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DEVELOPMENT AND USABILITY OF A WEB LEARNING CLASSROOM FOR SECONDARY SCHOOLS IN NIGERIA. A CASE STUDY OF ILORIN

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Abstract

This study was conducted to explore the possibility of developing a Web Learning Classroom (WeLClass) and ascertaining its usability in Nigerian secondary schools using some schools in Ilorin, Kwara State as a case study. It was expected that this innovation would open personal learning opportunities to learners at the secondary school level. The WeLClass was designed as a school management system, such that learners can interact with instructional contents uploaded; teachers and school administrators can take attendance and conduct online assessment; and parents can monitor their wards academic progress. This study adopted a design-based approach as its methodology, while the sample size included purposively sampled: 3 Computer Programmers; 3 Educational Technology experts, 3 students' parents, and 15 computer study students. All samples were selected based on their exposure and knowledge on web application. Three validated research instruments with a reliability value of 0.89 were employed, and three research questions were answered. The findings of the study were that a WeLClass for secondary schools in Nigeria can be developed; the computer programmers, educational technology experts, and parents rated WeLClass as usable; and students' reaction to WeLClass was excellent. This study concluded that WeLClass gives opportunities for students independent learning; easy conduct of teaching job responsibilities; and monitoring is made easy for parents. This study recommended that school administrators should start adopting WeLClass in their school management and administrative endeavours. This should be aimed at providing seamless educational services to internal and external stakeholders.

Keywords: Technology in Education; e-learning, Virtual Learning Environment; Web Learning.

Introduction

Over time, it has been tested and proven that human capabilities cannot be fathomed and has no limitation. Humans have the ability and freedom to grow, learn, think, adapt and develop the cognitive, affective and psychomotor skills needed for them to add value to creation and to be a functional asset to the universe. A primary rider to human exploration in developing their cognitive, affective and psychomotor skills is education. Education is a wealth of knowledge acquired by an individual after studying different subject matters or experiencing life lessons that provide an understanding of concepts.

As stated in the Nigeria National Policy of Education, (Federal Republic of Nigeria, FRN, 2014), at the end of secondary education which is part of the compulsory educational level that follows immediately after the successful completion of the Basic education level, secondary school graduates possess high cognitive, affective and psychomotor skills. Coincidentally, this is the purpose

and intention of education. In achieving this goal, the mode of instructional transmission must be learner-centred and should be in a motivating and interest inducing way. In bridging this gap, this study proposes to develop a web learning classroom to promote independent and individual learning.

This study emanated from the understanding that the physical characteristics of learning environments can affect learners emotionally, with important cognitive and behavioural consequences. Although emotional reactions to environmental stimuli vary widely across individuals and activities. An environment that elicits positive emotional responses will not only lead to enhanced learning but also to a powerful, emotional attachment to that environment. It may become a place where students love to learn, a place they seek for when they wish to learn and a place they fondly remember when they reflect on their learning experiences (Graetz, 2006).

The presence and application of technology change the environment, both directly and indirectly. The increased presence of personal networked devices such as laptops and mobile phones in the hands of Nigerian secondary school students has created an avenue for instructional medium migration (Oladipupo, Nuhu, Ajani & Ishola, 2019). The migration of subject contents to the web and the subsequent transition in classroom activity from teacher-centred information delivery to learner-centred collaborative and individual information acquisition has emerged. Today, Nigerian students spend a lot of time sourcing for information on the web through their mobile devices than asking teachers questions (Abanikannda & Ajani, 2019). These virtual information spaces are just as real as the physical and conventional four-wall classroom. Virtual worlds can emulate a natural and multidimensional environment.

Latest technological advancement has created more possibilities for new ways of teaching and learning. The worldwide web has captured the interest of educators and trainers than any other computer innovation. Educators and teachers are now incorporating it into their teaching. However, that is at the higher education level. Web-based learning environments are popular in higher institution but are yet to be fully employed at the secondary school level of education in Nigeria. As observed from literature such as the studies of Hujainah, Dahlan, and Al-haimi, (2016); Oladipupo, et al., (2019); Adedokun, Ajani, Nuhu and Shittu (2020), and a host of others, there is minimal web applications and research on web learning classroom purposively structured for secondary school educational endeavours in Nigeria. Hence, the objective of embarking on this research.

Based on the objective of this study, this study raised and answered three research questions:

1. What are the processes involved in developing a Web Learning Classroom (WeLClass) for secondary schools in Nigeria?
2. How do experts rate the usability of the developed WeLClass for secondary schools in Nigeria?
3. What is the reaction of Nigerian secondary school students to the developed WeLClass?

