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Exploring Students and Teachers Activities, Experiences and Impact of Opón Ìmò Mobile Learning Device on Teaching and Learning

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***Abstract*—There has been series of introduction of low-cost learning technologies worldwide such as laptop and tablet computers, especially in developing countries to address uneven standard education which has attracted attention from many researchers and practitioners as reflected in myriad studies. The State Government of Osun in Nigeria following the trend of technology globally introduced Opón Ìmò Initiative to tackle the learning problem through its Opón Ìmò Technology Enhanced Learning System. This study examined the students' and teachers' activities, experience, and impact of using Opón Ìmò for teaching and learning. Quantitative method was employed using 111 samples including teachers and secondary school leavers. The result shows that learners' activities influence learning experiences, while teachers' activities on the device negatively affect teaching experiences as surprisingly, teachers ICT experience negatively affect teaching with the device.**

Keywords— Opón Ìmò; Mobile devices; Learning Experiences; Tablet; Mobile learning; Nigeria

I. INTRODUCTION

The use of mobile devices is more relevant in all aspects of daily life, especially with significant impact in the education sector. New opportunities and enhanced learning experiences are created for all students irrespective of level of education through mobile technology. Students nowadays own and use diverse mobile devices to perform learning undertakings [1]. In as survey, students affirmed that using mobile device is relevant to do home works and assignments, which helped in improving their skills [1]. They further stressed that they prefer using mobile device to textbook for learning, and that learning apps on the mobile device were easy to use while they can learn anywhere anytime. The use of mobile devices for learning is gaining rapid popularity because of the following reasons: most students already have mobile device, moreover, it is affordable and cheaper compared to laptop; portability and flexibility makes it suitable for use in the classroom; students are keen to using technology nowadays, especially touch devices and interactive tools [2].

Osun state, being one of the southwest states in Nigeria has embarked on the distribution of tablet computer to secondary school students, which is designed to bridge learning gap among students in developing societies, especially sub-Saharan Africa [3]. The State, through its Opón Ìmò Technology Enhanced Learning System (OTELS), developed a learning tool, which according to [3] could revolutionize learning in developing states around the world. This tool is called the Opón Ìmò (Tablet of Knowledge). In comparison to the Bring Your Own Device (BYOD) scheme, OTELS project in Osun state Nigeria eases some of the difficulties of BYOD project by focusing on particular platform and device model thereby eliminating the issues associated with use of several device types and platforms. Additionally, social divisions are eliminated since the government distributes the tablets free of charge. Tablet benefits such as flexibility, portability, price and low battery consumption outweighs the advantages of laptop in the OLPC project [4].

In spite the series of studies on tablet device such as [5] [6] [7] [8] that investigated its use in teaching and learning process, this study differs as it examined the activities, experience and the impact of using the device for teaching and learning. This research article therefore investigated the learners and teachers' activities, experience and the impact of using Opón Ìmò for learning and teaching respectively. The article is organized as follows: section I is the introduction and section II summarizes literature and previous research on mobile devices and its use in schools. Section III describes the research methodology. An analysis of the findings reported in the study is performed in section IV. Interpretation of the results together with discussion of the significance of the results is presented in section V. Section VI summarizes the findings of the study and draw conclusion.

Opón Ìmò specifications

The Opón Ìmò's specifications are 7-inch touch screen, an internal storage capacity of 32GB, 512MB RAM and an operating system compatible with Android 4.0 and a front camera. The devices are installed with the E-book library, virtual classroom and integrated test zones. The E-book Library consists of 17 Core Subjects taught in school nationally with 4 Extra Curricula Subjects for Senior Secondary 1, 2 & 3 levels making a total of 55 textbooks

available on the Opón Ìmò Platform. The Virtual Classroom consists of 17 subjects for Senior Secondary 1, 2 & 3 which culminates into a total of 51 video tutorials made available to students which include 823 chapters in total with about 900 minutes (or 15 hours) of audio voiceovers and an average of 16 chapters per course. The Integrated Test Zone provide opportunity for the students to practice with past questions in form of Mock Exam tests in 14 core subjects in West African Senior Secondary School Examinations (WASSCE) for at least 10 years of past questions with an average of 500 questions each and approximately 1800 images. There are Practice tests for 46 courses with approximately 1220 chapters containing approximately 29,000 questions referencing approximately 825 images

