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**ARTICLE**

- Demographic variables and students use of e-learning resources in public secondary schools libraries in Rivers State of Nigeria** 10  
C. N. Owate, M. Afolabi and P. C. Akanwa

*Full Length Research Paper*

# Demographic variables and students use of e-learning resources in public secondary schools libraries in Rivers State of Nigeria

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The applications of e-learning resources to studies, teaching and learning by both staff and students have been investigated. However, the provision of e-learning tools for stake-holders is a modern goal to improving as well as achieving the quality of educational system in the twenty first century is imperative. Students' demographic variables and the use of e-learning resources in selected public secondary schools in Rivers State as presented in this research has detailed expository facts. The impacts of age, gender, class level availability, accessibility, and human resources as independent variables in the use of e-learning resources were determined. Six research questions and hypotheses each were validated or invalidated depending upon the respondents results. Linear regression, t-test and multiple regression analyses were employed as statistical tools. It was discovered that there are immense influences of some demographic independent variables such as age, gender, availability, accessibility, and human resources in the use of e-learning resources in public secondary schools in Rivers State. Besides availability and accessibility were major contributors to the associated relationships in the use of e-learning resources. Equally needful are human resources and students' skills. There was contrast distinction between class level and other independent variables since it had no significant effect on the use of e-learning resources within the domain for public schools in Rivers State

**Key words:** Demographic variables, age, gender, class level availability, accessibility, multiple regression and e-learning resources.

## INTRODUCTION

The increasing prevalence of new technologies in our daily lives has affected most of socio-economic activities. This is partly because over the past decade, electronic-learning resources (e-learning) systems has drastically changed our beliefs, value, culture, religion and entire

way of life.

Thus, most relatively affected areas include commerce and industry, manufacturing process, social and education systems. It is obvious that in attempting to keep abreast with some of the new advances,

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acceptance and applications of these newly discovered technologies to teaching and learning has become imperative.

Philip (2003) opined that organizational ability to learn and subsequent applications of learnt concepts could determine its survival, progress, development and proper ranking of institutions in the world-wide global competitive markets. This type of growth in part could be dependent upon ability to quick response to changes and adaptation to new-found technology. The placement can be achieved through appropriate training of staff by use of appropriate information and communication technology (ICT) support system in teaching-learning. Bandele (2006) opined that e-learning library resource is a revolution that involves the use of tools such as computers, internet and other telecommunication technology in every aspect of human endeavour. Ofodu (2007) defined e-learning as electronic or computerized learning-devices that assist human and other interactive materials for a wide range of teaching and learning, and for public or personal uses.

Consequently, there has been a suggestion achieved by applying hierarchy of needs for the ICT integrations to teaching and learning in most educational systems. A well designed and constructed guide to the education and school authorities will definitely assist in planning and decision making process. Alexander (1998), Okebukola (2005) and Johnson (2007), stressed the fact that the traditional methods of managing education and transmitting knowledge and skills are rapidly becoming inadequate to deal with the accelerated changes in the educational system. They suggested that effective use of the wide writing facilities offered by ICT opens up unprecedented opportunities for researchers who agreed that e-learning resources-revolution is centered upon the main use of internet, computers and telecommunication technologies.

In most aspect of societal and human activities, Bandele (2006), Jimoh (2007) and Ofodu (2007) opined that the application of internet system is increasing. The systems are regarded as electronic super-high-way through which information can be transmitted, shared and applied for the benefit of mankind as earlier stated. The merits of the systems include fast processing time, huge handling capacity, and variety of information processing methods, well organized learning and teaching process that suites the current generation of learners, precision and accuracy. Therefore, since these electronic or computerized devices assist human through interactive techniques, it becomes imperative that they can be effectively applied as electronic-learning resources for teaching and learning as well as for socio-economic uses.

There is a gain-saying that the educational fields in most developing economy of Africa have been drastically affected by the growing influence of developed e-learning resources. It has made great and remarkable impacts

on educational performance and achievements, the quality of life, industries, economy, education, teaching, learning, and research in most African educational institution in general and Nigerian in particular. But most African educational system has comparatively fallen below acceptable limit. This is generally observable in the world ranking of such institutions (Olorunsola et al., 2011; Aribisala, 2006).

The use of e-learning resources in secondary school libraries has emerged as important tools invented in the 20th century to assist in the performance of some tasks which ordinarily proved difficult if carried out manually. This technology was developed and practiced in most western countries but today e-learning resources are extensively used in the developing countries of Africa especially Nigeria and South Africa. For the purpose of clarity and proper understanding of the importance of this study, it is imperative to explain the concept of e-learning.

Ojwang (2012) defined e-learning as the intentional use of networked information and communications technology in teaching and learning. The author further adds that the term e-learning comprises a lot more than online learning, virtual learning, distributed learning, networked or web-based learning. According to the author, the letter "e" in e-learning stands for the word "electronic". The author stated that e-learning incorporates all educational activities that are carried out by individuals or group working online or offline, and synchronously (students and teachers interact face to face) or asynchronously (students and teachers communicate through a media, for example internet) networked or stand-alone computers and other electronic devices.

According to Huynh et al. (2003), "e-learning refers to learning supported by web. It can take place inside classrooms as a support to conventional teaching such as when students work on the web during class." The authors states that, it can also take place in virtual classrooms, in which all coursework is done online and classes do meet face to face. Clark and Mayer (2003) on the other hand, define e-learning as instruction delivered via a computer that is intended to promote learning.

Sabol (2010) averred that e-learning method involves all forms of educational technology in learning and teaching. According to the author, e-learning is best described as training on a computer, using different mechanisms and forms of media. However, it is believed that e-learning is students developing knowledge, skills and understanding through the use of computer-based technologies.

The work of Mildred et al. (2010), on e-learning in secondary schools shows that students' use of e-learning resources in secondary school libraries enhances teaching and learning. The authors acknowledge that with the use of e-learning resources in the secondary school libraries teachers can effectively deliver their teaching activities through the e-teaching methods while students both on regular or part-time program can enjoy

the e-learning in their hostels and homes. Because of the usefulness of e-learning resources in teaching and research, there is urgent need for students in secondary schools in Rivers state to be knowledgeable and skilful in the use of these resources to enhance their academic performance.

Demographic variables that could influence the use of e-learning resources in secondary school libraries in Rivers State are student's gender, age, knowledge, availability, technical manpower resources, accessibility and attitude. The present research intends to examine such demographic variables by investigating their impact on library e-learning resources with particular interest to secondary school libraries in Rivers State.

### Statement of the problem

The use of e-learning resources in the performance of various activities in secondary school libraries is not easily adopted as an indispensable tool for teaching and learning. This is because in most secondary schools in Nigeria, there are no adequate skills, accommodation for classroom and study activities.

In most cases many of the schools have no libraries. Those with libraries have little or no e-learning resources and facilities, technical manpower, irregular power supply, maintenance culture and regular funds for their sustenance. The outlined problems have led to poor library management in most secondary schools thereby reducing its importance in the scheme of reading, teaching and learning culture. Besides, the secondary schools that have no library and e-learning resources have no alternative access to e-learning.

On the contrary, an international best practice in modern library requires e-learning resources as basic tools for teaching, learning and youth development within the global world system. In Rivers State of Nigeria, the secondary schools without library and e-learning resources are prone to lack quality and reliable information sources as most of their information may be outdated and irrelevant. Such secondary schools will equally lack knowledge of e-learning resources and facilities and their applications.

### Scope of the study

This part of the study includes students' demographic variables and their influence on the use of e-learning libraries resources in twenty selected public secondary schools in Rivers State. The choice of schools spread across the local government regions.

### Significance of the study

It is hoped that the result from this study when published will be of great and immense benefits to the

following educational establishments such as Federal and State ministries of education, secondary school management boards, school authorities, teachers, librarians, students, policy makers and public library institutions. The study also will assist both the federal and state ministry of education, secondary school management board and school authorities to be involved in the review of curriculum and provision of adequate libraries and e-learning facilities. Above all, the study will serve as a contribution to the existing body of knowledge on students' use of e-learning resources in secondary school libraries.

