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Usability assessment of educational software by students: Case of *Ọpón-Ìmọ̀* in Osun State, Nigeria

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ABSTRACT

This study investigated usability of educational software: case of *Ọpón-Ìmọ̀* in Osun state, Nigeria. Specifically, the study investigated influences of gender and school locations on students' assessment of *Ọpón-Ìmọ̀* Technology Enhanced Learning System (OTELS) based on selected usability parameters. 701 students were selected from six secondary schools across the three Senatorial districts of the state. A researcher-developed instrument: Educational Software Usability Assessment Questionnaire (ESUAQ) was used for data collection. Using Pearsons Product Moment Correlation statistics, the instrument yielded reliability value of 0.87. t-test and ANOVA were used to test hypotheses one to five and six to ten respectively. Scheffe's post-hoc test was used to locate the direction of difference established in ANOVA. The study revealed that gender and school location had no significant influence on students' satisfaction with OTELS (t (666) = 1.21, p>.05., F (2, 665) = 0.436, p>0.05); efficiency (t (666) = 0.68, p>.05, F (2, 665) = 2.420, p>0.05); retentiveness (t (666) = 1.22, p>.05, F (2, 665) = 2.792, p>0.05) and error prevention (t (666) = 0.15, p>.05,). School location had significant influence on learnability of the software, F (2, 665) = 10.87, p<0.05.The study recommends that Osun state government may take into account students' location when teaching them how to use the software.

Keywords: *Education; Information Communication Technology; Educational Software; Usability Evaluation; Ọpón-Ìmọ̀ Technology Enhanced Learning System (OTELS)*

INTRODUCTION

Education is no longer restricted within the four walls of a regular classroom setting in many countries of the world. The noticeable advancements had even called for the redefinition of formal education in some instances. Access to formal education has continued to grow for interested persons and teachers roles are being redefined continually from being the sage at the centre of instructional system to the-guide-by the-side. Students at different levels are also able to learn more facts in less time due to the embrace of technology by education (Iyeke, 2011).

Researchers at various times have investigated the efficacy of Information and Communication Technology (ICT) in teaching and learning situations and have reported its positive impact when appropriately used. While authors such as Yusuf (1997), Egunjobi (2003), Ibode (2004), Aduwa-Ogiegbaen and Iyamu (2005), Tijani (2009), Adeyemo (2010) and Omiola (2011) reported that ICT facilitates improved students' achievements across various subjects at the secondary school levels, others such Krubu and Osawaru (2011), Palmén (2011), Adebayo (2012), and Zambuk and Ya‟uGital (2012) submitted that ICT facilitates effective and efficient educational administrative processes.

ICT as a concept has been explained by several authors in different lights; Zuochen and Dragana (2008), Ajayi and Ekundayo (2009), Adeyemo (2010), Adomi and Kpangban (2010) and Iyeke (2011) all agreed that ICT is a convergence of modern technological products (software and hardware) that can be used to collect, store, process and transfer information from one point to the other. Deductively therefore, ICT can be defined as all modern technological products

(software and hardware) that can be used to access, collect, gather, store, process and transmit learning contents from one point to the other by learners and teachers.

The development in the educational software sector cannot be divorced from the initial gains of ICT among people of all ages (Vannucci & Colla, 2010). Evolutionarily, educational software was designed by the US military to enhance personnel performances and was limited to user-software interaction in a text, less graphical way. According to Vannucci and Colla (2010), not until the 1960s that other civil institutions including universities began to embrace computer software for educational purposes. Educational software (ES) can be described as all software that can be used by teachers and students to support teaching-learning activities (National Centre for Technology in Education, 2007). There are five major types of ES: Tutorials software that are usually designed to introduce learners to new concepts in a step-by-step manner; Drill-and-practice software which primarily aims to help students re-learn facts; Games software encourage users to follow established rules with the aim of accumulating entertainment value; Simulation software afford users to experience live situations that are difficult, expensive and dangerous; and Problem-solving software presents problematic situations to the students expecting them to apply their cognitive skills to solving the problems (Cennamo, Ross & Ertmer, 2010).