Figure 1. Opón Ìmò tablet computer [30, online]

Figure 2. Students posing with Opón Ìmò tablet computer [30, online]

II. LITERATURE AND HYPOTHESES DEVELOPMENT

Information and Communication Technology (ICT), which is an umbrella term that includes all technologies for the communication of information (IGI Global), has become part of teaching and learning process. Initiatives and projects of ICT for quality education have been introduced around the world with the main objective of providing children access to technology use to improve their learning. The exposure of ICT in education is very important to expose student with current technology [9], [10]. Famous far-reaching schemes are in operation globally such as One Laptop Per Child (OLPC), mostly supported by non-profit organizations. OLPC deliver cheap educational mobile devices for use mostly in developing countries [4]. Similar initiative is the BYOD in Europe, which consider the use of devices such as laptops, netbooks, tablets, smartphones, etc. is another initiative. These initiatives benefited to children of various countries and the initiative is replicated in different versions in different countries. For instance, Thai government implemented a technology policy "*One Tablet Per Child*" (OTPC) aimed at preparing 21st century skills for Thai students [5]. According to this policy, more than 500 thousand of the first-grade students were offered personal tablet devices at no cost and to use as a learning tool in their daily classroom activities. Similarly, the Honduras Government also introduced the *Educatracho* program in 2013, which was part of an effort to improve the quality of education provision in elementary schools in poor areas. The program provided an XO 1.75 laptop equipped with Fedora 17 and Open Office 3 software. The laptops had Mathematics and Spanish textbooks stored in its memory though children were not allowed to take the laptops home because of security reasons and the program-targeted public schools in poor communities [11]. In 2011, India announced an anticipated low-cost computing device to compete with the One Laptop per Child (OLPC) initiative, hoping Aakash would give digital access to students in small towns and villages and end the digital divide in India though intended for urban college students rather than the OLPC's rural, underprivileged students [12].

The need to provide low-cost learning technologies such as laptops or tablet computers in developing countries with the aim to bridge the digital divide as well as addressing the uneven standards of education quality has been widely recognized by previous studies [6]. With this aim in mind, Osun Government launched Opón Ìmò initiative and distributed 25,477 tablet computers to Senior Secondary (S.S. 3) students statewide in 2013 [13]. Reference [14] assert that computer is not part of classroom technology in more than 90 percent of Nigerian public schools which implies that chalkboard and textbook continue to dominate classroom activities in Nigeria secondary schools [15]. This research work contributes to the ongoing discussions about students' usage of various technology devices in teaching and learning such as in OLPC, OTPC, *Educatracho*, Aakash and BYOD in learning. This research investigated the students and teachers' activities, experiences and the impact of Opón Ìmò on their learning and teaching respectively.

Teachers and students are carrying out numerous activities on mobile devices. It is also evident in [16] study that the students own and use diverse mobile devices to engage in educational activities and other social networking purposes. It was further stressed that some of the learning activities are sending SMS messages, playing educational games, social learning, reading e-books/pdfs, and completing assignments and quizzes. The activities the students engage in while using Opón Ìmò is likely to affect the experience with the device as well as the impact it will have on their learning (see Figure 1

and 2 for conceptual framework and hypotheses). The following hypotheses are proposed:

H1: Learners activities positively affect learners' experience.

H2: Learners activities positively influence impact of Opón Ìmò for learning

Learners' experiences with mobile learning lead to performance enhancement and motivation. Mobile learning applications engage interest and thrill the students, enhancing retention, as well as increasing enthusiasm, zeal and confidence [17]. Reference [16] explored learners' experiences with mobile device, which shows that students acknowledge that interactivity, flexibility, convenience, and engagement of mobile learning were authentic learning experiences. It may be possible that the impact of Opón Ìmò on the student learning will affect their experiences while further engaging with the device. The authors thus hypothesize that:

H3: Impact of Opón Ìmò will positively influence learners' experience

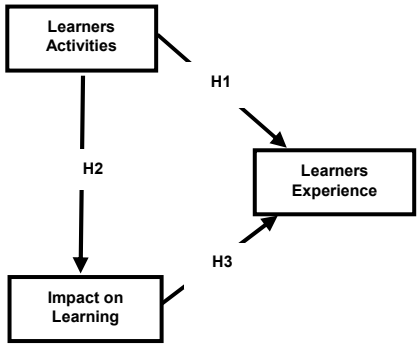

Fig. 1. Conceptual framework and hypotheses

As described above, students on mobile device carry out various activities, it is also applicable to teachers to engage in educational activities and social networking. It will not be out of place to consider if the activities carried out by teachers on tablet device influences their teaching with the device. Thus, we hypothesize that:

H4: Teachers activities positively influence teaching with Opón Ìmò

Teachers experience with ICT is very important to be able to make use of an ICT tool effectively and possibly translate it in the teaching and learning process. Technology experience is a key to empowerment for teaching and learning [19] and if a teacher lack understanding of how to use emerging technologies meaningfully, possess negative attitudes toward using them or are constrained by limited student or teacher technology access; it is unlikely they will engage these tools in their lessons [20]. They are however expected to take advantage of these tools to enhance student learning [20]. ICT training and ICT experience influence the teachers' knowledge, skills and attitude [21] which as a result impact their use of technology in teaching and learning process. It is therefore necessary to know if experience gathered or any professional development programme undertaken by teachers in ICT could predict the effective teaching using an ICT tool. Thus, the following hypotheses are proposed:

H5: ICT experience will positively influence teachers' activities on Opón Ìmò

H6: ICT experience positively impact teaching with Opón Ìmò

Several studies have attest to the impact of use of mobile learning tool such as [24] [25] [26] [27] [28] [31] and assert that m-learning has positively affects teaching and learning and it is considered useful for learning with its enormous potential in both classrooms and outdoor learning.

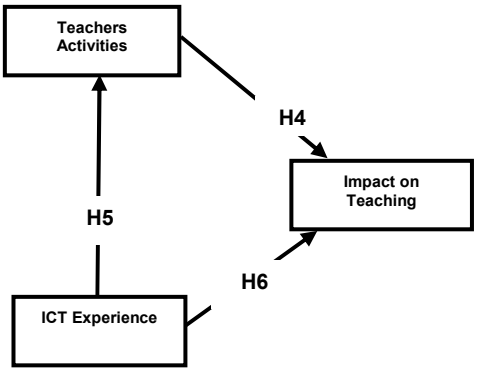

Fig. 2. Conceptual framework and hypotheses

III. METHODOLOGY

Participants and Procedure

The state of Osun consists of three educational districts, within the scope of the Opón Ìmò project. All the secondary schools in the state were part of the population of the study including the teachers and secondary school leavers (SSL). The study makes use of SSL because they have benefitted from the device for a year tenure ownership while in the final year of secondary school. The teachers also benefitted as a temporary owner of the device. During the survey, it was discovered that not all schools, teachers, and students were given Opón Ìmò as presented in [3]. With this in mind, purposeful sampling method was used to select school and teachers. Snowball approach was employed to get the SSL involve in the study. Reference [22] define snowball sampling method as chain-referral or link-tracing as [23] further stress that snowball sampling is possible when a researcher contacts groups of people that are relevant to the research topic and uses the contact of this small group to reach others. There was initial contact with some students and teachers across schools, especially the secondary school leavers as this group of people constitutes the primary respondents for snowball sampling of this survey, and through this group, chain referral was possible which constitutes the secondary group. We administered 300 hardcopies of questionnaire and retrieved 152 copies back with a response rate of 50.2%, which is an average. A total of 41 questionnaires were disqualified due to incomplete responses, and multiple skipping of some questions. Overall a total of 111 responses were considered valid and usable for

further data analysis. The sample size of student in this research consisted of 40 males (52%) and 31 females (48%), The largest age group that responded falls within 16 – 20 years which represents 72% of the sampled population. In addition, the teachers sampled indicate that 25 (60%) male and 15 (40%) female and the subjects they teach cut across all subjects taught in senior secondary schools.

Instrument

In this study, the students and teachers' activities, experiences and the impact of Opón Ìmò on their learning and teaching respectively were investigated. Paper based questionnaires were administered to both students and teachers as respondents to gather data on demographic characteristics, activities, experiences, and impact of Opón Imo on their teaching and learning process. Specifically, to understand the above-mentioned variables, items were adapted from [16] and participants were presented with close-ended questions employing 5-point scales response mode.