### Hypotheses

**Null hypotheses** are hereby proposed as the main technique for data analyses, and equally as the statistical tool for the study. All data collected for these purpose shall be subjected to significance, and t-test conducted at 95% confidence level for two-way test and at  $p > 0.05$ . The following hypotheses are being designed and formulated for the present study as guides to assess the strength of the evidence and data collated.

1. There is no significant relationship between the age of students and their use of e-learning library resources.
2. There is no significance relationship between the genders of students and the use of e-learning resources in secondary school libraries in Rivers State.
3. There is no significant impact between students' class on their use of e-learning resources.
4. There is no significant relationship between availability of ICT and students' use of e-learning resources in Rivers state secondary schools
5. There is no relatively significant difference in accessibility and students' use of e-learning library resources among the secondary schools in Rivers State.
6. There is no combined effect of availability, accessibility and skilled technical capacity of staff on the students' use of e-learning resources.

### Research design

This work was designed with principles of experimentation and survey verifications. Basically the design was a survey type that describes the state of e-learning resources in conjunction to students' demographic variables. The applications and use of e-learning resources within the framework of secondary schools in Rivers State by students was adopted.

The main purpose of this study was to determine t students' uses of e-learning resources in library and for teaching by Staff. Thus, the outlook of the design concentrated on three key areas namely e-library resources (infrastructure, skilled or experiences of staff/teachers), demographic variables of Students (age,

**Table 1.** Interpretation of data score points.

S/N	Degree of point	Interpretations	Symbols
1	4	Strongly agree	SA
2	3	Agree	A
3	2	Disagree	D
4	1	Strongly disagree	SD
5	10	Total	T

Decision mean point = 2.5. This is the assumed limit that validates our data.

gender, students' class, availability and accessibility) and inhibitors (challenges and utility). Therefore, these three key areas wasl combine to produce useful academic performance index.

This design was useful because it examined lack of knowledge of e-learning and its relative effect on the use of e-learning resources in secondary school libraries in Rivers State. It was organized to determine if lack of students' interest in the use of e-learning resources or the availability and accessibility of the resources were the major impediments. The chosen design method was based on behavioral response to changes with particular respect to the taxonomy of affective domain.

#### Area of study: Rivers State, Nigeria

Rivers State is one of the 36 States of Nigeria; its capital is Port Harcourt. Rivers State the Treasure Base of the Nation was created out of the formal Eastern Region in 1976. The state has 23 Local Government Areas namely: Ikwerre Local Government Area, Obio/Akpor, Port Harcourt City Local Government Area, Ahoada East, Ahoada West, Asari-Toru, Bonny, Degema, Etche, Gokana, Eleme, Okrika, Khana, Oyibo, Abua/Odual, Ogba-Egbema, Akuku-Toru, Ogu-Bolo, Emohua, Opobo-Nkoro, Andoni and Omuma Local Government Area. The state is bounded on the south by the Atlantic Ocean, to the North by Imo, Abia and Anambra States, to East by Akwa-Ibom State and to the West by Delta, Edo and Bayelsa States. Generally, the availability of these key industries in Rivers State compels one to have some knowledge of e-learning that should normally assist in acquiring new knowledge for the application of emerging technology

#### Population of the Study

The study consists of students from the forty (20) randomly selected from public secondary schools in twenty Local Government Areas in Rivers State. The populations of the study were 6,027. The distribution of the population in these secondary schools was for 2013/2014 academic session.

#### Sample and sampling technique

The data and reliable information were derived through the following techniques:

1. Observation of physical infrastructures for the implementation of e-learning resource program in a typical secondary school.
2. Interactive oral interview with principals or management staff of the school with a view to verifying the actual state of the e-learning library resources
3. Administration of questionnaire to both staff and randomly selected students for each school.

A self-designed questionnaire entitled "Project questionnaire for e-learning library resources in secondary schools" was used to collate data for the study. The questionnaire targeted availability of infrastructure, skilled teachers and adaptation of students to use of e-learning resources. The questions in the instrument were prepared on maximum ten-point scale structure (later converted to percentages).

The researcher reviewed the draft of the questionnaire and evaluation. The corrected copies of the questionnaire were administered by the researcher and some assistants. Standard sampling techniques as applied by Borg and Gall (1973) and Akobundu (2008) was employed. Thus, when the research population was below 1000 data points, twenty percent (20%) of the population was applied but for 5000 data points, ten percent (10%) and for 10,000, five percent (5%) of the population were used respectively. The study adopted stratified random sampling technique in selecting the sample. This sampling technique was considered appropriate based on the low error margin as confirmed by the observations of Isangedighi and Ogoamaka (1992). Table 1 indicates the usual interpretation of the collated data score points conversion.

#### METHODOLOGY

Standard statistical methods such as linear and multiple regressions Analysis (major), the Null hypotheses and t-test processing were employed in analyzing the data collated. The results obtained were applied to the research questions and proposed hypotheses for their verification. Linear regression analysis is a statistical process used for estimating the relationships among variables. Regression analysis estimates the expected output of the dependent variable given the independent variables. This implies that the mean results of the dependent variable when the independent variables are constant. Consequently, multiple regression analysis is widely used for predicting and forecasting events and function. Regression analysis is also used to understand the independent variables that are strongly related to the dependent variable, and to determine the forms of these relationships within the function.

#### RESULTS

The relevant questions for the use of e-learning library

resources were collated and quantified. Minimum of thirty (30) respondents were collected back from each of the schools.

Thereafter, the means, standard deviations  $\delta$  and variances of each item from each secondary school were statistically computed and recorded. It is important to state that the variance  $\delta^2$  which is the square of the standard deviations were equally noted. The quantified means of responses from thirty respondents for each school were taken with their standard deviations noted.

Other parameters were equally computed and presented in the relevant sections. The t-tests ( $t_{cal}$ ) were conducted at 95% confidence level for two-way test and at  $p > 0.05$ . The critical t-tests ( $t_{crit}$ ) for 98% confidence level at  $p > 0.02$  are equally performed. The various degrees of freedom are indicated at the relevant Tables at different sections.

Consequently, further statistical tools (Multiple regression analysis and SPSS VERSION 20) were employed to verify, validate and then applied for the interpretation of the associated relationships within the dependent and independent variables. The observations and data obtained are presented in Figure 1.

Apart from the remarks listed in Table 1, oral interview reports revealed that both students and staff lack motivations for use of e-learning resources. Also low-income for most professional staff prevented those having interest from owning personal computers or laptops that may have assisted service delivery and improved knowledge on usage. Most of the secondary schools agree that application of e-learning enhances teaching and learning, makes for large and easy coverage of the curriculum thereby increases competence and confidence of teachers thereby adding value to students knowledge and output. In addition, performance of students should normally increase. The bar charts in Figure 1 shows the level of accommodations and funding in place.

On the average, the provisions of accommodation for e-learning library resources are rated 3.0 for public institutions whereas funding is for public secondary schools in Rivers State. These ratings from this study are relatively low. Thus, they seem to posit lack of clear-cut policy and lack of funds. Also, lack of skilled man-power for facility repairs and lack of training and retraining of technical staff are serious challenges might be a problem.

### Application of t-test to null hypothesis

T-test is applied to research questions 1 to 5 for the purpose of establishing if there are some degrees of comparative relationships among the independent variables for the students' use of e-learning resources.

#### Null hypothesis 1

Null hypothesis 1 is based on the proposal that there is no significant difference between male and female

students concerning their use of e-learning library resources. The mean values for male and female in public schools are 3.2 and 3.0 respectively for males and females in the schools in Rivers State. The critical t-test values at 95 and 98% confidence levels for 31 degree freedom are approximately 2.05 and 2.47, respectively. The calculated or estimated t-test values for gender in secondary schools are 5.74. Therefore, null hypothesis 1 is rejected for public schools. This implies failure with respect to public schools because the mean values and variance did not certify the condition of equality for gender sensitivity.