The acceptance of ES is gradually gaining momentum worldwide, however not much educational gains can be recorded if usability components of such software are neglected (Jeffel, 2011; Ali, 2013; Brook, 2013). According to Zaharias (2004), Tsai (2006) and Luckin, Bligh, Manches, Ainsworth, Crook and Noss (2012), usability is a key quality assurance of e-learning materials and ensures that users' needs remain cardinal in technological developments. Any software or applications which fail usability evaluation may record low patronage from potential users (Minovic, Stavijanin, Milovanovic & Starcevic, 2009; Imtian, Chang & Issa, 2013). Usability as a concept has to do with users' experiences at the end of interaction with software or technological products (Usabilityfirst, 2013; Usability.gov, 2013; Ali, 2013). Specifically, it has to do with effectiveness, efficiency and user satisfaction with software or technological products (Nielsen (2012). This study with little modification relies on selected usability parameters of user satisfaction, efficiency, retentiveness, learnability and error prevention as submitted by Nielsen (2012).

Ọpón-Ìmọ̀ Technology Enhanced Learning System (OTELS) was developed out of governmental policy arising from Osun state organised educational summit which aimed at improving academic performances of secondary school students (Adebayo, 2011; Akinremi, 2013; Osun.gov.ng, 2013). The software is a standalone educational platform with three major categories: Hints and Tips which contains useful suggestions on how students can adequately prepare for examinations on different subjects; extra-curricular which comprises such subjects as Yoruba history, Ifa, Owe and Computer fundamental; and the Otels which has three other sub-categories. The three categories on the Otels include the Integrated test zone, the E-book library and the Virtual classroom. The E-book contains electronic copies of approved textbooks for senior secondary classes 1, 2 and 3. The Integrated test zone on the other hand provides questions and answers to students for practice while the Virtual learning classroom contains audio materials on different subjects which meant to serve students who prefer the auditory learning style (Osun.gov.ng, 2013; Tijani, 2013).

Theoretical framework

Learning theorists be it the behaviourists or cognitivists, have long been interested in explaining how the human mind receives, processes, interprets and understands information. However, with the advent of newer technologies and the consistent increase in their embrace by educators at the secondary school level, the field of learning theory must remain in the state of constant

change (Koch, 2012; Ebert 2009). The present study finds relevance in constructivism. According to Ford and Lott (2009), as long as society continues to record newer tools for instructional delivery, constructivism will remain relevance. Similarly, Kharade and Thakkar (2012), opinioned that any learning strategies which embrace the use of ICT in a learner-centered environments surely promotes knowledge acquisition in a constructivism way. According to the authors, constructivism refers to a set of learning theories which emphasizes learners' active role in constructing their own knowledge by linking their previous knowledge with latest ideas and concepts. The constructivist theory promotes learner-centered activity which emphasis the need to connect learners with learning experiences there by promoting their active engagement in the process of learning. This is the main focus of the OTELS.

Rationale for the study

Despite increasing acceptability of software for learning purposes, more usability assessments of such innovations are still desirable to ascertain their suitability or otherwise (Granić & Ćukušić, 2011). Except a system satisfies usability parameters, it might jeopadise the achievement of users' objectives (Tsai, 2006). Experts are in agreement that usability is an important attribute of e-learning software, it is a major contributor to poor adoption by users (Luckin et al., 2012) and a key forecaster of success or failure of an e-learning system (Abbitt, 2006), any interface which negates usability criteria will attract fewer users to it (Jeffels, 2011; Nielsen, 2012). This study therefore investigated how usable the students found the OTELS using selected usability parameters. Findings from the study may necessitate modifications or variations where necessary so as to increase acceptability and ensure optimal use of the software.

Research hypotheses

H_{01}: There is no significant difference between male and female students' satisfaction with OTELS
H_{02}: There is no significant difference between male and female students' rating of OTELS as being efficient.
H_{03}: There is no significant difference between male and female students' rating of OTELS as being retentive.
H_{04}: There is no significant difference between male and female students' rating of OTELS as being learnable.
H_{05}: There is no significant difference between male and female students' rating of OTELS*'s* capability to reduce error rate.
H_{06}: School location has no significant influence on students' satisfaction with OTELS.
H_{07}: School location has no significant influence on students' rating of OTELS as being efficient.
H_{08}: School location has no significant influence on students' rating of OTELS as being retentive.
H_{09}: School location has no significant influence on students' rating of OTELS as being learnable.
H_{010}: School location has no significant influence on students' rating of OTELS*'s* capability to reduce rate.

