Gender, Teaching experience.

Introduction

The institutions of learning mostly the tertiary and in few cases the post-primary have invested in Information and Communication Technologies (ICT) in the school system during the last two decades. ICT have impacted the teaching-learning process positively in the context of organization and the teaching and learning procedures in the classrooms (Wilson, Tete-Mensah & Boateng, 2014). One puzzling question is how effective are these technologies utilized in science classrooms and its impact on student's achievement and retention in different subjects. Some researchers have tried to answer this question at the theoretical and the empirical levels. Some of these researchers (Jack & Songo, 2020; Ifeakor; 2018;Itighise, 2016;Nwana, Ofoegbu & Egbe, 2017; Okoli, & Osuafor, 2018; Waiganjo, 2021) whose results revealed that many of the ICT resources needed for Science teaching are not available and those available are inadequate; and Itighise and Babayemi (2018) whose results revealed adequacy but poor utilization; but there exists a gap on secondary school Science teachers perceptions in the study area (Jalingo Education Zone, Taraba State). Researchers are still faced with two main difficulties in trying to answer the questions based on effectiveness of Technologies and students' performance. On one hand is that student's performance is hard to observe and there is still confusion about its definition. On the other hand, ICT are evolving technologies and their effects on academic achievement are difficult to isolate at instance from the child's immediate classroom environment.

But, as opined by Gebhardt, Thomson, Ainley and Hillman, (2019), ICT have significantly changed how people interact with each other, and the ways people live and work around the world.

In today's world, the use of ICT in teaching at the secondary schools could be help to improve students' performance in the basic science subjects. The adoption and application of ICT in teaching of the basic science subjects in secondary schools has come to occupy an important place in the education sector and national development and, indeed the development of the world. ICT as opined by Ameen, Adeniji and Abdullahi, (2019) is an instrument par excellence that a nation can rely upon to bring about self-reliance in an educational system.The use of ICT in teaching of school subject like the basic science subjects in secondary schools today, one can communicate in different ways using power points, spread sheets to present graphs of data from around the world. The use of ICT in teaching the basic science subjects in secondary schools, like any other devices is because of the ability or its capability to store large volumes of data, organize and analyze data accurately in other to produce quality information and which has been the rapidly expanding trend. Some of the ICT resources provided in the schools include computers, projectors, laptops, and TV. These facilities basically aid the students in learning abstract concept that they able not able to have in the real classroom situation.

Efficient use of ICT resources needs a good and conducive climate in secondary school classroom and the use of technology, and these can be achieved through appropriate motivational strategies by government. ICT resources contribute consequently to the global trend in towards producing a new generation of teachers who can successfully employ digital technologies (ICTs) for delivering educational services successfully. Training teachers in using ICT resources in the classroom appears to have had more success in science than in other subjects. But, the low availability and accessibility of ICT resources in teaching and learning coupled with the challenge of effective utilization by science teachers; hinders the spread of ICT technology in different schools; hence, teaching through ICT becomes ineffective (Jack & Songo, 2020). One of the major challenges facing the use of ICT resources is lack or inadequate ICT facilities that could be supplied to all schools. Like other developing countries as opined by Albinimi, (2016), teachers are also faced with the problem of integrating ICT in classrooms due to lack of ICT competencies, attitude and perceptions towards the use of ICT, limited motivation to use ICT resources, age, gender-related issues, teaching qualification and experience.

Many schools and organisations use computers to assess students and provide feedback in their different fields of learning, however, there is no sufficient data concerning the influence of teacher's gender (male or female) and teaching experience (experienced & inexperienced teachers) as regards availability and use of ICT resources which was filled by this present study. Also, investigation of secondary school teachers' knowledge on the use of ICT resources in the whole process of teaching and learning can be increase based on the practice and available ICT resources (Rashid & Francis, 2016). Also, effective utilization of ICT resources in secondary schools is also largely dependent upon the availability and accessibility of ICT resources.