In contrast, null hypothesis 1 passed within the private secondary schools domain. This implies that both means and variances for gender sensitivity have been certified. Significant differences exist in Rivers State public secondary schools with respect to gender difference whereas for private schools in Rivers State, there are no significant differences between males and female in the use of e-learning resources as predicted by t-test in Table 2.

Besides, Table 2 had indicated that public schools have similar effects of no influence with respect to gender. The present t-test precisely confirmed that difference in gender effects for the use of e-learning resources in public schools.

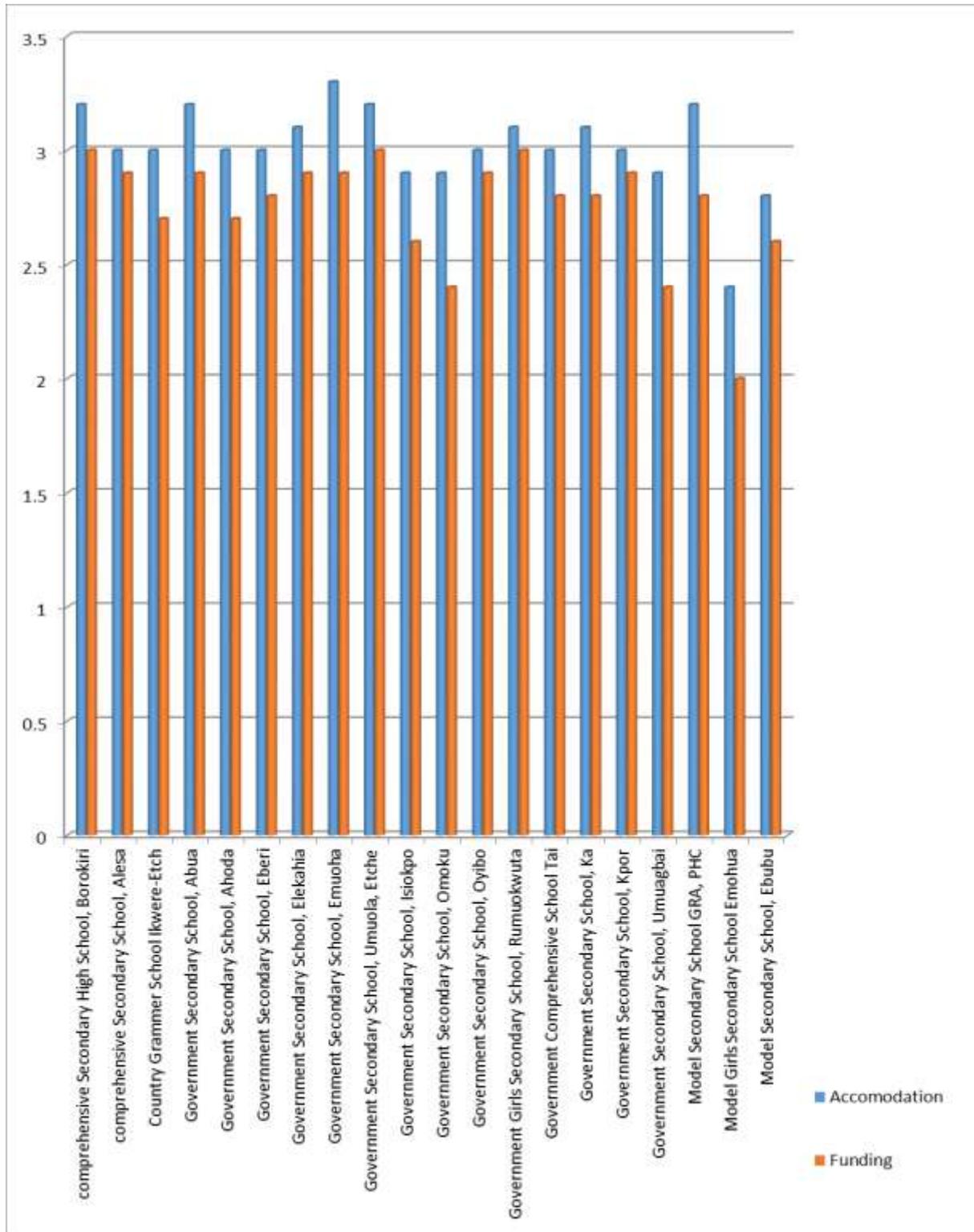
#### Null hypothesis 2

Null hypothesis 2 is based on the proposal that there is significance difference between the younger and older students on the use of e-learning library resources. The mean values for younger and older students in public secondary schools in Rivers State are 3.0 and 3.5, respectively. The critical t-test values at 95 and 98% confidence levels for 38 degree of freedom are 2.1 and 2.55 approximately. The calculated or estimated t-test values for the public secondary schools are 7.73.

Therefore, null hypothesis 2 in Table 3 is rejected for public. Therefore, significant differences exist in Rivers State public secondary schools with respect to age difference for schools in Rivers State. There is no significant difference between younger and older students in the use of e-learning resources as predicted by t-test in Table 3. Consequently, there are significant differences between the younger and older students in the use of e-learning resources as presented in Table 3 for public secondary schools.

#### Null hypothesis 3

In Table 4, null hypothesis 3 considered the proposal that there is no significant impact between SS 1 and SS 3 class students in the use of e-learning resources in their libraries. Their respective mean values are 3.1 and 3.2 respectively. The critical t-test values at 95 and 98% confidence levels for 38 degree of freedom are



**Figure 1.** The Bar Chart showing the variations of available accommodation and Funding for e-learning resources in public secondary schools in Rivers State.

approximately 2.10 and 2.55 respectively. The calculated or estimated t-test values for the public secondary

schools are 2.00. Therefore, null hypothesis 3 is accepted as true for public secondary schools in Rivers

**Table 2.** There is no significant difference between male and female students concerning their use of e-learning library resources.

Respondents	n	mean	$\delta$	Df	$t_{cal}$	$t_{crit}$	Remarks
<b>Students' use of e - learning resources</b>							
Male	16	3.2	0.1	31	5.742	2.048	Significant
Female	17	3.0	0.1				

\*Means that the critical value  $t_{crit}$  was taken at 98% confidence level.

**Table 3.** There is no significance difference between the students' age in their use of e-learning library resources.

Respondents	n	mean	$\delta$	Df	$t_{cal}$	$t_{crit}$	Remarks
<b>Students' use of e - learning resources</b>							
8 - 12 years	20	3.0	0.1	38	7.729	2.101	Significant
13 - 17 years	20	3.5	0.3				

\*Means that the critical value  $t_{crit}$  was taken at 98% confidence level.

**Table 4.** There is no significant relationship between class level of students and their use of such resources in their libraries.

Respondents	N	Mean	$\delta$	Df	$t_{cal}$	$t_{crit}$	Remarks
<b>Students' use of e - learning resources</b>							
SS 1	20	3.1	0.1	38	2.000	2.101	Not significant
SS 2	20	3.2	0.2				

\*Means that the critical value  $t_{crit}$  was taken at 98% confidence level.

**Table 5.** There is no significant relationship between availability of e-learning resources and students' use of such e-learning resources.

Respondents	N	Mean	$\delta$	Df	$t_{cal}$	$t_{crit}$	Remarks
<b>Students' use of e - learning resources</b>							
Availability	20	3.1	0.1	38	9.488	2.101	Significant
Non availability	20	3.0	0.2				

\* Means that the critical value  $t_{crit}$  was taken at 98% confidence level.

State. This means that it passed the conditions of equality of mean values and variances for class level. Therefore, no significant differences exist between the student's class level and her use e-learning resources. It is interesting to note that null hypothesis 3 passed within the public schools because other factors are equally important. This implies that both means and variances for level of class sensitivity factors are equal. Therefore, no significant difference exists for class structure in Rivers State public secondary schools. The use of e-learning resources as predicted by null hypotheses 3 and t-test results are in harmony.