Definition of terms

- *Ọpón-Ìmọ̀* Technology Enhanced Learning System (OTELS): is software used for learning by senior secondary school students in Osun state, Nigeria.
- Heuristics: is a set of guidelines used for software evaluation in usability engineering but adapted for the usability evaluation of the *Ọpón-Ìmọ̀* technology enhanced learning system.

- Students' Satisfaction: is how well the students agree with the functionality of the OTELS in their learning situations.
- Learnability: is the ease with which students accomplish basic tasks after their interaction with the OTELS without any external help.
- Retentiveness: is the rate with which students can memorise the basic features of the OTELS and their functions after interacting with the system.
- Eefficiency: is the ease with which students can complete learning tasks within short time and minimal efforts while using the OTELS.

METHODOLOGY

This study employed the descriptive research design of the survey type. All Senior Secondary School 3 students in public secondary schools across Osun state, Nigeria constituted the population for this study. This category of respondents was selected because they were the only beneficiaries of OTELS as at the time this study was conducted.

Osun state is politically divided into three Senatorial districts: Osun East, Osun West and Osun Central. Purposive sampling method was used to select two Local Government Areas (LGAs) from each of the senatorial district where OTELS had been distributed to students as at the time of this study. Purposive sampling method was further employed to select a school from each of the six LGAs so selected. The selected schools were in the following locations: urban schools – Osogbo and Ile-Ife; sub-urban schools- Ede and Ire; Rural schools- Osu and Ile-Ogbo. In all, 1,100 students (male and female) who had received the software were selected purposively to participate in the study. However, only 701 students out of the selected 1,100 were available when the researcher visited their schools.

Educational Software Usability Assessment Questionnaire (ESUAQ) was used to gather information in this study. The ESUAQ was administered on the students after not less than three months of interaction with the software. The instrument was drawn based on usability metrics (efficiency, retentiveness, learnability, error prevention and user's satisfaction) developed by the International Organization for Standardisation /International Electrotechnical Commission (ISO/IEC) 9126-11 and Nielsen (2012) after proper modifications to reflect the focus of this study:. The questionnaire was divided into sections A and B. Section A asked questions bothering on respondents' demographic information while section B contained questions on students' assessment of the OTELS as an educational software and was designed using the 4-point Likert scale of Strongly Agree = 4, Agree = 3, Disagree = 2 and Strongly Disagree = 1. Section B was further subdivided into five subsections: B1, B2, B3, B4, and B5.

The ESUAQ was validated by six experts; two experienced secondary school English language teachers from Osogbo high school, three Educational technologists and one Information and communication scientist from University of Ilorin, Ilorin, Nigeria. Reliability of the instrument was determined through a test-retest method with an interval of three weeks from the date of the first test. The instrument was administered to 40 students of Osogbo high school, Osogbo in Osun state, using Pearson Product Moment Correlation, reliability coefficient value of 0.87 was obtained which indicated the suitability of the instrument for the study. After obtaining necessary clearance from concerned authorities, the researcher with his assistant visited the selected schools to administer the questionnaire on the respondents. In total, 701 copies of the questionnaire were distributed, completed and collected out of which 668 (95.3%) were found usable. The remaining 33 copies were discarded due to non-completion or selection of more than one response option. Data gathered from the ESUAQ were analysed with t-test and Analysis of Variance (ANOVA) using the Statistical Package for the Social Sciences (SPSS 20). Specifically,

hypotheses 1-5 were tested with t-test and hypotheses 6-10 tested using Analysis of Variance (ANOVA).

RESULTS

Table 1: *Demographic data of students based on gender*

Variable	A	Total	Percentage	B	Total	Percentage
Stdts' Gender	Male	362	54.2	Female	306	45.8 668

Table 1 shows the respondents distribution based on gender. 362 (54.2%) of the respondents were males while 306 (45.8%) were females.

Table 2: *Distribution of students by school location*

Variables	Frequency	Percentage
Rural	238	35.6
Urban	223	33.4
Sub-Urban	207	31.0
Total	668	100.0

Table 2 reflects students' school locations; out of 668 students sampled, 238 (35.6%) were from schools based in the rural areas (i.e. Osu and Ile-Ogbo), 223 (33.4%) were from schools based in the urban areas (i.e. Ile-Ife and Osogbo), while the remaining 207 (31.0%) were from schools based in the sub-urban areas (i.e. Ede and Ire).