Students' learning remains central in any academic achievement debate. ICTs provide a window of opportunity for educational institutions and other organizations to harness and use technology to complement and support the teaching and learning process. However, despite the enormous advocacy of ICT aided teaching and learning, investment and donation of ICT equipment to education, there is still challenge of compliance and utilization of ICT resources in teaching and learning in the classroom. The cause of concern is that

unless this problem is addressed, investment in the procurement and compliance of ICT in the schools in Taraba State will be a mirage. Some of the schools that have limited resources and are unable to adequately utilize them mostly due to lack of qualified teachers to handle such gadgets and lack of ample time for the practical aspect of the teaching activities. This has continued to reduce the efficiency of such materials in the teaching of the basic science subjects in secondary schools using ICT facilities. Another issue is the fact that it is only in some of the schools that ICT resources are available for teaching the Basic science subjects and the absent of these facilities hinders the smooth teaching of the subject in such school which affects the overall smooth teaching of the school in the under study. This may make secondary schools, fail to achieve its mission and to produce students who are ready for the higher education which is increasingly reliant on ICT aided generation and dissemination of knowledge. It is in view of this backdrop and gaps in the study area that the researchers were motivated to investigate the Science teachers' perceptions on the availability and utilization of ICT resources and its impact on students' academic achievement. The statement of the problem therefore is: "Will the availability and utilization of ICT resources by science teachers in secondary schools teaching-learning process help to improve students' academic achievement in the basic science subjects in Jalingo Education Zone, Taraba State?"

In order to proffer solution to the problem, the study aimed in assessing Science teachers' perceptions on availability and utilization of ICT resources and its impact on students' academic achievement in secondary schools in Jalingo Education Zone, Taraba State.

Research Questions

The following research questions guided the study:

1. What is the level of availability of ICT resources for Science teaching in Secondary Schools in Jalingo Education Zone, Taraba State?
2. What are Science teachers' perceptions on impact of ICT resources availability and students academic achievement in Secondary Schools in Jalingo Education Zone, Taraba State?
3. What is the level of utilization of ICT resources in Science teaching in secondary schools in Jalingo Education Zone, Taraba State?
4. What are Science teachers' perceptions on impact of ICT resources utilization and students academic achievement in Secondary Schools in Jalingo Education Zone, Taraba State?
5. What is thelevel of utilization of ICT resources between male and female science teachers' in secondary schools in Jalingo Education Zone, Taraba State?
6. What is the level of utilization of ICT resources between experienced and inexperienced science teachers' in secondary schools in Jalingo Education Zone, Taraba State?
7. What is the relationship between the availability and utilization of ICT resources in secondary schools in Jalingo Education Zone?
8. What is the relationship between the availability and utilization of ICT resources in secondary schools based on gender?
9. What is the relationship between the availability and utilization of ICT resources in secondary schools based on teaching experience?

Research Method

The descriptive survey design was used for this study; since is an efficient way of gathering data to help address the research questions through the use of questionnaire.

The study area is Jalingo Education Zone, Taraba State, Nigeria. The study area seems to be more developed and have more science teachers in secondary schools. There seems to be a gap of assessment of science teachers ICT

resources availability and utilization in the study area.

The population for the study comprises all Science teachers (2020/2021 academic session) in government secondary schools (senior) in Jalingo Education zone, Taraba State made up of three local government areas (Ardo-Kola, Jalingo & Lau). The zone has 38 government secondary schools with 1,084 teachers and 76 principals/Vice principals (PPSMB, 2020).

A sample of Two hundred and thirty-two (232) Science teachers was randomly selected from the Public Secondary Schools in the study area. Multi-stage sampling technique was employed in this study because it allowed the researcher to adequately cover every component of the study such as school type/location, gender and teachers qualification/experience. Firstly, simple random sampling technique was used to select one Education zone (Jalingo, made up of Ardo-Kola, Jalingo & Lau LGAs) from the nine Education zones in Taraba state; which served as the representatives of the entire population. Secondly, through purposive sampling, 30 schools were selected considering accessibility and science/science-related teachers available during the period of administration of the questionnaire. In order to avoid bias, only schools with science teachers and also offers the basic science subjects are considered fit for the study. The total sample of 232 Science teachers (127 males & 105 females) was used for the study.

The research instrument used in data collection was a structured questionnaire for respondents tagged "ICT Availability and Utilization Questionnaire (ICTAUQ).The instrument was designed by the researchers and consisted of two sections (A & B): Section A consisted of the essential bio-data of the science teachers; while Section B contains the items which would seek respondents' views and opinions, made of 32-items on ICT resources availability and utilization. The questionnaire was structured on a four-point Likert-type scale of Strongly Agree, Agree, Disagree and Strongly Disagree. This instrument was used simply because it can reach a large number of respondents within a short time. It will give them adequate time to respond to the items, offer a sense of security (confidentiality) to the respondents. Lastly, it was objective since there is no bias resulting from the personal characteristics. The units of analysis are availability of ICT resources, utilization of ICT resources, teachers' perceptions on availability and utilization of ICT resources and academic achievement, relationship between availability and utilization, and also considering gender (male or female Science teachers) and teaching experience as part of the variables used for the study. Science teachers whose years of service are equal or below 10 years are referred to as inexperienced teachers while those above 10 years are referred to as experienced teachers in this study.