Data Analysis

The data collected was analyzed using the Statistical Package for the Social Sciences (SPSS) 21.0 and SmartPLS 2.0 for modelling. Statistical methods such as Factor Loadings, Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) was employed to analyze the response of the participants.

The factors loaded well within the acceptable thresholds (0.58 – 0.85). The composite reliability of all the latent variables is greater than the threshold of 0.7. The variance extracted passed the set rule of thumb of 0.5. The reliability test of Cronbach's alpha manifest between 0.80 and 0.95 (students' data) and between 0.71 and 0.93 (teachers' data). All the teacher's indicators conformed to the verdict of 0.7 except one that was marginal.

IV. RESULTS

Table 1 and Figure 3 present the path coefficient and variation. Learners activities positively affect learners experience, that is, Learner Activities → Learners Experience β = .14 and t = 2.24, the result is significant at (p< 0.05) and Learners activities positively influence impact of Opón Ìmò for learning, that is, Learners Activities → Impact of Opón Ìmò for learning β = .68 and t = 7.53, the result is significant at (p< 0.05). Also, Impact of Opón Ìmò for learning will positively influence learners experience, that is, Impact of Opón Ìmò for learning → Learners Experience β = .79 and t = 13.78, the result is significant at (p< 0.05). Impact of Opón Ìmò for learning is the strongest predictor of Learners Experience β = 0.79 while Learner Activities is the lowest predictor of Learners Experience with β = 0.14. Learners Experience explains (R^2=90.5%) variance of the entire model. Hypotheses 1 – 3 tested are supported.

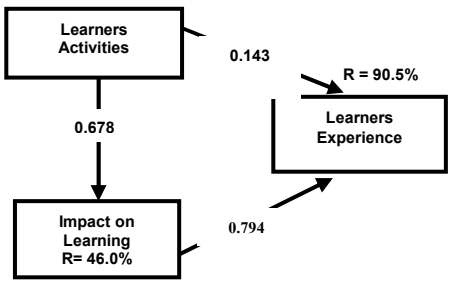

Fig. 3. Conceptual framework and tested hypotheses

Table 1. Standardized path coefficients and corresponding hypothesis results

HYP	Path	Sample	Mean	SD	T-Test	HYP Confirmed
H1	LA→ LE	0.14	0.14	0.06	2.24	Yes
H2	LA→ IFL	0.68	0.69	0.09	7.53	Yes
H3	IFL→ LE	0.79	0.79	0.06	13.78	Yes

HYP = Hypothesis, SD = Standard Deviation, LA = Learner Activities, LE= Learner Experience and IFL= Impact of Opón Ìmò for learning

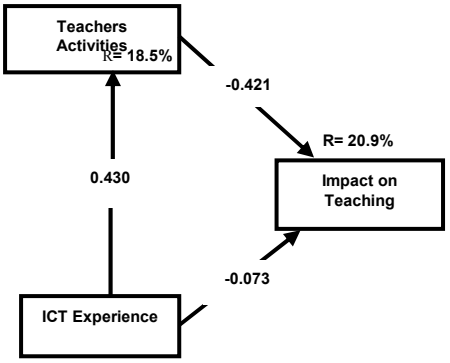

Fig. 4. Conceptual framework and Tested hypotheses

Table 2. Standardized path coefficients and corresponding hypothesis results

HYP	Path	Sample	Mean	SD	T-Test	HYP Confirmed
H4	TA→ IFT	-0.42	-0.44	0.17	2.43	Yes
H5	TIE→ TA	0.42	0.47	0.14	3.02	Yes
H6	TIE→ IFT	-0.07	-0.07	0.22	0.34	No

HYP = Hypothesis, SD = Standard Deviation, TIE = Teachers ICT Experience, TA = Teacher Activities, and IFT= Impact of Opón Ìmò for Teaching

Table 2 and Figure 4 present the path coefficient and variation. Teachers activities negatively impact teaching with Opón Ìmò, that is, Teachers Activities→ Impact of Opón Ìmò β = -.43 and t = 2.43, the result is significant at (p< 0.05) and ICT experience will positively influence teachers' activities on Opón Ìmò, that is, Teachers ICT Experience → Teachers Activities β = .42 and t = 3.02, the result is significant at (p< 0.05). Lastly, ICT experience negatively impact teaching with Opón Ìmò, that is, Teachers ICT Experience→ Impact of Opón Ìmò β = -.07 and t = 0.33, the result is significant at (p<

0.05). Teachers ICT Experience explains (R^2=20.9%) variance of the entire model. Two Hypotheses tested are supported.