#### Null hypothesis 4

Table 5 of null hypothesis 4 investigated the proposal

which states that there is no significant difference between availability and non-availability of e-learning resources. The mean values for availability and non-availability of e-learning resources in secondary schools of Rivers State are 3.1 and 3.0 respectively. The critical t-test values at 95 and 98% confidence levels for 38 degree of freedom are approximately 2.10 and 2.50 respectively. The calculated or estimated t-test values for the public secondary schools are 9.49. Therefore, null hypothesis 4 is rejected for public schools in Rivers State. This means that it failed the test with respect to the schools because of the mean values and variance. There is indeed significant difference between availability and students' use of e-learning resources in Rivers. Therefore, a significant difference exists in Rivers State public secondary schools with respect to providing e-learning resources and the knowledge acquired.

**Table 6.** There is no significant relationship between students' accessibility in their use of such e-learning resources.

Respondents	N	Mean	$\delta$	Df	$t_{cal}$	$t_{crit}$	Remarks
<b>Students' use of e - learning resources</b>							
accessibility of e-learning	20	3.2	0.10	38	3.26	2.101	Significant
Non accessibility to e-learning	20	3.0	0.02				

\* Means that the critical value  $t_{crit}$  was taken at 98% confidence level.

**Table 7.** Summary of findings on the proposed null hypotheses using the t-test method and linear regression method were conducted at 95% confidence level for two-way test and at  $p>0.05$ ).

Proposal no.	T-test		Linear regression	
Hypothesis	$t_{cal}$	$t_{crit}$	Remarks	Remarks
Null hypotheses 1	5.74	2.05	Significant	Significant
Null hypotheses 2	7.73	2.10	Significant	Significant
Null hypotheses 3	2.00	2.10	Not significant	Not Significant
Null hypotheses 4	3.16	2.10	Significant	Significant
Null hypotheses 5	9.49	2.10	Significant	Significant

### Null hypothesis 5

In Table 6, the mean values for accessibility and non-accessibility of e-learning resources in public secondary schools in Rivers State are 3.2 and 3.0 respectively. The calculated t-test value for the public secondary schools is 3.26 while the critical values were 2.10 and 2.55 at 95 % and 98 % confidence levels.

Thus, accessibility to e-learning resources is significant in public schools of Rivers State. This means that some students in public schools in Rivers State where some e-learning resources exist had low relative access to them. Therefore null hypothesis 5 is rejected for public schools. It implies that null hypothesis 5 has failed to certify the test condition with respect to public schools since the mean values and variance did not certify the condition of equality for accessibility difference sensitivity.

Table 7 which presents the summary of results obtained from both t-tests and linear regression for the Null hypotheses (1 to 5). It shows that for public secondary schools in Rivers State only one out of six proposed hypotheses passed.

Results from Null hypothesis 3 agree with the proposal of the researcher that no significant difference exists among class levels in the use of e-learning resources by secondary school students. This implies that class level and the capacity of skilled human resources are not factors that significantly influence the students' use of e-learning resources since the class levels give equal opportunities to students within the same class. It is definitely in this context of class-field that class level becomes an insignificant demographic variable for students' use of e-learning library resources.

Thus, use of e-learning library resources for enhancing

students learning in their secondary schools is imperative. It is therefore, suggested by results collated that age, gender, accessibility and availability have the capacity for exerting great influence in students' use of e-learning resources. They will certainly influence the applications of e-learning resources in public schools. These variables are considered to have significant impact upon the output knowledge acquired by both students and staff for using e-learning resources within the system.

### Application of multiple regression analyses

The statistical tool that will reveal the influence are applied to the processed data because it assists in defining the strengths of inter-relationships of independent variables applied.

In this regard, the dependent variable is students' use of e-learning for the purpose of acquiring knowledge and skills for the increasing technology. The independent variables are combinations of age, gender, class level, availability and accessibility that formed the core research question 6 and hypotheses 6.

This was further be explored and tested via multiple regression procedures. In this attempts, effort was additionally made to precisely predict the degree of influencing factors for the use of e-learning resources in secondary schools in Rivers State. These are hereby shown in Tables 8 to 14 and Figures 2 to 9.

The results of the correlation coefficients R for the provision of accommodation and Funding in secondary schools in Rivers State are shown in Table 8. Accommodation in schools recorded 0.122 with error

**Table 8.** Correlation coefficients for the provision of accommodation and Funding for secondary schools in Rivers State.

Type	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	STD error
Accommodation	0.122	0.015	-0.101	0.03
Funding	0.536	0.287	0.203	0.03

**Table 9.** ANOVA indicating sum of squares for accommodation and funding for schools in use of e-learning resources in Rivers State.

Variable	Sum squares		Mean squares		F		% Sig.		df
	Accomm	Fund	Accomm	Fund	Accomm	Fund	Accomm	Fund	
Regression	0.013	0.548	0.007	0.274	0.129	3.419	88	56	2
Residual	0.876	1.362	0.052	0.080					17
Total	0.889	1.909	-	-					19

**Table 10.** Durbin Watson parameters for the measure of correlation between accessibility and availability in the use of e-learning and provision infrastructure and skilled manpower.

Variable	Df 1	Df2	% Sig.	Durbin Watson
Availability	2	17	88.2	2.81
Accessibility	2	17	56.8	1.50

**Table 11.** Correlation coefficients for the measure of availability and accessibility with respect to students' use of e-learning resources in secondary schools in Rivers State.

Type	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	STD error
Availability	0.602	0.0363	0.068	0.08
Accessibility	0.473	0.0224	-0.135	0.02

**Table 12.** ANOVA model of sum of squares for the availability and accessibility with respect to Staffs' knowledge in the use of e-learning resources in secondary schools in Rivers State.

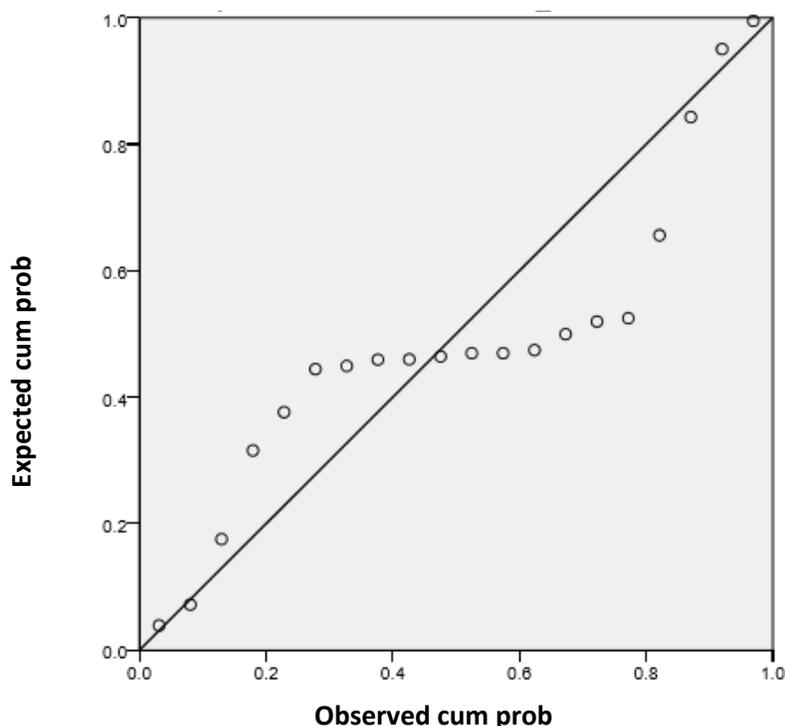
Variable	Sum. squares		Mean.S.Squares		F		% Sig.		df
	Availa.	Access	Availa.	Access	Availa.	Access	Availa.	Access	
Regression	0.053	0.094	0.009	0.016	1.232	0.624	32.1	75.9	6
Residual	0.093	0.326	0.007	0.025					13
Total	0.146	0.420	-	-					19

**Table 13.** Durbin Watson model for the measure of correlations accommodation and funding in the use of e-learning resources in secondary schools in Rivers State.