Validation of instrument, ICTAUQ in this study would be the most important consideration in the selection and use of any testing procedure. In order to ascertain the validity of this instrument, it was presented to three experts for content and face validation, and were expected to thoroughly read through the instrument, make corrections regarding the relevance of the items as well as the clarity and comprehensiveness. The suggestions and corrections formed the basis and modification of the questionnaire items.

In order to establish the reliability of the instrument, pilot test was carried out to pre-test the research plan. This was done with a view to further validate and ensure that the instrument was suitable and the research is reproducible. A pilot test was carried out with 30 students in a secondary school outside the study area. The aim of the pilot test is to establish the reliability of the research instrument and workability of the research design and procedure. The questionnaire was administered and the Cronbach Alpha coefficient was used as it is the most accepted reliability test tool. This is because Cronbach Alpha coefficient takes care of items that are not scored dichotomously. Thus, the reliability

was computed using Cronbach Alpha correlation co-efficient and it yielded a reliability co-efficient of 0.83; which was considered good and reliable for the study.

The instrument (questionnaire) was administered to the sampled schools and after the completion of the responses; copies of the questionnaires were collected on the spot to ensure a 100% return rate. The data collected was analysed using mean, standard deviation and Pearson Moment Correlation to determine the availability and extent of utilization of ICT resources taking into consideration science teachers' gender and teaching experience. Means were used to answer research questions 1 to 6 while Pearson product moment correlation coefficient (r) was used to answer research questions 7 to 9 at 0.05 significant level. In determining the level of Availability and Utilization, Means equal to or greater than 3.00 (≥3.00) are high, means between 2.99-2.50 are medium, while means equal to or less than 2.49 (≤2.49) are low.

Presentation of Results

Answering Research Question One

What is the level of availability of ICT resources for Science teaching in Secondary Schools in Jalingo Education Zone, Taraba State?

The answer to research question one is presented in Table 1.

Table: 1 Mean Scores on level of availability of ICT resources for teaching as perceived by Science Teachers.

S/N	Level of availability of ICT resources for Science teaching in Secondary schools	N	Minimum	Maximum	Mean	Std. Dev.	Level
1	E-books as high-tech materials are available in the school	232	1.00	4.00	2.07	.869	Low
2	Electronic or marker Whiteboards are available for class lessons	232	1.00	4.00	1.81	.840	Low
3	Computers& printers are available for preparing/presenting lessons, Computer-based testing, and printing of educational materials.	232	1.00	4.00	2.32	.861	Low
4	Audio and video discs available for class lessons.	232	1.00	4.00	2.38	.825	Low
5	Slides for power-point presentations are available for class lessons	232	1.00	4.00	2.04	.833	Low
6	Internet and On-line educational tools are available to aid lessons.	232	1.00	4.00	1.90	.869	Low
7	Computer software programmes on basic science subjects are available for easy interaction in class.	232	1.00	4.00	2.19	.772	Low
8	Television/projectors are available for class lessons	232	1.00	4.00	2.24	.885	Low
	Grand mean	232			2.12		Low

Table 1 revealed that the mean scores of all items are low according to the means scores classification used for this study (less than 2.5 test-value) from a 4-points Likert scale. This shows that the Science teachers' response scores seemed to be in disagreement with the statements of all items on availability of the itemized ICT resources in secondary schools in the sampled secondary schools. Also the

grand mean score of all the items is 2.12. This suggests that level of availability of ICT resources for Science teaching in Secondary Schools in Jalingo Education Zone is low.

Answering Research Question Two

What are Science teachers' perceptions on impact of ICT resources availability and students academic achievement in Secondary Schools in Jalingo Education Zone, Taraba State?

The answer to research question two is presented in Table 2.

Table 2 Mean Scores on teachers perceptions on impact of availability of ICT resources and Students' Academic Achievement

S/N	Teachers Perceptions on Availability of ICT resources and Students' Academic Achievement	N	Minimum	Maximum	Mean	Std. Dev.	Remark
1	Available Computer soft ware will help make the teaching-learning process less cumbersome for the teachers& improves students' performance.	232	1.00	4.00	2.69	.770	Agree
2	Available ICT resource such as E-books/tools enables students learning abstract concepts easier & achieve higher.	232	1.00	4.00	2.67	.743	Agree
3	Available ICT resources such as Internet &On-line educational tools bring abstract concepts closer to the students for easy understanding.	232	1.00	4.00	3.21	.842	Strongly Agree
4	Students perform better as a result of the integration of available ICT resources such as slides & projectors in their lessons.	232	1.00	4.00	3.53	.850	Strongly Agree
5	Students can obtain better scores in exams when they are taught with available ICT resources & tested using CBT.	232	1.00	4.00	2.88	.748	Agree
6	Available ICT resources attract the interest of the learner for a better understanding of concepts & achievement.	232	1.00	4.00	3.28	.845	Strongly Agree
7	Available ICT resources helps to close the distance gab between the high, medium and low achiever learners.	232	1.00	4.00	3.18	.839	Strongly Agree
8	Available ICT resources motives and help change negative attitudes of learners and enhance their achievement.	232	1.00	4.00	3.25	.843	Strongly Agree
	Grand mean	232			3.09		Strongly Agree