Research Methodology

This study adopted a design-based approach in developing the WeLClass and further ascertaining its usability in Nigerian secondary school. The popular ADDIE model was adopted in this study. The target population of this study were Computer Programmers, Educational Technology Experts, Parents, and Computer Study Students in Nigeria. The sample size comprised purposively sampled 21 respondents on the proportion of: 3 Computer Programmers; 3 Educational Technology Experts; 3 Parents; and 15 Computer Study Students in Ilorin, Kwara State. All sample were selected

based on their technological knowledge and experience.

In this study, three research instruments were developed and validated: the WeLClass that was developed; an expert and parent usability rating guide; and students reaction questionnaire. The instruments had a reliability value of 0.89. The entire research was conducted within a space of 8 months. Research ethics and principles were strictly adhered to by informing the participants about the voluntary participation, anonymity and confidentiality of data. Data obtained was analysed using descriptive statistical tools of frequency counts, percentage, range and statistical mean.

Results

This portion describes the findings of this study in tables and subsequently interpreted.

Research Question One: What are the processes involved in developing a WeLClass for secondary schools in Nigeria?

This study adapted ADDIE model to develop the WeLClass for secondary schools in Nigeria. The processes involved: Analysis; Designing; Developing; Implementing; and Usability (ADDIU). The model is graphically illustrated in Figure 1:

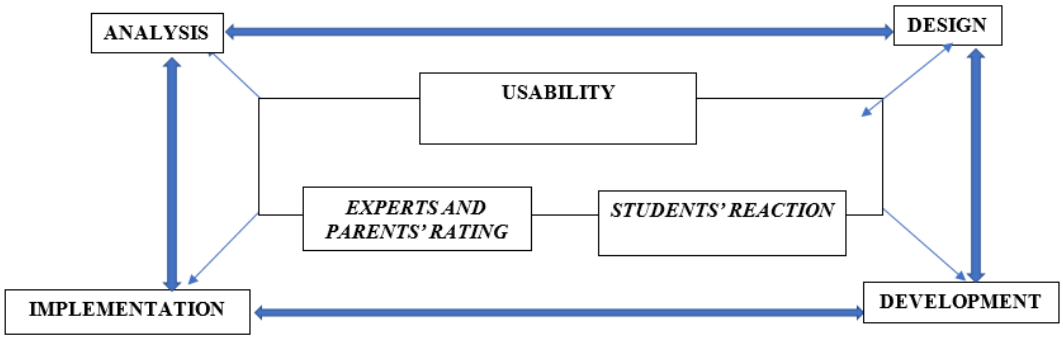

Figure 2: ADDIU Model

Source: Researchers

The first step of Analysing involved information gathering. Proper review on web application was made to identify the existing applications that were utilised at the Nigerian secondary school education level. During the identification, most of the existing applications were mostly structured for students of higher institution who can independently consume high Internet data subscription; navigate independently; site appeal was low; contents are mostly structured for higher-level students; and opportunity to assess previous knowledge was not catered for. Also, the analysis stage provided avenue to state the purpose of the WeLClass, generate goals; identify the characteristics of the target audience; the best style and interactive nature of the WeLClass; the programming language that will be employed in designing the WeLClass; and the kind of contents that will be suitable to the targeted audience.

The second stage was the designing stage. In this stage, the information gathered at the Analysis stage was used in structuring a template of the WeLClass. At this point, a site map was developed. The site map included the list of all the topical areas of the site, as well as sub-topics where applicable. This served as a guide as to what content were to be on the WeLClass, and the

necessary essentials to developing a consistent, easy to understand and navigational system. Also, at this stage the user graphical interface was considered to meet the standard operational regulations.

The third stage included the developmental stage. This stage embraced the main development. This stage took a step higher in the individual graphic elements from the prototype to create the actual functional site. This was typically done by first developing the home page, followed by a "shell" for the interior pages. The shell served as a template for the content pages of the WeLClass, as it contains the main navigational structure. Once the shell was created, the contents were distributed throughout the WeLClass in the appropriate areas. Elements such as the Content Management System (CMS) like WordPress and interactive contact forms were implemented and made functional during this phase, as well as on the technical front, a good front-end web development by writing valid HTML/CSS codes that complies to current web standards, maximizing functionality, as well as accessibility for large audience as possible, were all conducted at this phase.

The fourth stage was implementing the developed WeLClass for validation. At this stage, the developed WeLClass was pilot tested to ascertain its practicality. This stage engaged face and content validators to ascertain the forms functionality and other scripts of the WeLClass, compatibility with different web browsers in old and newer versions was conducted. The last stage included the evaluation stage. The evaluation was done to ascertain the usability of WeLClass in Nigeria secondary schools. This is further explained in subsequent research questions. Summarily, a WeLClass for secondary schools in Nigeria can be developed.