Hypothesis One: There is no significant difference between male and female students' satisfaction with OTELS.

Table 3: *Students' satisfaction with OTELS based on gender*

Variable	N	X	SD	Df	t	Sig.	Remarks
Male	362	16.84	3.01	666	1.21	0.23	Accepted
Female	306	17.13	3.31				

Table 3 revealed that there was no significant difference between male and female students' satisfaction with the OTELS. This was reflected in the result: $t (666) = 1.21$, $p>.05$. Thus, the hypothesis was accepted. This implies that there was no significant difference between the satisfaction of male and female students with the OTELS at 0.05 alpha level. How satisfactory the male students were with the software was not differ significantly from that of the female students.

Research Hypothesis Two: There is no significant difference between male and female students' rating of OTELS as being efficient.

Table 4: *Students' rating of the OTELS as being efficient based on gender*

Variable	N	X	SD	Df	t	Sig.	Remarks
Male	362	17.23	2.98	666	-0.68	0.50	Accepted
Female	306	17.38	2.37				

From Table 4, it could be deduced that there was no significant difference between male and female students' rating of OTELS as being efficient. This was reflected in the result: t (666) = 0.68, p>.05. Thus, the hypothesis was accepted. This implies that there was no significant difference between the rating of male and female students of OTELS as being efficient at 0.05 alpha level. The rating of the software as being efficient by male students was not different significantly from that of the female students.

Research Hypothesis Three: There is no significant difference between male and female students' rating of OTELS as being retentive.

Table 5: *Students' rating of OTELS as being retentive based on gender*

Variable	N	X	SD	Df	t	Sig.	Remarks
Male	362	16.73	2.73	666	1.22	0.22	Accepted
Female	306	16.99	2.86				

Table 5 shows that there was no significant difference between the male and female students' rating of OTELS as being retentive. This was reflected in the result: t (666) = 1.22, p>.05. Thus, the hypothesis was accepted. This implies that there was no significant difference between the rating of OTELS as being retentive by male and female students at 0.05 alpha level. The rating of the software as being retentive by the male students does not differ significantly from that of the female students.

Research Hypothesis Four: There is no significant difference between male and female students' rating of OTELS as being learnable.

Table 6: *Students' rating of OTELS as being learnable based on gender*

Variables	N	X	SD	Df	t	Sig.	Remarks
Male	362	17.93	2.70	666	0.32	0.75	Accepted
Female	306	17.87	2.72				

Table 6 indicates that there was no significant difference between male and female students' rating of OTELS as being learnable. This was reflected in the result: t (666) = 0.32, p>.05. Thus, the hypothesis was accepted. This implies that there was no significant difference between rating of the OTELS as being learnable by male and female students at 0.05 alpha level. The rating of the OTELS as being learnable by male students does not differ significantly from that of the female students.

Research Hypothesis Five: There is no significant difference between male and female students' rating of OTELS capability to reduce error rate when in use.

Table 7: *Students' rating of the* OTELS *capability to reduce error rate based on gender*

Variable	N	X	SD	Df	t	Sig.	Remarks
Male	362	15.91	3.36	666	.15	0.88	Accepted
Female	306	15.87	3.37				

Table 7 revealed that there was no significant difference, between the male and female students' rating of OTELS*'s* capability to reduce error rate when in use. This was reflected in the result: t (666) = 0.15, p>.05. Thus, the hypothesis was accepted. This implies that there was no significant difference between male and female students' ratings of the OTELS capability to reduce error rate when in use at 0.05 alpha level. The rating of the OTELS as being capable to reduce error rate when in use by the male students was not significantly different from their female counterparts.

Research Hypothesis Six: School location has no significant influence on students' satisfaction with OTELS.

Table 8: *Students' satisfaction with the OTELS based on school location*

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	8.678	2	4.339	.436	.647
Within Groups	6624.837	665	9.962		
Total	6633.515	667			

The result in Table 8 revealed F (2, 665) = 0.436, p>0.05, for students' satisfaction with the OTELS based on school location. This was found not to be significant, meaning that there was no significant difference in the students' satisfaction with OTELS based on school location. Since it was established that there was no significant difference in the students' satisfaction with the OTELS based on school location, it implies that students' satisfaction with the software does not differ significantly with regards to school location; therefore, the hypothesis was accepted.