Table 2 revealed that the mean scores of all items are greater than 2.5 (test-value) from a 4-points likert scale. This shows that the science teachers' response scores seemed to be in agreement with the statements of all items. Also, the grand mean score of all the items is 3.09. The mean scores of all items are high and teachers strongly agreed to all the items according to the means scores classification used for this study (greater than 3.0 test-value) from a 4-points Likert scale. This shows that teachers strongly agreed that availability of ICT resources to aid science teaching has high impact on students' academic achievement.

Answering Research Question Three

What is the level of utilization of ICT Resources in Science teaching in secondary schools in Jalingo Education Zone, Taraba State?

The answer to research question three is presented in Table 3.

Table 3 Mean Scores on Level of Utilization of ICT Resources for Science Teaching as Perceived by Science Teachers.

S/N	Level of ICT Resources utilization for science teaching in Senior Secondary schools	N	Minimum	Maximum	Mean	Std. Dev.	Level
1	I use E-books as high-tech materials to prepare & present my lessons.	232	1.00	4.00	1.69	.470	Low
2	I use Electronic or marker Whiteboards in class	232	1.00	4.00	1.70	.439	Low
3	I use Computers& printers for preparing/ presenting lessons, Computer-based testing, and printing of educational materials.	232	1.00	4.00	2.41	.420	Low
4	I use Audio and video discs to aid my lessons.	232	1.00	4.00	2.33	.507	Low
5	I use Slides for power-point presentations during class lessons.	232	1.00	4.00	1.34	.482	Low
6	I use internet and On-line educational tools to aid my lessons.	232	1.00	4.00	1.38	.456	Low
7	I use Computer software programmes for easy interaction during class lessons.	232	1.00	4.00	1.18	.396	Low
8	I use Television/projectors to aid my lessons.	232	1.00	4.00	1.25	.439	Low
	Grand mean	232			1.66		Low

Table 3 revealed that the mean scores of all items are low according to the means scores classification used for this study (less than 2.5 test-value) from a 4-points Likert scale. This shows that the Science teachers' response scores seemed to be in disagreement with the statements of all items on utilization of the itemized ICT resources in the sampled secondary schools. Also the grand mean score of all the items is 1.66. This suggests that level of utilization of ICT resources for Science teaching in Secondary Schools in Jalingo Education Zone is very low.

Answering Research Question Four

What are Science teachers' perceptions on impact of ICT resources utilization and students academic achievement in Secondary Schools in Jalingo Education Zone, Taraba State?

The answer to research question four is presented in Table 4.

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Table 4 Mean Scores on teachers perceptions on utilization of ICT resources for Science teaching and students academic achievement

S/N	Teachers Perceptions on ICT resources Utilization and Students' academic achievement	N	Minimum	Maximum	Mean	Std. Dev	Remark
1	Students understand abstract concepts better and achieve higher when such concepts are projected on a screen for them to see.	232	1.00	4.00	3.27	.854	Strongly Agreed
2	The use of ICT stimulates the interest of the learner of the lesson being taught and helps to improve students' performance.	232	1.00	4.00	3.29	.881	Strongly Agreed
3	The use of ICT resources increases the learners' interest and achievement in Science.	232	1.00	4.00	3.22	.790	Strongly Agree
4	Proper utilization ICT resources give students additional medium for effective learning and enhances achievement.	232	1.00	4.00	3.25	.764	Strongly Agree
5	The use ICT resources allow the teachers to cover broad teaching experiences within a shorter time-frame and students understand science concepts & achieve higher.	232	1.00	4.00	2.93	.637	Agree
6	The use of ICT resources helps the learning process faster for students who might be slow learners & helps to close the distance gab between the high, medium and low achiever learners.	232	1.00	4.00	3.04	.792	Strongly Agreed
7	ICT resources such as audio-visual aids help students to learn effectively and achieve higher.	232	1.00	4.00	3.00	.705	Strongly Agreed
8	ICT resources like internet and On-line educational tools help students from different parts of the world to learn science concepts and achieve better.	232	1.00	4.00	3.22	.721	Strongly Agreed
	Grand mean	232			3.15		Strongly Agreed