Variable	Df 1	Df2	% Sig.	Durbin Watson
Accommodation	6	13	35.1	1.75
Funding	6	13	71.0	1.39

**Table 14.** Summary of some data derived from multiple regression analyses using SPSS version 20 at 95% confidence level.

Variable	Durbin constant		Correlation constants		ANOVA analyses		Sum of squares		P-P plot	Histograms
	DNC	% sign	corr. C	Co. eff	F. VAL	% sign	F. val.	% sign		
Accomm.	1.75	35.1	0.122	0.03	0.129	88	0.624	71	Fair	Poor
Funding	1.39	71.0	0.536	0.03	3.418	56	1.232	35		
Available	2.81	88.2	0.602	0.08	1.233	32	0.059	10	Good	Good
Accessible	1.50	56.8	0.473	0.02	0.624	76	0.096	33		

**Figure 2.** Normalized p-p plot of regression residual for Students' Knowledge with respect to accommodation and Funding in public schools.

margin of 0.03 whilst funding schools have 0.536 with error of 0.03. In Table 9, Anova model of sum of squares, the F- values for accommodation and Funding schools are 0.129 and 3.419 respectively with significance percentages of 88 and 56.

The Durbin Watson correlation constants presented in Table 10 are 2.81 and 1.50 with significance of 88.2 and with 56.8% for availability and accessibility for schools in Rivers State. Figures 2 and 3 present the normal p-p plot of regression standardized residual (errors) for accessibility and availability for schools in Rivers State.

The Normalized p-p plot of regression residual for Students' Knowledge with respect to accommodation and Funding in public schools and that of availability and accessibility (Figures 2 and 3). They comparatively

indicate that students are aware of what were availability and accessibility, and that they are important parameters for the use of e-learning resources. This is because respondents' linear-fitted points in Figure 3 are relatively closely-related to the line than that of Figure 2.

This observation is confirmed in Figures 4 and 5 where the histograms of regression residuals for both students' and staffs' knowledge with respect to accommodation and Funding and availability and accessibility in public schools are clearly indicated. It was observed that availability and accessibility show a relatively normal uniform distribution pattern. The histograms for staffs' and students' knowledge against accommodation, funding, availability and accessibility for public schools in Rivers State are shown in Figures 7, 8 and 9.

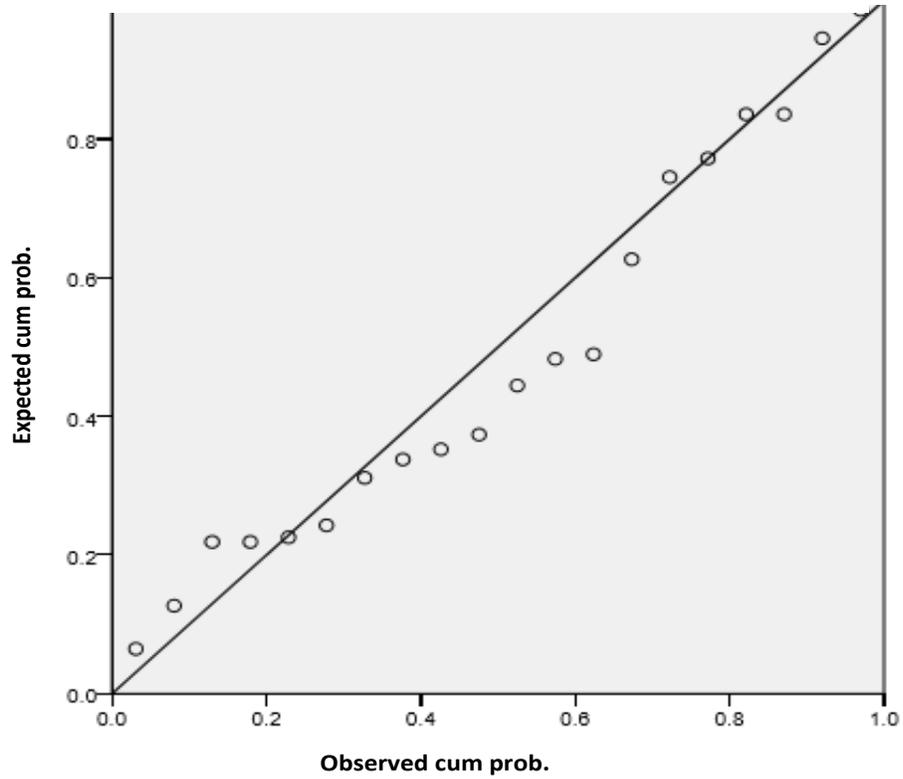


Figure 3. Normalized p-p plot of regression residual for availability and accessibility.

