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Availability and Utilization of information and Communication Technology on Academic Performance of Students in Public Senior Secondary Schools in Rivers State, Nigeria

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ABSTRACT

The study investigated perceived influence of availability and utilization of Information and Communication Technology facilities on academic performance among public senior secondary school students in Rivers State. The study adopted a descriptive survey research design. Two research questions were answered and two null hypotheses were tested at 5% level of significance. The population of the study comprised the entire public senior secondary school students in Senior secondary school three in Rivers State numbering 5,802. A sample size of 400 students was drawn from the population using stage sampling technique. The researchers developed instrument was used for data collection. The instrument was validated by the researchers' supervisor and two other experts in Department of Psychology, Guidance and Counselling of Rivers State University, Port Harcourt. The reliability coefficient of the instrument was determined through the test re-test method using Pearson's product moment correlation statistics which yielded a reliability coefficient of 0.88. The research questions were answered using mean and standard deviation scores while the hypotheses were tested using independent samples t-test. The result of the study revealed that availability and utilization of ICT facilities significantly influenced academic performance among public senior secondary school students in Rivers State and that their perceived influence differs based on gender. The recommendations among others was that Rivers State Government through its Post Primary School Board, and the Ministry of Education should endeavour to make adequate ICT facilities available to the public senior secondary schools in the State with special consideration for female students as the availability of ICT facilities is affecting their academic performance to a high extent.

Keywords: Information and communication technology, availability, utilization, facilities, academic performance.

INTRODUCTION

Academic performance is a crucial scholastic outcome in contemporary schools. It pertains to the extent to which students are able to put the knowledge, skills and values that they gain into meaningful use. Academic performance is the basis for decision making about the welfare of students in most secondary schools. Academic performance as a phenomenon of interest encases the intensity and extensity of students' success in school through various educational levels. It is how well a student is able to demonstrate that learning has taken place. It can also be construed as the output of concerted scholastic inputs overtime.

It is worthy of note that academic performance is an indicator of the mastery of the subject matter in schools. Teachers and other school officials normally grade success with the use of class overall performance, graduation scores, and results from standardized tests (Ahmodu et al., 2018). Akomolafe and Adesua (2016) advanced that academic performance which is translates to academic achievement encompass student's grades, honors, awards, active results and opinions that show their educational prowess, engagement in student lifestyles, contributions to their community and resilience. Formal tests, quizzes, and examinations are the traditional strategies for assessing students' academic performance. Students' academic performance is believed to be influenced by several factors among which are: college students' learning strategies, peer pressure, teachers 'strategies, and learning infrastructure (Antoine, 2015). Suffice it to state that academic performance hinges on plethora personal and situational factors.

Academic performance among senior secondary school students in Rivers State remains of high interest to concerned individuals and institutions in the State. This is so because more often than not, it serves as the basis for selection, placement, demotion, promotion and offering of scholarships and awards to schools and students in the State. Over the years, there has been a paradigm shift in teaching and learning in Rivers State. Advancements in science and technology have given rise to the use of Information and Communication Technology (ICT) Facilities for teaching and learning. Information and Communication Technology Facilities such as computers, smart phones, electronic books, electronic libraries, speakers, subscriber identification module (SIM) cards, mouse, key boards, modems, flash drives, projectors, etc can enhance the academic performance of students as they provide them with symbolic models, phonemic transcriptions, digital dictionaries and other packages that foster individuality, creativity critical thinking among the students.

Corroboratively, Dawes (2011) averred that ICT facilities can enhance teaching and learning through its dynamic, interactive and engaging contents and it may provide real opportunities for individualized instruction. ICT facilities have the potentials to accelerate, enrich and deepen skills, motivate and engage students in learning. They can also help to relate school experiences to work practices, create economic variability for tomorrow workforce, strengthen teaching and learning and provide opportunities for connection between the school and the world. Hence, with the use of Information and Communication Technology (ICT) facilities in teaching and learning in line with international best practices, there is renewed interest in the underlying mechanics and dynamics of academic performance among students (Yushall cited in Adenuga et al., 2011).

Positive efforts are being made by the different tiers of government, the Local, the State and the Federal government in Nigeria to integrate and promote the use of ICT facilities in teaching and learning to foster the academic performance of Nigerian students through various support systems such as school Net Project (Adenuga et al., 2011). However, it is pertinent to note that a lot of ICT facilities are still not available in schools; and the ones available are not usually well utilized (Murat, 2012).