Table 4 revealed that the mean scores of all items are greater than 2.5 (test-value) from a 4-points likert scale. This shows that the science teachers' response scores seemed to be in agreement with the statements of all items. Also the grand mean score of all the items is 3.15. The mean scores of all items are high and the science teachers strongly agreed to all the items according to the means scores classification used for this study (greater than 3.0 test-value) from a 4-points Likert scale. This shows that teachers strongly agreed that utilization of ICT resources to aid science teaching has high impact on students' academic achievement.

Answering Research Question Five

What is thelevel of utilization of ICT Resources between male and female science teachers' in secondary schools in Jalingo Education Zone, Taraba State?

The answer to research question five is presented in Table 5.

Table 5 Mean Scores onthe level of utilization of ICT resources by Science teachers based on gender.

S/N	Level of utilization of ICT resources for Science teaching in Secondary schools based on gender	MALE N= 127 Mean	Std. Dev.	Level	FEMALE N= 105 Mean	Std. Dev.	Level
1	I use E-books as high-tech materials to prepare & present my lessons.	1.63	.499	Low	1.75	.501	Low
2	I use Electronic or marker Whiteboards in class	1.68	.439	Low	1.72	.441	Low
3	I use Computers& printers for preparing/ presenting lessons, Computer-based testing, and printing of educational materials.	2.39	.573	Low	2.43	.570	Low
4	I use Audio and video discs to aid my lessons.	2.36	.590	Low	2.30	.596	Low
5	I use Slides for power-point presentations during class lessons.	1.31	.420	Low	1.37	.417	Low
6	I use internet and On-line educational tools to aid my lessons.	1.40	.486	Low	1.36	.484	Low
7	I use Computer software programmes for easy interaction during class lessons.	1.21	.511	Low	1.15	.515	Low
8	I use Television/projectors to aid my lessons.	1.22	.540	Low	1.27	.544	Low
	Grand mean	1.65	.507	Low	1.67	.509	Low

Table 5 revealed that the mean scores of all items for both male and female Science teachers are low according to the means scores classification used for this study (less than 2.5 test-value) from a 4-points Likert scale. This shows that both the male and female Science teachers' response scores seemed to be in disagreement with the statements of all items on utilization of the itemized ICT resources in the sampled secondary schools. Also, the grand mean scores of all the items for the male and female Science teachers are 1.65 and 1.67 respectively; and the difference in the grand means is 0.02 which is quite negligible. This suggests that level of utilization of ICT resources in Secondary Schools in Jalingo Education Zone by both male and female science teachers is low.

Answering Research Question Six

What is the level of utilization of ICT Resources between experienced and inexperienced science teachers' in secondary schools in Jalingo Education Zone, Taraba State?

The answer to research question six is presented in Table 6.

Table 6 Mean Scores on level of Utilization of ICT resources by science teachers based on teaching experience.

S/N	Level of ICT Resources utilization for Science teaching based on teaching experience	Experienced teachers N= 143 Mean	Std. Dev.	Level	Inexperienced teachers N = 89 Mean	Std. Dev.	Level
1	I use E-books as high-tech materials to	1.77	.469	Low	1.61	.470	Low

	prepare & present my lessons.						
2	I use Electronic or marker Whiteboards in class	1.66	.500	Low	1.74	.455	Low
3	I use Computers& printers for preparing/ presenting lessons, Computer-based testing, and printing of educational materials.	2.45	.550	Low	2.37	.476	Low
4	I use Audio and video discs to aid my lessons.	2.31	.511	Low	2.35	.507	Low
5	I use Slides for power-point presentations during class lessons.	1.35	.472	Low	1.32	.472	Low
6	I use internet and On-line educational tools to aid my lessons.	1.43	.456	Low	1.33	.456	Low
7	I use Computer software programmes for easy interaction during class lessons.	1.19	.366	Low	1.17	.368	Low
8	I use Television/projectors to aid my lessons.	1.25	.429	Low	1.24	.421	Low
	Grand mean	1.68	.478	Low	1.52	.444	Low

Table 6 revealed that the mean scores of all items for both experienced and inexperienced science teachers are low according to the means scores classification used for this study (less than 2.5 test-value) from a 4-points Likert scale. This shows that both the experienced and inexperienced science teachers' response scores seemed to be in disagreement with the statements of all items on utilization of the itemized ICT resources in the sampled secondary schools. Also, the grand mean scores of all the items for the experienced and inexperienced science teachers are 1.68 and 1.52 respectively; and the difference in the grand means is 0.16 which is negligible. This suggests that level of utilization of ICT resources in Secondary Schools in Jalingo Education Zone by both experienced and inexperienced science teachers is low.