Research Hypothesis Seven: School location has no significant influence on students' rating of OTELS as being efficient.

Table 9: *Students' rating of OTELS as being efficient based on school location*

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	42.536	2	21.268	2.420	.090
Within Groups	5843.123	665	8.787		
Total	5885.659	667			

Table 9 also revealed F (2, 665) = 2.420, p>0.05, for students' rating of the OTELS as being efficient based on school location. This was found not to be significant, meaning that there was no significant difference in the students' rating of the OTELS as being efficient based on school location. Since it was established that there was no significant difference in the students' rating of the OTELS as being efficient based on school location, it implies that students' rating of the software as being efficient based on school location does not differ significantly, therefore the hypothesis was accepted.

Research Hypothesis Eight: School location has no significant influence on students' rating of OTELS as being retentive.

Table 10: *Students' rating of OTELS as being retentive based on school location*

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	43.115	2	21.558	2.792	.062
Within Groups	5135.310	665	7.722		
Total	5178.425	667			

Table 10 revealed F (2, 665) = 2.792, p>0.05, for students' rating of the OTELS as being retentive based on school location. This was found not to be significant, meaning that there was no significant difference in the students' rating of the OTELS as being retentive based on school location. Since it was established that there was no significant difference in the students' rating of the OTELS as being retentive based on school location, it implies that students' rating of the software as being retentive based on school location does not differ significantly, therefore the hypothesis was accepted.

Research Hypothesis Nine: School location has no significant influence on students' rating of OTELS as being learnable.

Table 11: *Students' rating of OTELS as being learnable based on school location*

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	154.658	2	77.329	10.867	.000
Within Groups	4732.017	665	7.116		
Total	4886.675	667			

Table 11reveals that F (2, 665) = 10.87, p<0.05, for students' rating of the OTELS as being learnable based on school location. This was found to be significant, meaning that there was a significant difference in the students' rating of the OTELS as being learnable based on school location. Since it was established that there was a significant difference in the students' rating of the OTELS as being learnable based on school location, it implies that students' rating of the OTELS as being learnable based on school location differ, therefore the hypothesis was rejected.

Furthermore, Scheffe's post-hoc analysis was conducted to locate the direction of the difference among the groups. Table 12 shows the result of the analysis on Scheffe's post-hoc and the mean difference.

Table 12: *Scheffe's Analysis of Significant Difference of Students' Rating of the* OTELS *as Being Learnable Based on School Location*

(I) School Location	(J) School Location	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Rural	Urban	-.46518	.24861	.174	-1.0751	.1447
	Sub-Urban	-1.17803*	.25352	.000	-1.8000	-.5561
Urban	Rural	.46518	.24861	.174	-.1447	1.0751
	Sub-Urban	-.71285*	.25746	.022	-1.3445	-.0812
Sub-Urban	Rural	1.17803*	.25352	.000	.5561	1.8000
	Urban	.71285*	.25746	.022	.0812	1.3445

From the Scheffe's post-hoc analysis on students' rating of the OTELS as being learnable based on school location in Table 12, it can be deduced that there was a significant difference between rural and sub-urban students' ratings. Also, the Scheffe's post-hoc analysis showed that there was a significant difference between urban and sub-urban students' ratings. Hence, Scheffé's analysis established a significant difference in students' rating of the software as being learnable based on school location.

Research Hypothesis Ten: School location has no significant influence on students' rating of the OTELS capability to reduce rate.

Table 13: *Students' rating of* OTELS*'s capability to reduce error rate when in use based on school location*

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	17.360	2	8.680	.767	.465
Within Groups	7523.220	665	11.313		
Total	7540.579	667			

Table 13 showed that F (2, 665) = 0.767, p>0.05, for students' rating of the OTELS capability to reduce error rate when in use based on school location. This was found not to be significant, meaning that there was no significant difference in the students' rating of the OTELS capability to reduce error rate when in use based on school location. Since it was established that there was

no significant difference in the students' rating of the OTELS capability to reduce error rate when in use based on school location, it implies that students' rating of the OTELS capability to reduce error rate when in use based on school location does not differ, therefore the hypothesis was accepted.