It is worthy of note that availability of ICT facilities deals with the extent to which ICT facilities are present or within reach. Despite the giant strides made to provide schools with ICT facilities, it is common knowledge that such facilities are not readily available in secondary schools within Rivers State and this can influence the academic performance of the students; hence the need for this study.

Most schools where the ICT facilities are available in Rivers State have another problem to tackle; and that is the issue of utilization. Utilization of ICT facilities is a growing cause of concern in the secondary schools in Rivers State. Some schools literarily use available ICT facilities to decorate classrooms and offices. They rarely use such facilities for teaching and learning and this can influence the academic performance of the students as it deprives them of meaningful learning opportunities as well as inhibits their digital exposure. Waziri (2006) disclosed that the major challenges behind utilization of ICT facilities in schools include; inadequate electricity supply, inadequate ICT facilities, lack of technical support, high cost of ICT facilities, poor incentives, poor internet connectivity and lack of teacher confidence on the use of these ICT facilities.

Basri et al. (2018) studied impact of availability as a set back to ICT adoption for better academic performance: Evidence from Saudi Universities. By using a quantitative research approach and a sample size of 1000 students, statistics was collected about the ICT adoption in universities and the relative performance of students belonging to four Saudi universities. Structure equation modelling

was selected to determine the validity of the research model. The Analysis of Moment Structures (AMOS), specifically used for structural equation modelling and direction evaluation, was used as the research instrument. The finding revealed that there exists a relationship between ICT adoption and educational performance in a conservative environment. An additional finding also indicated that ICT adoption resulted in the development of the performance of girl students more than the male.

Hashemi et al. (2022) studied gender differences on the reputation and limitations of ICT use in English language learning: Students' perspectives in Takhar University, Afghanistan. A quantitative research method was utilized and a total of 152 respondents answered the questionnaires. The findings of the study indicated that the individuals held fantastic perceptions in terms of the use of ICT in mastering the English language at Takhar University. In addition to that, the study found out that the commonplace barriers to the availability and usage of ICT are the inadequacies in many factors inclusive of net/Wi-Fi, electricity, technological gadgets, ICT infra-systems, time and confidence in the usage of ICT, sufficient training and help. These were found to negatively affect the academic performance of students irrespective of gender.

Simoes et al. (2022) studied influence of availability of computers on students' academic success. With speedy-developing era, schools have to adapt and use technology continuously as a tool to develop. This study seeks to recognize the influence of laptop elements on college students' academic success. The researchers proposed a model on the effect of laptop attitudes, non-availability of computer learning environments, laptop learning motivations, computer confidence, computer use, laptop self-efficacy, loneliness, moms' training, mother and father' marital status, gender and circle of relatives length on educational fulfillment (AA). Boma et al. (2022) studied gender differences in utilization of information and communication technology among students in Library and Information Science for better academic performance. Information and communication technology is very critical for everyday life. It has received a whole lot of attention within the training region. It additionally incorporates person variations in its use and applicable capabilities. It is utilized in all aspects of life for distinct functions. The essential objective of the study was to analyze how male and female undergraduates of Library and Information Science of University of Port Harcourt make use of Information and Communication Technology for academic and amusement purposes. The study employed a descriptive survey studies design. The target population was made up of undergraduate students, from year 1 to year 4 of the Department of library and Information Science, University of Port Harcourt (2019/2020) session totaling 222. The study employed the simple random sampling technique. The study sample was 111 proportionally allotted amongst all undergraduate' university students of Library and Information Science Department. Questionnaire was used for information gathering, 222 copies of questionnaire were administered. The results were analyzed using mean (x) to answer the research questions while z-test was used to test the hypotheses at 0.05 level of significance. The study found out that there is an extensive gender gap in the usage of ICT for better academic performance among undergraduates. The findings revealed that girls use ICT facilities for educational purposes more than their male counterparts.

Qazi et al. (2022) studied gender differences in facts and communiqué era use and competencies: a systematic review and meta-evaluation. Even though records and verbal exchange technology (ICT) is crucial for everyday existence and has gained big interest in education and other sectors, it additionally carries gender variations in its use and relevant talents. This systematic assessment aimed at to investigating gender differences in ICT use and competencies for mastering via technology. A complete search of eight journal databases and a specific selection criterion was done to exclude articles to fit the researchers' exclusion standards. The researchers blanketed forty two peer-reviewed empirical publications and conference complaints published between 2006 and 2020. For a subsample of studies, the researchers achieved a small-scale meta-evaluation to quantify viable gender variations in ICT use and abilities. A random-effects version exposed a small and positive, yet no longer giant, effect size in favour of boys ($g = 0.17$, 95% CI [−0.01, 0.36]).