Answering Research Question Seven

What is the relationship between the availability and utilization of ICT resources in secondary schools in Jalingo Education Zone?

The answer to research question seven is presented in Table 7.

Table 7 Correlation Statistics of the availability and utilization of ICT resources

		Availability of ICT Resources	Utilization of ICT Resources
Availability of ICT Resources	Pearson Correlation	1	.804
	Sig. (2-tailed)		.000
	N	232	232
Utilization of ICT Resources	Pearson Correlation	.804	1
	Sig. (2-tailed)		.000
	N	232	232

*Correlation is significant at the 0.05 level (2-tailed).

From the Table 7, the result shows that the correlation between availability and utilization of ICT resources is r=.804, P=.000 (2-tailed) significant at 0.05 level of significance. This shows that there is a high positive relationship between availability and utilization of ICT resources among science teachers in

secondary schools in Jalingo Educational Zone.

What is the relationship between the availability and utilization of ICT resources in secondary schools based on gender?

Answering Research Question Eight

The answer to research question seven is presented in Table 8.

Table 8: Correlation Statistics of the availability and utilization of ICT resources based on gender.

Correlations

Gender			Availability of ICT Resources	Utilization of ICT Resources
Male	Availability of ICT Resources	Pearson Correlation	1	.085
		Sig. (2-tailed)		.941
		N	127	127
	Utilization of ICT Resources	Pearson Correlation	.085	1
		Sig. (2-tailed)	.941	
		N	127	127
Female	Availability of ICT Resources	Pearson Correlation	1	.170
		Sig. (2-tailed)		.073
		N	105	.105
	Utilization of ICT Resources	Pearson Correlation	.170	1
		Sig. (2-tailed)	.073	
		N	105	105

Correlation is insignificant at the 0.05 level (2-tailed).

Table 8 shows a moderate but positive relationship between availability and utilization of ICT resources by the male science teachers is r=.804 insignificant at p=.941 (2-tailed) at 0.05 level of significance. This shows that there is an insignificant positive relationship between availability and utilization of ICT resources among male science teachers in secondary schools in Jalingo Educational Zone.

Also, in Table 8 shows a moderate but positive relationship between availability and utilization of ICT resources by the male science teachers is r=.170 insignificant at p=.073 (2-tailed) at 0.05 level of significance. This shows that there is an insignificant positive relationship between availability and utilization of ICT resources among female science teachers in secondary schools in Jalingo Educational Zone.

The result therefore reveals that the relationship between the availability and utilization of ICT resources in secondary schools based on gender is insignificant.

Answering Research Question Nine

What is the relationship between the availability and utilization of ICT resources in secondary schools based on teaching experience?

The answer to research question eight is presented in Table 9.

Table 9 Correlation Statistics of the availability and utilization of ICT resources based on teaching experience.

Correlations

Teaching Experience			Availability of ICT Resources	Utilization of ICT Resources
Experienced	Availability of ICT Resources	Pearson Correlation	1	.021

Teachers		Sig. (2-tailed)		.764
		N	143	143
	Utilization of ICT Resources	Pearson Correlation	.021	1
		Sig. (2-tailed)	.764	
		N	143	143
Inexperienced teachers	Availability of ICT Resources	Pearson Correlation	1	.173
		Sig. (2-tailed)		.069
		N	89	89
	Utilization of ICT Resources	Pearson Correlation	.173	1
		Sig. (2-tailed)	.069	
		N	89	89

Correlation not significant at the 0.05 level (2-tailed).

Table 9 shows a moderate but positive relationship between availability and utilization of ICT resources by the experienced science teachers is r=.021 insignificant at p=.764 (2-tailed) at 0.05 level of significance. This shows that there is an insignificant positive relationship between availability and utilization of ICT resources among experienced science teachers in secondary schools in Jalingo Educational Zone.

Also, in Table 9 shows a moderate but positive relationship between availability and utilization of ICT resources by the male science teachers is r=.173 insignificant at p=.069 (2-tailed) at 0.05 level of significance. This shows that there is an insignificant positive relationship between availability and utilization of ICT resources among inexperienced science teachers in secondary schools in Jalingo Educational Zone.

The result therefore reveals that the relationship between the availability and utilization of ICT resources in secondary schools based on teaching experience is insignificant.