DISCUSSIONS AND CONCLUSIONS

The discussion in this study cantered on findings on influence of gender and school location on: effectiveness of the OTELS; efficiency of the OTELS; satisfaction of the students with OTELS*;* learnability of the OTELS; and how retentive the students found the OTELS.

Majority of the students found the OTELS easy to use regardless of their gender and school locations. Even the students who were in rural areas claimed they could operate the device with ease. This might be due to the penetration of mobile technologies into most rural communities within the state through which majority of the respondents might have acquired basic technological skills. Also, most students regardless of their gender and school locations believed that OTELS supports their learning positively. This might be connected with the growing popularity of mobile technologies and social media among young people. Even though OTELS is not internet-ready, majority of the students still found in it a worthy academic companion. However, both gender and school location did not have any influence on students' responses as regards their satisfaction with the OTELS as a learning tool.

Although, gender did not have any significant influence on the learnability of OTELS based on students' responses, there was a significant influence of school locations on the learnability of the OTELS by the students. Scheffe's post hoc analysis indicated that there exist a significant difference between students located in rural schools and their counterparts located in sub-urban schools and between students located in urban schools and their colleagues located in sub-urban schools. The significance of location as regards the learnability of the OTELS might not be unconnected with inadequacy of training and lack of consistent usage of the system by the students. However, gender and school location did not have any significant influence on the students' believe that the OTELS has capability to reduce error rate when they are using it for their learning exercise. Based on the research questions answered and hypotheses that were tested, the following conclusions were made:

1. Gender did not have any significant influence on: students' satisfaction with the OTELS; students' rating of the OTELS as being efficient; students' rating of the OTELS as being retentive; students' rating of the OTELS as being learnable; and students rating of the OTELS's capability to reduce error rate.

2. School location did not have any significant influence on: students' satisfaction with the OTELS; students' rating of the OTELS as being efficient; students' rating of the OTELS as being retentive; and students' rating of the OTELS capacity to reduce error rate. However, school location had significant influence on students' rating of the OTELS as being learnable; there was significant difference between the ratings of the students in rural areas and students in the sub-urban areas. Also, significant difference existed between the rating of the students in sub-urban areas and students in the urban areas based on the learnability of the OTELS.

IMPLICATION OF THE STUDY

The following implications were drawn based on the findings of this study. There was no significant influence of gender on students' rating efficiency of the OTELS, students' satisfaction with the OTELS, learnability of the OTELS, retentiveness of the OTELS and capability of the OTELS to reduce error rate. Students' responses to all questions were devoid of any bias towards their sex which implies that generalisation of the study across gender can be done. In addition, school location had no influence on other parameters measured except learnability of the OTELS. The implication of this is that the students in the rural areas did not find the system learnable as much as the sub-urban students and while sub-urban students did not also find the OTELS learnable as much as the students in the urban schools. This evident that training the students how to use the OTELS the same way would be counter-productive. While the urban students would learn how to use the system better and quickly, those of the rural and sub-urban areas would not. Another implication is also that students based in both rural and sub-urban schools are likely not to be using the software optimally due to inadequate capacity to use.

RECOMMENDATIONS

1. When training students on how to use the software, particular attention could be given to students in the rural and sub-urban areas judging from the result of this study which indicated disparity in the way the students learn how to use the software in respect of their school locations.

2. Effort could also be made towards ensuring that the interests shown in the OTELS by female students are sustained so that they can be nurtured to translate this into other areas of interests such as science and technology-oriented courses later in life.

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APPENDICES

Appendix 1

Educational Software Usability Assessment Questionnaire (ESUAQ) for Senior Secondary School Students in Osun State, Nigeria.

Section A

SCHOOL INFORMATION

Name of School: ……

Gender: Male …… Female ……

School Location/Town: ……..

Section B

As an OTELS user, please indicate with a tick ( ) the extent to which you agree or disagree with the following statements.