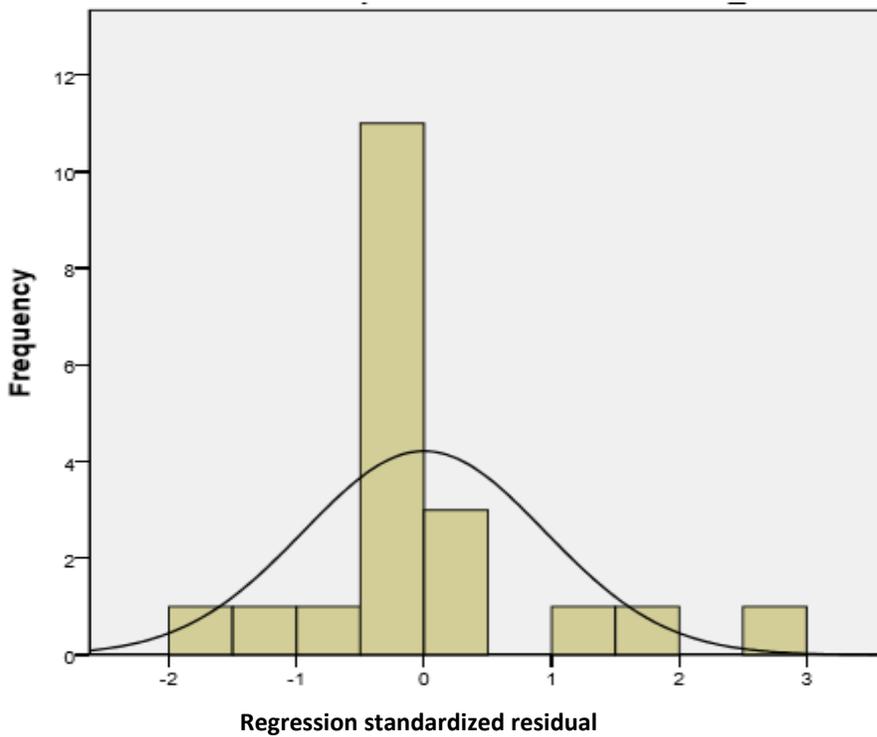
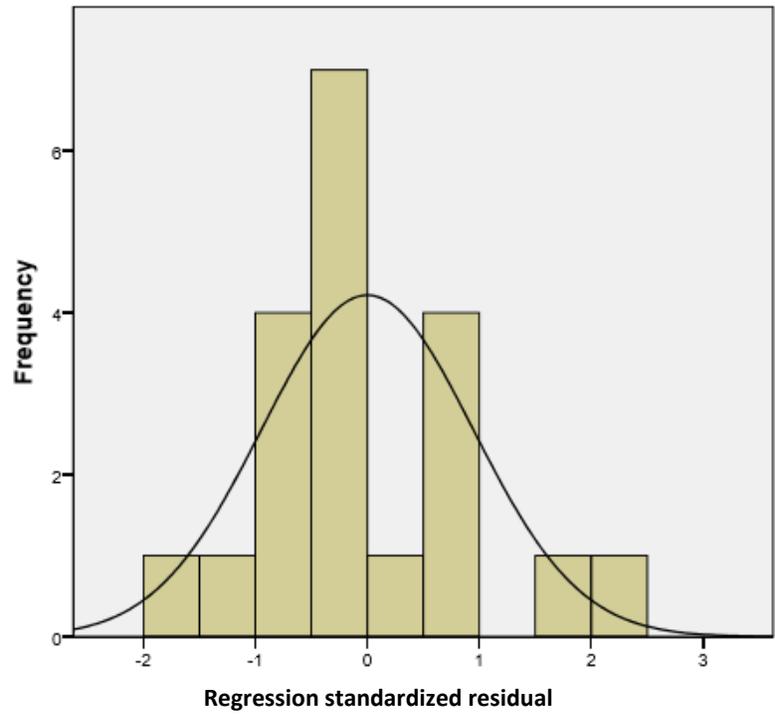
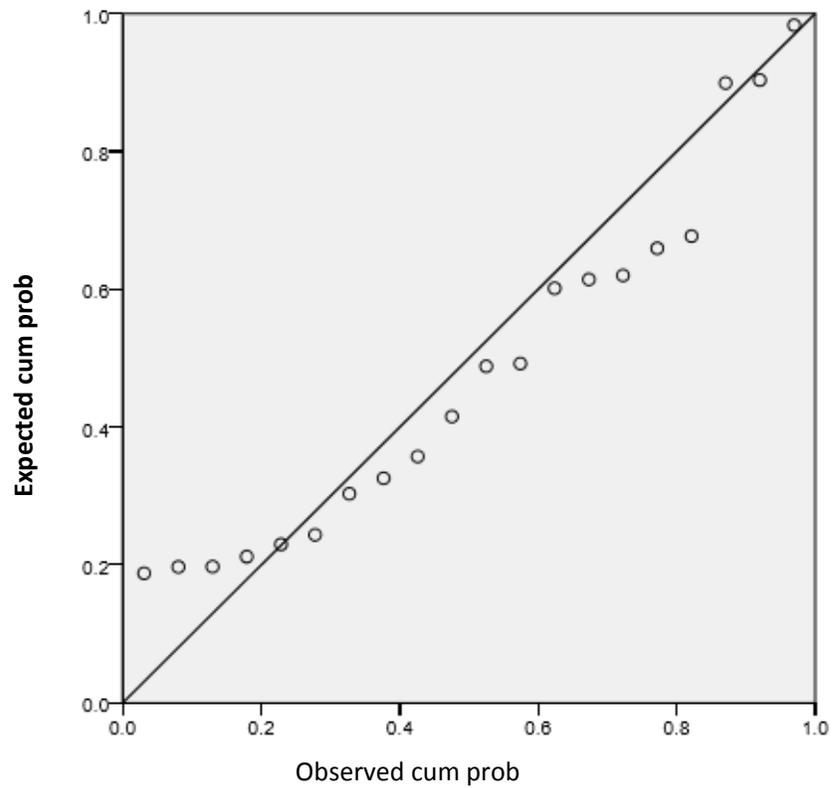


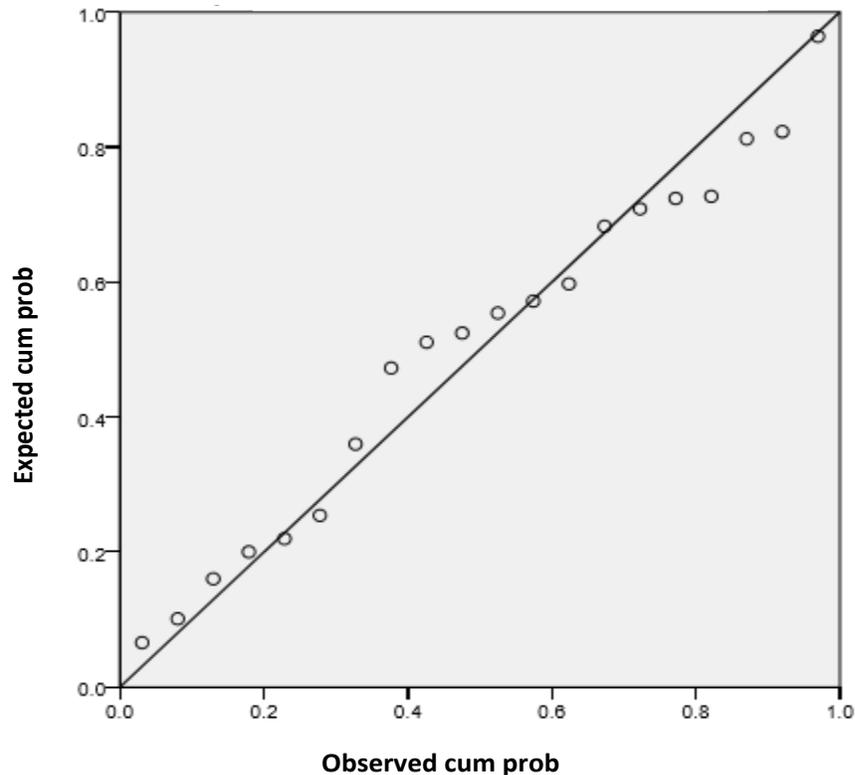
Figure 4. Histogram of regression residual for Staffs' Knowledge with respect to accommodation and Funding in public schools.



**Figure 5.** Histogram of regression residual for Staffs' Knowledge with respect to Availability and accessibility in schools.



**Figure 6.** Normalized p-p plot of regression residual for Students' Knowledge with respect to availability, accessibility and human capacity in public schools.



**Figure 7.** Normalized p-p plot of regression residual for Students' Knowledge with respect to age, gender, class level and human capacity in schools.

The results of the correlation coefficients  $R$  for availability and accessibility to e-learning resources in secondary schools in Rivers State are shown in Table 11. Availability in schools recorded 0.602 with error margin of 0.08 whereas accessibility have 0.473 with error of 0.02.

In Table 12, the ANOVA version of the sum of squares with  $F$ - values for accommodation and funding to e-learning resources of schools were 1.232 and 0.624, respectively. The significance are 35.1 and 70.9% respectively.

The Durbin Watson's correlation constants presented in Table 13 are respectively 1.75 with significance of 35.1 and 1.39 with 71.0 % significance for accommodation and funding in the use of e-learning resources for schools in Rivers State. In Figures 7 and 8 are the p-p plots of regression analysis of standardized residuals of the measure of predictable dependent variable (Students' knowledge) in the use of e-learning resources for secondary schools in Rivers State.

Figures 8 and 9 shows the histogram of dependent variable (students' views) in public schools for Rivers State

## DISCUSSION

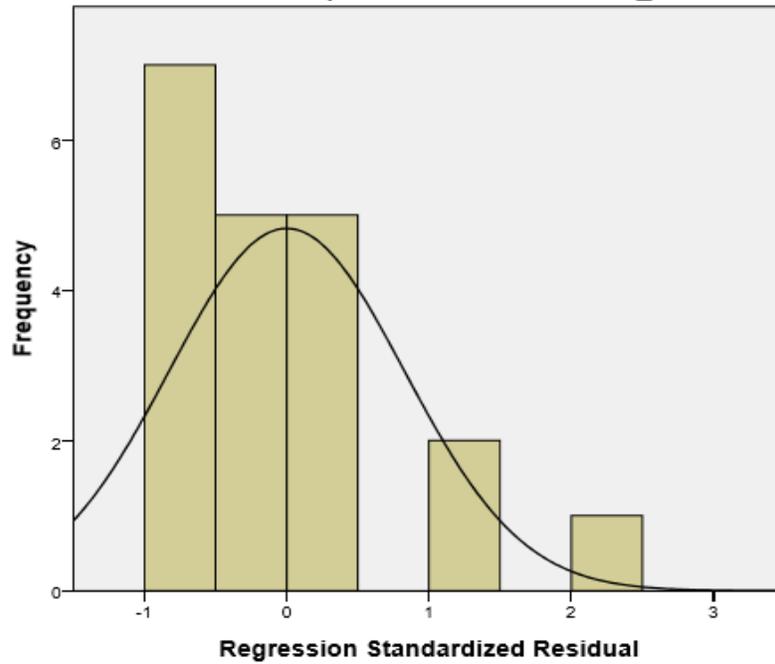
The present investigation considered the influence of

students' demographic variables on their use of e-learning libraries resources in selected public secondary schools in Rivers State. Consequently, based upon the characteristics of the independent variables, six research questions and six hypotheses were formulated as guides and model path-way to achieving the set-goals for the study.