Discussion of Findings

Table 1 was on the level of availability of ICT resources for teaching in Secondary Schools in Jalingo Education Zone as perceived by Science Teachers. The respondents responses disagreed that: E-books as high-tech materials are available in the school; electronic or marker wwhiteboards are available for class lessons;computersand printers are available for preparing/presenting lessons; computer-based testing, and printing of educational materials; audio and video discs available for class lessons; slides for power-point presentations are available for class lessons;internet and on-line educational tools are available to aid lessons;computer software programmes on basic science subjects are available for easy interaction in class; and that television/projectors are available for class lessons. The findings therefore revealed that there is low level of availability of ICT resources for Science teaching in Secondary Schools of Jalingo Education Zone. This finding is in agreement with these researchers(Amedu, 2014; Faboya, 2015;Jack & Songo, 2020; Ifeakor; 2018;Itighise, 2016;Nwana, Ofoegbu&Egbe, 2017; Okoli, & Osuafor, 2018; Onwuagboke, Singh &Onwuagboke, 2014; Waiganjo, 2021) whose results reveals that many of the ICT resources needed for science teaching are not available and those available are inadequate; but contradictsItighise and Babayemi, (2018) finding of adequacy in ICT resources.

Table 2 was on science teachers' perceptions on impact of availability of ICT resources and Students' Academic Achievement. The respondents agreed that: available computer software helps to make the teaching-learning process less cumbersome for the teachersand improves students' performance; available ICT resource such as E-books/tools enables students learning abstract concepts easier and achieve higher; available ICT resources such as Internet andOn-line educational tools brings abstract concepts closer to the students for easy understanding; students perform better as a result of the integration of available ICT resources such as slides and projectors in their lessons;students can obtain better scores in exams when they are taught with available ICT resources and tested using CBT; available ICT resources attracts the interest of the learner for a better understanding of concepts and achievement; available ICT resources helps to close the distance gab between the high, medium and low achiever learners; and that available ICT resources motives and help change negative attitudes of learners and enhance their achievement. The study therefore revealed that availability of ICT resources for science teaching, have high impact on students' academic achievement. This finding agrees with Obayi (2013) who revealed that computer is utilized but not to a very large extent in mathematical computation of student results, and securing students academic records.The findings also supports Ameen et al. (2019); Jack and Songo, (2020) and Waiganjo, (2021) who revealed that though most schools lack ICT tools and the teachers lack ICT skills, but most teachers have the right attitudes.

Table 3 was on the level of Utilization of ICT resources for science teaching in Secondary Schools as perceived by Teachers. Majority of the respondents either disagreed or strongly disagreed that they use E-books as high-tech materials to prepare & present my lessons, they use Electronic or marker Whiteboards in class, they use Computers& printers for preparing/presenting lessons, Computer-based testing, and printing of educational materials, they use Audio and video discs to aid my lessons, they use Slides for power-point presentations during class lessons, they use internet and On-line educational tools to aid my lessons, they use Computer software programmes for easy interaction during class lessons, and that they use Television/projectors to aid my lessons. This suggests that there is a low level of utilization of ICT resources for Science teaching in Secondary Schools in Jalingo Education Zone. This findings agrees with previous researchers (Faboya, 2015;Jack & Songo, 2020; Ifeakor; 2018;Itighise, 2016;Itighise and Babayemi, 2018;Nwana et al. 2017; Okoli, & Osuafor, 2018; Onwuagboke et al. 2014; Waiganjo, 2021)) whose findings low level of ICT resources utilization.This finding also agrees with Obayi (2013) who asserted that the level of utilization of ICT was hindered by constraints of using computer in computing students' result in the two selected tertiary institutions in Enugu state.

Table 4 was on teachers' perceptions on utilization of ICT resources for Science teaching in Secondary Schools in Jalingo Education Zone. The respondents mostly agreed that:Students understand abstract concepts better and achieve higher when such concepts are projected on a screen for them to see; the use of ICT stimulates the interest of the learner of the lesson being taught and helps to improve students' performance; the use of ICT resources increases the learners interest and achievement in Science; proper utilization ICT resources give students additional medium for effective learning and enhances achievement; the use ICT resources allow the teachers to cover broad teaching experiences within a shorter time-frame and students understand science concepts and achieve higher; the use of ICT resources helps the learning process faster for students who might be slow learners and helps to close the distance gab between the high, medium and low achiever learners; ICT resources such as audio-visual aids helps

students to learn effectively and achieve higher and that ICT resources like internet;and on-line educational tools help students from different parts of the world to learn science concepts and achieve better. This showed that teachers strongly agreed that utilization of ICT resources to aid science teaching has high impact on students' academic achievement. The findings supports Waiganjo, (2021), whose result revealed that most teachers have the right attitudes and positive perceptions on the meaningful use of ICT in teaching and learning. The findings also supports the review on studies related to teachers' perceptions about ICT usage for teaching conducted by Venkataraman andManivannan, (2021), which revealed that the concept of attitude toward E-Learning is good but technology usage is poor.