User satisfaction with the OTELS					
S/N	**Statement**	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
1	The OTELS has all the features I need for my learning				
2	The OTELS provides suggestions I need towards the right usage				
3	The OTELS is rigid and inflexible to interact with				
4	I am satisfied with the functions offered by the OTELS				
5	The terminologies that have been used in the OTELS are familiar to me e.g bookmark				
6	The arrangement of subjects on the OTELS is perfect and should not be changed				
Efficiency of the OTELS					
	Statement	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**

7	I find navigating around the OTELS very easy				
8	It is easy to switch from one zone to the other on the OTELS				
9	I can effectively complete my work using the OTELS				
10	It takes little time to bookmark and retrieve learning contents on the OTELS				
11	I can efficiently complete my work using the OTELS				
12	I can navigate within the OTELS using available short codes				
Retentiveness of the OTELS					
	Statement	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
13	I don't need any expert's help to use the OTELS the second time				
14	I can easily locate the E-book library, Test-zone and Virtual classroom on the OTELS				
15	I usually mistaken the Mock exam for the Practice test on the OTELS				
16	I can mention the basic zones of the OTELS without seeing them				
17	Remembering how to navigate within the OTELS is very simple				
18	I need to read my user's guide each time I want to use the OTELS				
Learnability of the OTELS					
	Statement	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
19	Opening the OTELS is very easy				
20	It is easy to locate and listen to contents of the virtual classroom				
21	In the OTELS, remembering icons and their functions is very difficult for me				
22	Understanding the different categories in the OTELS is easy for me				
23	I can take test while reading my e-books and still return to same chapter with ease				
24	While listening to the Virtual classroom, I can pause and continue later				

OTELS Error Prevention Capability					
	Statement	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
25	When using the OTELS, I can reverse any error(s) I commit				
26	There is a user guide on the OTELS, so I cannot make irreversible errors				
27	When am using the OTELS,I cannot commit any error				
28	Any error I commit while using the OTELS is always reversible				
29	It is not possible to commit error while using the OTELS				
30	I cannot commit any error because all icons on the OTELS are properly labeled and visible				