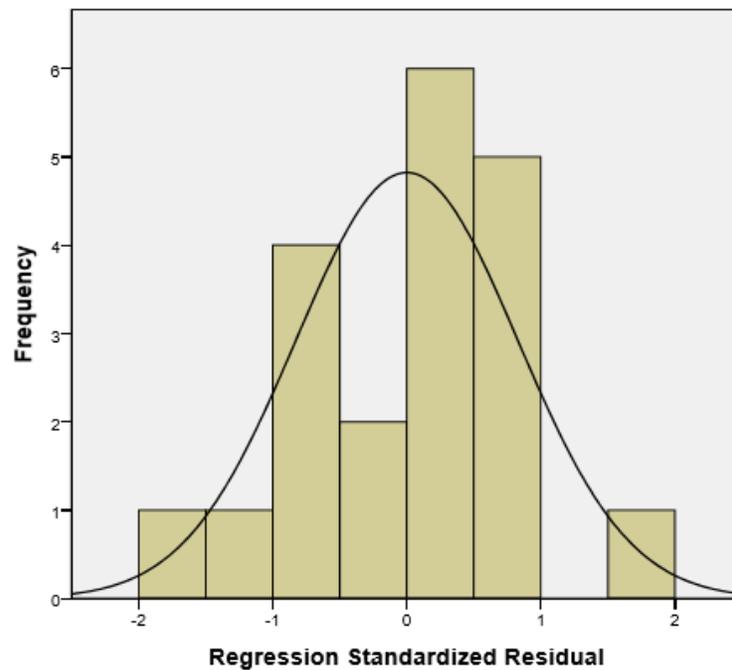
### The influence of students' age on the use e-learning resources

This section sought to determine if there is significance difference between the younger and older students in the use of e-learning library resources. Result from the data analysis shows that there is significant differences significance difference between the younger and older students in the use of e-learning library resources in Rivers State public secondary schools. The results of the correlation coefficients  $R$  with age, gender, availability, accessibility and human capacity in secondary schools in Rivers State measured against students acquired knowledge as dependent demographic variable are between 0.129 and 0.602 with error margin between 0.02 and 0.08 (Tables 7 to 9).

Murray (1978) in his study titled "cognition and learning in traditional and behavioral therapy; the Modern



**Figure 8.** Histogram of regression residual for Students' Knowledge with respect to availability, accessibility and human capacity in public schools.



**Figure 9.** Histogram of regression residual for Students' Knowledge with respect to age, gender, class level and human capacity in schools.

Therapies in New Jersey" noted that in behavioral learning, age and knowledge of different types of learning are paramount. Different studies also revealed that there is age difference in learning even between males and

females and between children and adolescent in the use of new technology or new e-learning resources (Akobundu, 2008).

In addition the work of Martin (1991), titled 'School

children's attitudes towards computer' revealed that there is evidence that gender gap exists between children and adolescence. It is obvious that results from the current work supports the fact that age and gender differences influenced the use e-library resources in learning

The fact that knowledge of e-learning resources and age groupings influence the utilization of such facilities in secondary school libraries was explained by Tsubira and Mulira (2004). The current studies have clearly confirmed through application of multiple regression analysis that students who are relatively mature easily adopt to the use of e-learning resources more efficient and can use any other type of library resources as they progress in learning and age.

### **The effect of gender of students on the use e-learning resources**

By examining the influence of students' gender on the use of e-learning resources the mean values of respondents for male and female obtained in schools under study are 3.1 and 2.9 respectively. That is, majority respondents in public schools agree that gender influences the use of e-learning library resources significantly.

The result implies that there is associated relationship between gender and other independent variables such as accommodation, funding, accessibility etc. Thus, the current research has precisely shown that influence age cannot be singularly isolated from other independent demographic variables as the only contributor. The study discovered that girls between the ages of 15-25 years enjoy e-learning resources like computers and are more self-confident in its use than boys. While boys use computers at home more than girls for different applications such as games, music, internet, word processing, graphics etc. The study of Shashanni (1994), on gender differences in computer attitudes and use among students shows that computer attitude and its uses by children between the ages of 11-12 and 15-16 in United Kingdom are different.

Islam et al. (2011) posit that in the public schools "males have higher levels of impacts at later stage of learning than the female students at classroom scenarios where instructors use no technology, whereas female students were reported to have higher levels initially than male students". Other authors found that across genders, a continuous rate of increase in using e-learning technology lead to a point of diminishing returns whereby the technology becomes a distraction and both male and female students' motivation begin toe-learning course (Hyer and Sikoska, 2003).

Some researchers like Rajagopal and Bojin (2003) and Shashanni (1997) have contrary views on the issue. They are of the opinion that male students respond to the use of new technologies than their female counterparts

because of egoism and possible leadership role bestowed on them by nature. Their stand is however based on the fact that boys have more technological confidence than the girls. These scholars discovered that gender gap exists between the ages in their use of e-learning resources.

It is believed that the divergent views on the roles of males and females students in the use of e-learning resources will last for some time in the academic and research arena. However the present study have shown that gender is a co-factor with other demographic variables in affecting the use of influencing e-learning resources. The strength of this result is hinged upon multiple regression analysis on gender impacts which by the correlation coefficients (0.122 to 0.602) obtain in Table 14 contribute largely. That is its contribution is not very significant given other conducive independent variables.

### **The influence of students' class levels on the use e-learning resources**

These results show that there was no significant differences defined by class structural levels in the use of e-learning resources in Rivers State public secondary schools. The linear and multiple regression analyses and t-tests agree that class level did not significantly influence the use e-learning. That is there is no significant difference between the SS 1 and SS 3 students in the use of e-learning resources. This does not presupposes that student's age is not important in the use of e-learning resources. What is important here is the class levels and besides students of diverse ages can be in same class level and may receive diverse results depending upon other combined factors as predicted by the multiple regression.

In Nigeria and Rivers State in particular, it was noted that students from SS I to SS III are within the teenage age bracket (older) of 13 to 20 years and are likely to explore more information for carrying out assignments and research more than the JSS I to JSS III students who are younger in age. Consequently students who were not taught in their early years to the use e-library resources and new technologies in the library, may later in life develop what is referred to as techno-phobia, so it is therefore imperative that students should be taught how to use e-learning resources at JSS I to JSS III so that they can be able to utilize the resources of their school libraries at secondary school level.

### **The influence of availability of e-learning resources in schools in Rivers State**

The study at this point tried to establish that there is no significant impact between students who have e-learning

resources in their school libraries and those who do not have e-learning resources in their libraries. The mean values for availability and non availability of e-learning resources in public secondary schools are 3.1 and 3.0 respectively. The calculated t-test values schools is 3.16 whereas the critical value is 2.10.

Therefore, in public secondary schools, availability of e-learning resources is seen as a *sin qua no* for using e-learning resources. This means that availability did not certified the conditions of equality of mean values and variances for availability of e-learning resources. Therefore there are significant differences between availability and non availability e-learning resources and the use of e-learning resources in libraries in Rivers State public secondary schools. Also the derived multiple regression analysis the p-p plot of Figure 8 and Figure 9 indicate a fair normal distribution of the dependent variables with respect to availability and accessibility.