Chiao and Chiu (2018) studied the mediating effect of ICT usage on the relationship between students' socioeconomic status and achievement. Data from the 2012 East Asia Program for International Student Assessment (PISA) were used for the structural equation modeling estimations, drawing on the sample of 31,161 students. The outcomes showed that using ICT for records retrieval and social interaction could widen the success gaps as a result of versions in SES. The study also

observed that gender extensively moderates the positive relationship between college students' SES and ICT utilization for learning, in addition to social interaction. However, utilization of ICT facilities was found to be negatively linked to academic performance among students of high and low socioeconomic status.

Statement of the Problem

Academic performance among public senior secondary school students in Rivers State is at low ebb. And this is not only worrisome but also problematic given that academic performance is integral to their assessment and evaluation in the school and the larger society. There seems to be slight differences in the academic performance of the students along the lines of gender and parent's socio-economic status and this may not be unconnected to availability of ICT facilities and utilization of ICT facilities considering the fact that this facilities are designed in content and function to boost the academic performance of the students. To be concise, poor academic achievement among public senior secondary school students in Rivers State may be influenced by availability of technological facilities such as; desktop computers, televisions, laptops printers, digital camera, projector screen, scanner, internet, flash drive, computer laboratory, interactive white board and other ICT gadgets as such facilities are obviously lacking in most of the secondary schools in Rivers State.

Concomitantly, utilization of the aforementioned ICT facilities can influence academic performance among the students as they may not be beneficial when they are not utilized. Inspite of the distribution of ICT facilities by the State Government and Non-Organizational bodies to schools in Rivers State, it is painful and disdainful to note that most of such facilities are poorly utilized or not utilized at all in schools. This can as well influence academic performance as most exams are now ICT based. The problem of the study was to investigate the perceived influence of availability and utilization of ICT facilities on academic performance among public senior secondary school students in Rivers State.

Purpose of the Study of the Study

The purpose of the study was to investigate perceived influence of availability and utilization of ICT facilities on academic performance among public senior secondary school students in Rivers State: The specific objectives are to:

1. Investigate the extent of perceived influence of availability of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender;
2. Investigate the extent of perceived influence of utilization of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender;

Research Questions

The study was guided by the following research questions:

1. What is the extent of perceived influence of availability of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender?
2. What is the extent of perceived influence of utilization of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender?

Hypotheses

The following null hypotheses were formulated to further guide the study:

1. There is no significant difference in the extent of perceived influence of availability of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender.
2. There is no significant difference in the extent of perceived influence of utilization of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender.

METHODOLOGY

The study adopted a descriptive survey research design. The area of the study was Rivers State. The population of the study comprised the entire public senior secondary school students in Senior Secondary school 3 in Rivers State, numbering 5,802 (Source Rivers State Post Primary Schools Board, 2024). The least tolerable sample for the study as determined using Taro Yamane formulae was 374; however the sample was increased to 400 to guarantee better representation of the population. Stage random sampling technique was used in selecting the sample size of 400 from the public senior secondary schools in the three Senatorial Districts that make up Rivers State. The

technique ensured better representation of the senior secondary school students under investigation. The researcher developed instrument titled "Influence of Availability and Utilization of ICT Facilities on Academic Performance Scale" (IAUICTFAS) was used for data collection. The instrument was checked for face and content validity by the researcher's supervisor, and two other experts in the Department of Educational Psychology, Guidance and Counselling. The validators vetted the items in terms of relevance, appropriateness and suitability to the research objectives and questions. Their corrections and recommendations were considered in the final version of the instrument. The reliability coefficient of the instrument was determined with Pearson's product moment correlation statistic using test re-test method. Thirty (30) copies of the instrument were administered to a group of public senior secondary school students outside the target population and re-administered to them after an interval of two weeks. The initial and subsequent scores of the students were coded and correlated using Pearson's product moment correlation. The obtained reliability coefficient for the entire instrument was 0.88. To administer the instrument, the researcher established rapport with the respondents and explained why they needed to respond to the items sincerely and how they can do so correctly. The researcher employed the services of two research assistants who were properly trained about the administration and interpretation of the instrument. The copies of the instrument were administered to the students with permission of the participating school principals and teachers. After the administration of the copies of the instrument, the completed copies were retrieved on the spot. The research questions were answered using mean scores and standard deviation; while the hypotheses were tested using independent samples t-test at 0.05 level of significance. The mean rating for the scores of were distributed as follows (Very High Extent (VHE) 3.50 - 4.00 ; High Extent (HE) 2.50 - 3.40, Low Extent (LE) 1.50 - 2.40 ; and Very Low Extent (VLE) 0.00 - 1.40 .