Appendix II

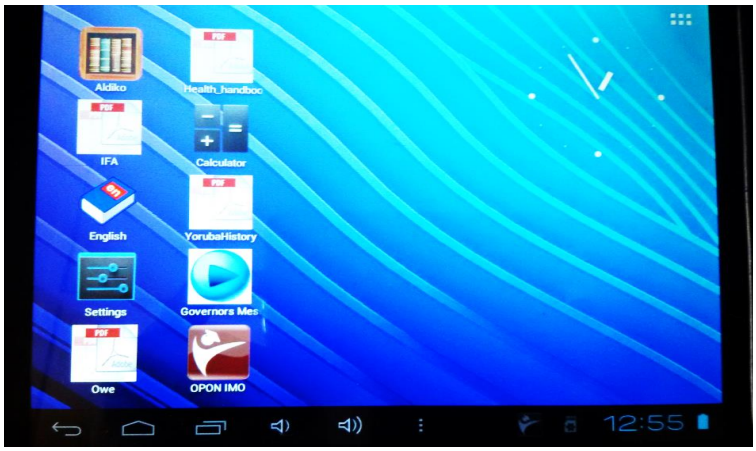

Figure 1: *OTELS represented by the last icon to the right*

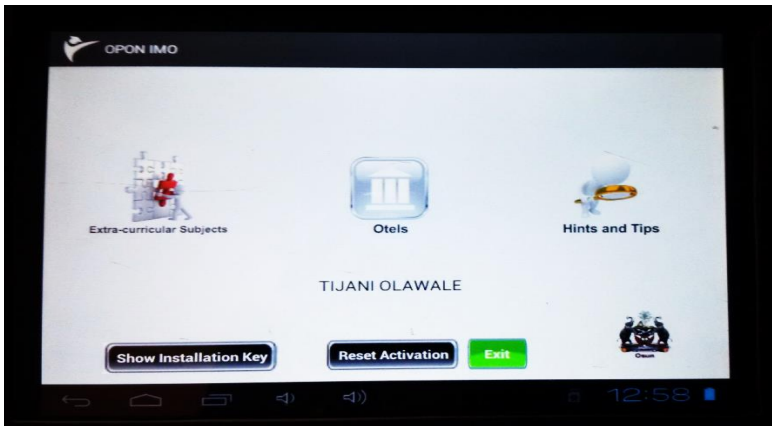

Figure 2: *Different arms of OTELS*

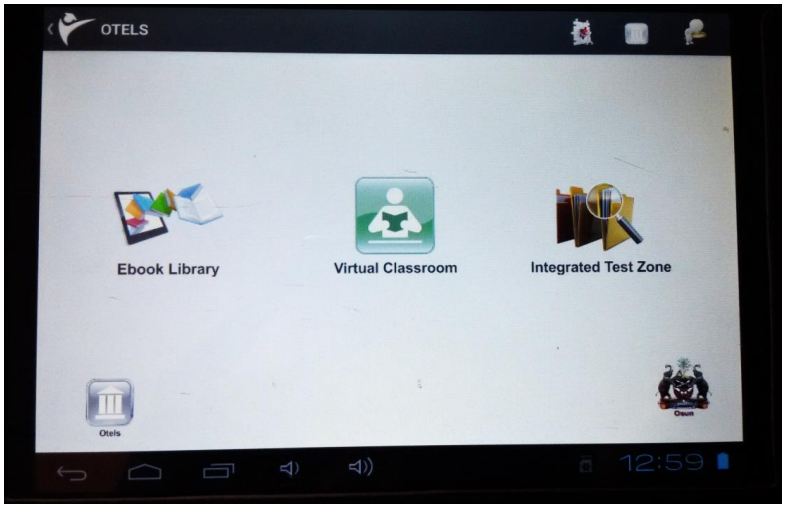

Figure 3: *Icons representing different zones on the OTELS*

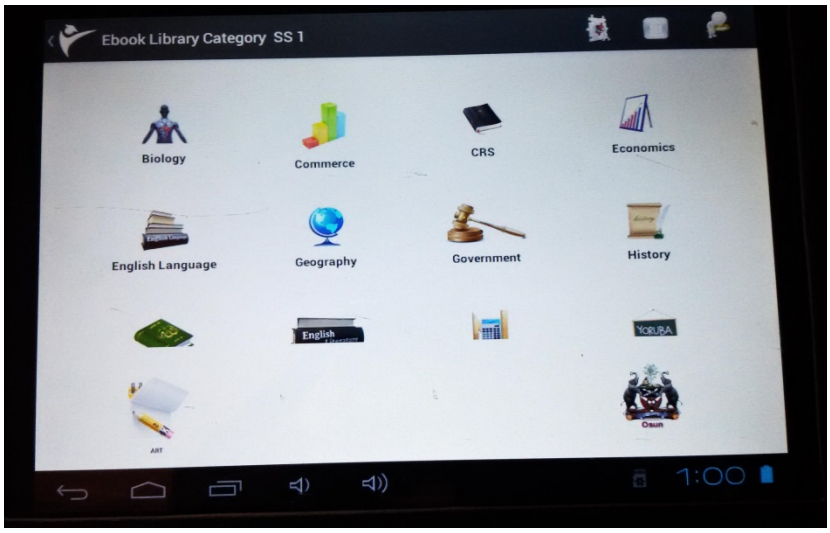

Figure 4: *The E-book library on the OTELS*

Figure 5: *The virtual classroom on the OTELS*

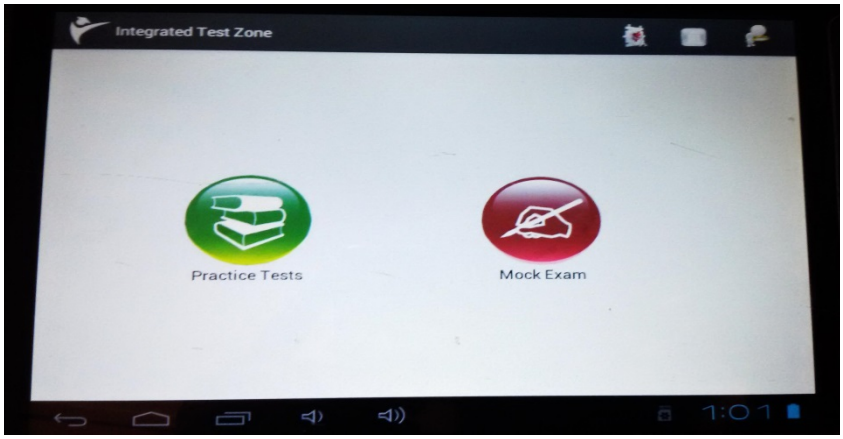

Figure 6: *The test zones*

Source: Tijani (2015)