V. DISCUSSION

The main objective of the study is to explore the students and teachers' activities, experiences and the impact of Opón Ìmò on their learning and teaching respectively. There has been series of studies on tablet use in educational settings such as [5] [6] [7] [8]. They mostly examined the readiness, attitude, learning style, impact of the mobile device and how they are linked to academic performances. This study was undertaken to know if the activities learners engage in while using tablet device (Opón Ìmò) will affect their experience and as well have impact on their learning with the device. Furthermore, to ascertain whether the teachers' activities while using Opón Ìmò will influence teaching process with the device, if ICT experience will influence teachers' activities as well as have impact on their teaching with Opón Ìmò is the specific objectives of this study. The PLS result reveals the acceptance of all the three hypotheses under the learners' categories. This research provides some contributions for academics, first, impact of Opón Ìmò for learning positively influence learning experience and it is the highest predictor of learning experience. This indicates that the higher the belief of learners that the Opón Ìmò has impact on learning, the higher their experiences will be using the device. Second, learners' activities will positively influence impact of Opón Ìmò for learning. This gives an indication that the more activities learners partake on Opón Ìmò, the more it will have impact on learning, or literally, the more they will appreciate the usefulness or effectiveness of the device for learning process. Third, learners' activities positively affect learners experience, that is, the more the learner engage in all sort of activities on Opón Ìmò which may be educational or social networking, the higher the experience they will acquire over time.

The hypotheses tested for the teachers' activities, experience with Opón Ìmò and impact of the device for teaching reveals that two of the hypotheses was accepted. Teachers' activities negatively affects teaching with Opón Ìmò, that is, the activities teachers engage in while navigating through the tablet does not matter while teaching with it. Also, the result indicates that there is no balance between teacher's activities on Opón Ìmò and its impact on their teaching due to distraction and some other external factors like time management, constant power outage and influence of the third party like State government stringent law on the use. This negative prediction of teaching activities on the impact of using Opón Ìmò demonstrates the current teacher's manual teaching activities over the electronic activities and change resistance to the new mobile learning technology in Nigeria. Opón Ìmò is an advanced teaching aid that needs more ground work, orientation, sustenance and building the confidence of the teacher's and student's as the direct beneficiary of this supplementary technology.

Furthermore, ICT experience will positively influence teachers' activities on Opón Ìmò. This result reveals that the experience gathered by teachers over the use of ICT will enable them to engage with series of activities on ICT tool.

Surprisingly, teacher's ICT experience did not predict the impact of Opón Ìmò in this study. This finding is not in tandem with [20] that found out that ICT training and ICT experience influence the teachers' knowledge, skills and attitude which as a result, impact their use of technology in teaching and learning process.

VI. CONCLUSION

This research addresses the activities, experience, and impact of Opón Ìmò (tablet) device on teachers and students for teaching and learning in State Osun, Nigeria. The research proposed two similar models, as one address the teacher and the other cater for the students. Learners' activities, Learners experience and impact of learning with Opón Ìmò was structured as construct, which the measurement items adapted from [16]. Teachers' activities, experiences, and Impact on learning also follow suit. The survey data were collected from 110 beneficiaries of the tablet device including the teachers and secondary school leavers in custody of the Opón Ìmò while in school to test the hypotheses empirically. Most of the hypotheses were found to be supported in the tested hypothesis of the proposed model especially specially the students' part. This information will be helpful to determine how the introduction of the device to educational system as affected both teacher and students and provides possible explanation for the significant relationships among the constructs.

However, this study is not without limitation. The sample size from teachers and students in Osun State secondary schools was small (n=110) and this small sample motivates us to use Smart PLS statistics software which has a robust algorithm for small sample size [29]. Additionally, the study used one state out of thirty-six states in Nigeria for the study being the early adopter of mobile learning technology. In this direction, the future researcher should endeavor to carry out an interstates study on mobile learning adoption in Nigeria for comparison. This study will give insight to the rate of adoption of mobile learning in Nigeria. We recommend multi-group analysis for this proposed study.

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