The data in Table 4 shows that the sums of squares are relatively good. Therefore, a significant difference does not exist in Rivers State public and private secondary schools with respect to availability of e-learning resources. The use of e-learning resources as a functional dependable demographic variable with respect to availability is strong when compared to other independent variables. Thus availability of e-learning resources which refers to the physical presence of these resources in the school libraries have been confirmed by this investigation as the most important demographic variable for e-learning. Inadequate e-learning tools in stock can invariable hinder the objective of students' knowledge in e-learning in schools.

Aguolu (2002) in his study on libraries and information management emphasized that availability involves making sure that the materials that may be on demand or needed by potential users are acquired, processed, "ready for use" and shelved in the appropriate locations in the library.

Therefore, typical secondary school library should be stocked with e-resources such as computer, scanner, printer, internet, e-mail, videophone systems, teleconferencing devices, and wire application protocols (WAP), radio, television and satellites, multimedia computer and multimedia projectors (Larose, 1999; Akobundu, 2008).

### **The Frequency of accessibility of e-learning resources in schools in Rivers State**

This section of the research sought to determine if there is significant influence between students/staffs who access and those who do not have access to e-learning resources. This is because having access to e-learning enhances the acumen for acquiring knowledge and those without access or limited are prone to scarce knowledge in e-learning resources.

The mean values for accessibility and non-accessibility of e-learning resources in public secondary schools in Rivers State are 3.2 and 3.0 respectively. The calculated t-test values for the public secondary schools are 9.49 while the critical values were 2.10 and 2.55 at 95 and 98% confidence levels. Thus accessibility has significant effect to e-learning resources in public schools.

The derived multiple regression analyses of the p-p plot of Figure 8 and the histogram of Figure 9 indicate a fairly normal distribution of the dependent variables with respect to availability and accessibility. The data in Table 4.18 for sum of squares are relatively good.

A study entitled, "management of Information and Communication Technology and Vocational Education in Imo State, Nigeria", Uzo (2006), posits that for proper progress to be made in the administration and management of vocational education, access to e-learning infrastructure for both students and teachers has to be explored. He stated that accessibility to e-learning resources by both teachers and students would likely enhance their research, teaching and learning activities. This statement is as true and current today as it was years ago.

According to Aguolu (2002), e-learning resources may be available in the library and identified in the bibliography of the library as relevant to one's subject of interest, but the user may not be able use them. The authors went further to state that the more accessible information resources are, the more likely they are to be used. Students find it difficult to migrate from the traditional learning mode to the new e-learning. Different people from different background exhibit different attitudes to certain things, issues and objects.

Nwaoku (2005) states that attitude that defines accessibility has cognitive and mental components made up of concepts and belief. It is against this background that the study is set to examine students' demographic variables and their utilization of e-learning resources with particular interest in secondary school libraries in Rivers State. Suffice to emphasize that accessibility to e-learning resources is significant in public schools but not a significant factor in private schools. This means that students in private schools in Rivers State have relative access to e-learning resources when compared to similar students in public secondary schools in same State.

However, Onyejemezi (1988) in a study on "Educational Technology in Nigerian Education" asserts that the reasons why available instructional materials (e-learning resources) are not used in various secondary schools in Nigeria is because students do not know about their existence and therefore lack the necessary skills and competence to operate the e-learning resources.

According to Larose (1999), most science students lack basic practical skills to science equipment, showing that students in various secondary schools in Nigeria are not conversant with the use of e-learning resources. But for the fact that students use of e-learning resources have

positive impact in their lives especially creating new ideas, skills, competence and confidence, there is need for the students to have knowledge of e-learning resources. The study of Summers and Easdown (1996), revealed that subject specialization of student could influence their use of e-learning resources.

### **The measure of combined effects of some independent variable on e-learning resources in Rivers State**

It is obvious that different factors can influence the use of e-learning resources in secondary school library. Besides, it is not possible to acquire e-learning resources without availability, accessibility, maturity of age and technical human resources as expressed by the employed multiple regression analysis. There is significant difference between students' knowledge and use of e-learning resources in Rivers State public secondary schools. This study area sought to determine how the necessary technical manpower resources that are available in the secondary schools libraries in Rivers State will influence the use of e-learning resources.

In this investigation, the dependent variable is students' acquired knowledge and skills for using or not using e-learning resources and the independent variables are differences in age, gender, availability and accessibility of e-learning resources and technicality of human resources. Identification of how these multiple variables relate to the dependent variable are in Tables 7, 8 and 9 and Figures 4,5,6 and 7. All the data strongly agree on normal distribution, well dispersed points that indicate fair inter and intra relationships within the variables. Table 14 also confirmed these deductions which suggests that availability, students' technical knowledge and human resource manpower contributed mainly to the effective use of e-learning library resources.

The importance of this is hinged on the use of information about all of the independent variables and attempt to make accurate predictions about the use of e-learning resources in secondary schools in Rivers State. Edom (2012) and Abouchid and Eid (2004) equally said that technical manpower in e-learning is imperative for effective application of the system by students. In fact Abouchid and Eid (2004) suggested that a minimum of an assistant librarian per school is necessary as that should definitely assist in chatting the cause of e-learning.

Recently, Islam et al. (2011) have shown the effects of e-learning upon teaching and learning. It was initiated, notably by developed countries with the IMPACT studies funded by the British Educational and Communications Technology Agency (BECTA) and ongoing evaluations of the UK National Grid for Learning. It would appear that while the SESI research literature has included a focus upon broad processes of school improvement and

learning outcomes, the literature has featured an emphasis on smaller-scale evaluations. It is also evident that international evaluations of these sorts of interventions can be very useful. Many of the issues and difficulties that had to do with using e-learning in enhancing learning experiences transcend national and cultural boundaries and are common to all countries with commensurate levels of technology.

The current study apart from showing the importance of human technical manpower and professionalism in service delivery by using e-learning tools at both students and staff levels, has clearly asserted that human technical manpower and professionalisms are contribute immensely to the process of acquiring and applications of e-learning resources. This is collaborated through the use of multiple regression analysis.

### **CONCLUSIONS AND RECOMMENDATIONS**

The research findings are summarized as:

1. There is indeed immense influence of the demographic independent variables such as age gender, availability, accessibility, students' knowledge and technical human resources on the use of e-learning resources in public secondary schools in Rivers State.
2. The demographic dependent variable (use of e-learning resources) changes at different rates depending on the environment and the inter/intra relationships between the combined demographic variables such as age, gender, availability and accessibility.
3. Availability and accessibility of e-learning resources coupled with human resources and students' skills and previous knowledge are the major contributors to the associated relationships with the dependent variable. This was established from the coefficient of correlation and Durbin Watson's Constants obtained.
4. It was also clear to respondents from public institutions in Rivers State that **accommodation** (e-learning resource space) and **funding** are relatively important parameters to the development and use of e-learning resources in Rivers State secondary schools.
5. It was obvious from all established data that class level does not have any significant impact on the use of e-learning resources and provision of e-learning tools.

The application of e-learning resources to studying, teaching and learning by students and the provision of e-learning tools for stake-holders are modern goals to achieving quality education system in the twenty first century. Students' demographic variables and the use of e-learning libraries resources in selected public secondary schools in Rivers State have presented the above facts in detailed expository format.

This study examined the students' demographic variables and the use of e-learning libraries resources in

selected public secondary schools in Rivers State. The impacts of age, gender, class level availability, accessibility, and human resources in the use of e-learning resources were determined. The research questions and hypotheses were validated or invalidated depending upon the respondents results.

It was discovered that there are immense influences of some demographic independent variables such as age, gender, availability, accessibility, and human resources in the use of e-learning resources in public secondary schools in Rivers State. Besides availability of e-learning resources, human resources and students' skills are major contributors to the associated relationships. There was a contrast distinction between class level and other independent variables for the Public schools in Rivers State in this investigation and the uses of e-learning resources within their domain.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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