DATA ANALYSIS AND PRESENTATION OF RESULTS

Research Question 1: *What is the extent of perceived influence of availability of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender?*

Table 1: Mean Score Analysis of the Extent to Which Availability of ICT Facilities Influence Academic Performance Based on Gender

S/N	Items	Male			Female		
		X	S.D	Result	x	S.D	Result
1.	Computer Set / Laptops are available in my school and this is affecting my academic performance	2.5	1.1	HE	3.7	1.2	VHE
2.	Printers are available and it affects my academic performance	3.5	1.0	VHE	3.3	0.3	HE
3.	Internet facilities are available and as such I can verify information online	3.0	1.2	HE	3.9	1.1	VHE
4.	Photocopying machine is available and it is affecting my academic performance	2.4	1.1	LE	3.6	1.2	VHE
5.	Interactive white board is available in my school and this is affecting my academic performance	3.5	1.0	VHE	3.6	1.2	VHE
6.	Projectors are available in my school; I don't struggle to see the board anymore	2.5	1.1	HE	3.9	0.1	VHE
7.	Fax machine is available and it is affecting my academic performance positively	3.0	1.2	HE	3.5	1.0	VHE
8.	Satellite disc is available and this is distracting me from studying	3.5	1.0	VHE	3.7	0.7	VHE
9.	Computer Lab is available; I now have some were to go and prepare for CBT tests	2.5	1.1	HE	3.4	1.0	HE
10.	Radio (Tape recorder) is available; I easily record and listen to myself during revisions	3.5	1.0	VHE	3.9	0.3	VHE
	Grand mean	**3.0**		**HE**	**3.7**		**VHE**

Table 1 above shows the extent to which availability of ICT facilities influence academic performance among public senior secondary school students in Rivers State based on gender. An overview of the table revealed that male students had a grand mean of 3.0 while the female students had a grand mean of 3.7. This shows that whereas availability of ICT facilities influenced academic performance among the male students to a high extent; it influenced academic performance among the female students to a very high extent.

Research Question 2: *What is the extent of perceived influence of utilization of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender?*

Table 2: Mean Score Analysis of the Extent to which Utilization of ICT Facilities Influence Academic Performance Based on Gender

S/N	Items	Male			Female		
		$\bar{X}$	S.D	Result	$\bar{X}$	S.D	Result
1.	I use Computer Set, Laptop, Printer, Scanner, etc. and it is affecting my academic performance	3.9	1.1	VHE	2.5	0.1	HE
2.	I always use the ICT facilities available in my school; I am not struggling to cope as a result of that.	3.5	1.0	VHE	2.5	1.2	HE
3.	I use them for learning and it is affecting my academic performance positively	3.2	1.2	HE	2.9	0.9	HE
4.	I use them to source for new information	3.1	1.1	HE	3.5	0.7	VHE
5.	I use them for verification purposes	3.9	1.1	VHE	2.7	0.3	HE
6.	Teachers use ICT tools during teaching; and this enhances our performance	3.5	1.0	VHE	2.6	0.5	HE
7.	I use ICT facilities for revision and is affecting my academic performance positively	3.2	0.2	HE	2.7	0.4	HE
8.	I use them to attempt past questions	3.1	0.5	HE	3.9	0.7	VHE
9.	I use ICT facilities for mock tests	3.2	0.7	HE	2.5	0.9	HE
10.	I use ICT facilities for personal development	3.1	1.1	HE	3.2	1.0	HE
.	**Grand Mean**	**3.4**		**HE**	**2.9**		**HE**

Table 2 above shows the extent to which utilization of ICT facilities influence academic performance among public senior secondary school students in Rivers State based on gender. An overview of the table revealed that the male students had a grand mean of 3.4 while the female students had a grand mean of 2.9. This shows that utilization of ICT facilities influenced academic performance among male and female students to a high extent.