Table 5 was on the level of utilization of ICT resources by science teachers based on gender. The respondents disagreed to the statement that science teachers:use E-books as high-tech materials to prepare and present my lessons; use Electronic or marker Whiteboards in class;use computers and printers for preparing/ presenting lessons,computer-based testing, and printing of educational materials; use Audio and video discsto aid my lessons; use slides for power-point presentations during class lessons; use internet and on-line educational tools to aid my lessons; use Computer software programmes for easy interaction during class lessons; and use Television/projectors to aid my lessons. It can therefore be concluded that there is a low level of utilization of ICT resources in Secondary Schools by both male and female science teachers with an insignificant difference. This finding is in agreement with these researchers (Ameen et al. 2019; Fomsi&Orduah, 2017; Yushau,& Nannim, 2020); whose results revealed no significant influence of gender on teachers level of utilization of ICT resources. But, contradicts Gebhardt et al (2019) and Onwuagboke et al. (2014) who posited that the extent of utilization of ICT resources in teaching and learning showed significant difference based on gender.

Table 6 was on the level of Utilization of ICT resources by science teachers based on teaching experience. The study revealed that both experienced and inexperienced science teachers:use E-books as high-tech materials to prepare and present my lessons; use Electronic or marker Whiteboards in class;use Computersand printers for preparing/ presenting lessons, Computer-based testing, and printing of educational materials; use Audio and video discs to aid my lessons; use Slides for power-point presentations during class lessons; use internet and on-line educational tools to aid my lessons; use computer software programmes for easy interaction uring class lessons; and use Television/projectors to aid lessons**.** This showed that the difference in terms of level of utilization of ICT resources in Secondary Schools by both experienced and inexperienced science teachers is negligible or insignificant. This finding is in agreement with Onwuagboke et al. (2014) who revealed that the mean difference between the experienced and inexperienced science teachers was found to be statistically insignificant; but contradicts Yushau, and Nannim, (2020)whose result showed a significant difference in ICT utilization means score between teachers based on teaching experience.

Table 7 revealed that there is a high and positive relationship between availability and utilization of ICT resources among science teachers in secondary schools in Jalingo Educational Zone. While Tables 8 and 9 revealed an insignificant but positive relationship between male and female science teachers which supported these researchers (Ameen et al, 2019; Fomsi&Orduah, 2017; Yushau,& Nannim, 2020); but, contradicts Gebhardt et al (2019) and Onwuagboke et al. (2014) who posited that the extent of utilization of ICT resources in teaching and learning showed a significant difference based on gender. The findings also showed an insignificant but positive relationship between the availability and utilization of ICT resources in secondary schools based on

teaching experience which supported previous work by Onwuagboke et al. (2014); but contradicts Yushau, and Nannim, (2020)whose result showed a significant difference in ICT utilization based on teaching experience.

Conclusion

From the findings of the study, it is concluded that there is low level of availability and utilization of ICT resources for Science teaching in Secondary Schools in Jalingo Education Zone.The availability and utilization of ICT resources have high impact on students' academic achievement.

The study also concludes that there is a low level of utilization of ICT resources by both male and female science teachers; and experienced and inexperienced science teachers. And, gender and teaching experiences were significant factors influencing the level of ICT utilization in science teaching. Also, no significant difference was found due to gender and teaching experience. But, the availability and utilization of ICT resources has significant influence on the academic achievement of secondary school students.

The study also concludes that there is a high and positive relationship between availability and utilization of ICT resources among science teachers; but there is also an insignificant positive relationship between male and female science teachers; and experienced and inexperienced science teachers on the availability and utilization of ICT resources in science classrooms.

Recommendations

The following are the recommendation from this study.

1. The government and school administrators should make adequate ICT tools and ensure more ICT utilization is encouraged at the secondary school level irrespective of science teachers' gender and teaching experience.
2. There should be regular sensitization programmes on the importance of using ICT resources as it facilitates students' learning and enhances students' academic achievement.
3. The government should make more ICT materials available for schools for its effective implementation in teaching and learning.
4. School administration should ensure that there is platform for continuous training of teachers on effective application on relevant skills of ICT in teaching and learning in Science classrooms.

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