Research Question Two: How do experts rate the usability of the developed WeLClass for secondary schools in Nigeria?

Data collected was analysed with simple and cumulative average, while range was used to determine the overall rating of the developed WeLClass. A benchmark of 0-15.00 and 15.01-30.00 to represent not usable and usable were employed respectively. Results of the analysis are shown in Table 1 and interpreted as thus;

Table 1: Experts Rating of Usability of the Developed WeLClass for Nigerian Secondary Schools

S/N	Computer Programmer	Average Rating	Educational Technologist	Average Rating	Parent	Average Rating
1.	Interphase Interactivity and Responsiveness	4.03	Captivating information presentation	3.99	Ease of Use	4.01
2.	Proper Programming Codes	3.78	Content simplicity	4.01	Usefulness	4.81
3.	Suitability to Target Audience	3.52	Colour combination and style formatting	3.27	Content Understandability	4.02
4.	Updatability and Modification Access	3.75	Ease of navigation	3.01	Ease of Navigation	3.88
5.	Ease of Navigation	4.03	Suitability to target audience	3.56	Site Appeal	4.31
6.	Information and Data Security	3.05	Content understandability	4.05	Simplicity of Content	3.76
	Average Range	**22.14**	**Average Range**	**21.89**	**Average Range**	**24.79**
	Grand Range			**22.94**		

As indicated in Table 1, all the experts including the parents rated the developed WeLClass as usable. Indicatively as generated from Table 1, the parent participants (24.79) rated WeLClass higher than the computer programmers (22.14) and educational technology experts (21.89). Generally, the rating participants claimed that WeLClass is useful; has a good site appeal; easy to use; contents are understandable and simple; good interphase interactivity and responsiveness; easy navigation; good programming outlay; activated with update and modification access; and has good data and information security. Summarily, computer programmers, educational technology experts, and parents rated WeLClass as usable in Nigerian secondary schools.

Research Question Three: What is the reaction of Nigerian secondary school students to the developed WeLClass?

Data collected was analysed with statistical mean. A benchmark of 2.50 was employed, indicating that any value less than 2.50 was regarded as negative; value that is not lower nor higher than 2.50 was regarded as indecisive; while value higher than 2.50 was regarded as positive. Results of the analysis are shown in Table 2 and interpreted as thus:

Table 2: Students' Reaction to the Developed WeLClass

S/N	Reaction Items	Mean
1.	I was scared when I was asked to use the WeLClass	3.11
2.	I found learning on WeLClass fun and interesting.	3.08
3.	Learning in the WeLClass was appealing and interactive, compare to the normal classroom	3.64
4.	With the robust contents in the WeLClass, I found it easy to use different instructional resources to aid my learning.	3.48
5	I look forward to the adoption of WeLClass in my school	3.94
	Grand Mean	**3.45**

Table 2 presents the mean on students' reaction to the developed WeLClass. All the mean values are higher than the benchmark of 2.50 indicating that students reacted to each of the items positively. Generally, students claimed that they were able to learn with the use of WeLClass and they look forward to its adoption in their schools. In summary, to the students' reaction to WeLClass was excellent.

Discussion, Conclusions and Recommendations

The findings of this study indicated that WeLClass can be developed and be useful in Nigerian secondary schools. This is in accordance with Oladipupo, et al., (2019) who resolved that instructional applications and Web applications for learning can be developed and deployed for use in Nigerian schools. As much as this finding aligns with the study of Oladipupo, et al., (2019), researchers such as Graetz (2006) stated that the development of instructional related applications could be developed, but the deployment is a critical issue. The researcher highlighted that fear of technology taking over the role of teachers in secondary school is a major reason why schools and teachers will not accept web applications use in their schools. In tackling this factor, this study generated concerns by examining the usability of the developed WeLClass by experts including

teachers and parents. The outcome of the examination revealed that experts rated the WeLClass as usable, indicating the readiness for acceptance and use.

This study equally ascertained the students' reaction to the developed WeLClass. The students become critical to this study because they will be the end-users of this novel application. The outcome shows that students reacted positively to the developed WeLClass. Indicatively, fear of use, interest and fun, interactive nature, ease of use, and general adoption were indicated to be catered-for in the developed WeLClass. This means that students appreciate it and they are ready to use it for learning. This is in line with the study of Adedokun, et al., (2020) who agreed that students will react excellently to novel instructional applications, as far as their concerns are tackled.

This study concludes that that web learning classroom packages are can be designed to be usable and to also provide opportunities for students independent learning; easy conduct of teaching job responsibilities; and students monitoring can be made easy for parents. This study recommends that school administrators should start adopting WeLClass in their school management and administrative endeavours. This should be aimed at providing seamless educational services to internal and external stakeholders.

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