H_{01}: There is no significant difference in the extent of perceived influence of availability of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender.

Table 5 Independent Samples t-test Analysis of the Mean Rating of the Influence of Availability of ICT Facilities on Academic Performance Based on Gender

Gender	N	Mean	Standard deviation	df	t-test	Sig.	Remark
Male	133	3.0	1.1	398	6.54	.000	Significant
Female	276	3.7	0.8				

The data in table 5 above shows the significance of the difference in the mean rating of the influence of availability of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender. An overview of the table revealed that the t-value of 6.54 was obtained with p-value of .000 which is less than 0.05 level of significance. Thus, the null hypothesis is rejected. The implication is that the influence of availability of ICT facilities on

academic performance among public senior secondary school students in Rivers State differs significantly based on gender.

$H_{0\ 2}$: There is no significant difference in the extent of the perceived influence of utilization of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender.

Table 7 Independent Samples t-test Analysis of the Mean Rating of the Influence of Utilization of ICT Facilities on Academic Performance Based on Gender

Gender	N	Mean	Standard deviation	df	t-test	Sig.	Remark
Male	133	3.4	0.9	398	5.62	.000	Significant
Female	276	2.9	0.7				

The data in table 7 above shows the significance of the difference in the mean rating of the influence of utilization of ICT facilities on academic performance among public senior secondary school students in Rivers State based on gender. An overview of the table revealed that the t-value of 5.62 was obtained with p-value of .000 which is less than 0.05 level of significance. Thus, the null hypothesis is rejected. The implication is that the influence of utilization of ICT facilities on academic performance among secondary school students in Rivers State differs significantly based on gender.

DISCUSSION OF FINDING

Influence of Availability of ICT Facilities on Academic Performance Based on Gender

The result of research question 1 and hypothesis 1 (Table 1 and Table 5) revealed that whereas availability of ICT facilities influenced academic performance among the male students to a high extent; it influenced academic performance among the female students to a very high extent. Furthermore the tables revealed that the influence of availability of ICT facilities on academic performance among public senior secondary school students in Rivers State differs significantly based on gender. This result suggest that female students tend to use ICT facilities more than male students to enhance their academic performance; thus when such facilities are unavailable their academic performance suffers serious set back. This result agrees with the finding of Basri et al. (2018) which revealed that ICT adoption resulted in the development of the performance of female students more than the male. The result however disagrees with the finding of Hashemi et al. (2022) which revealed that availability of ICT facilities negatively affect the academic performance of students irrespective of gender.

Influence of Utilization of ICT Facilities on Academic Performance Based on Gender

The result of research question 2 and hypothesis 2. (Table 3 and Table 7) revealed that utilization of ICT facilities influenced academic performance among male and female students to a high extent. It was further revealed that the influence of utilization of ICT facilities on academic performance among secondary school students in Rivers State differs significantly based on gender. Female students tend to be more active when it comes to the use of ICT facilities. This result agrees with the finding of Boma et al. (2022) which revealed that there is an extensive gender distinction in the usage of ICT for better academic performance among undergraduates of Library and Information Science and that girls use ICT facilities for educational purposes more than their male counterparts. The result equally support the finding of Qazi et al. (2022) which revealed that a random-effects version exposed a small and positive, yet insigniicant effect size in favour of boys.

CONCLUSION

Based on the findings of the study, study concluded as follows:

Information and Communication Technology (ICT) facilities are integral to academic performance among present day public senior secondary school students in Rivers State. The students need the ICT facilities to boost their vocabulary, learn right pronunciations, get and verify new information online and lots more. The academic performance of the students is affected by the availability and utilization of ICT facilities. Most of the ICT facilities that the students need to boost their academic performance are not readily available. Concomitantly, the few ICT facilities that are available are rarely utilized in

the teaching and learning. Furthermore, the extents to which these variables influence the academic performance of the students is moderated by gender. .

RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

1. Rivers State government through its Post Primary School Board and Ministry of Education should endeavour to make adequate ICT facilities available in the secondary schools in the State with special consideration for female students as the availability of ICT facilities had a high significant influence on their academic performance.

2 . Male senior secondary school students in Rivers State should endeavour to maximize their usage of ICT facilities for better academic performance.

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