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Development and Evaluation of Virtual Learning Environment For Learning Selected Technical Drawing Concept In Ilorin Metropolis

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Abstract

This study developed and evaluated Virtual Learning Environment for learning selected technical drawing concepts in Ilorin metropolis. The study employed the use of design and development research of model type using the significant learning-integrated course design model. The sample size of the participants was five Educational Technology experts and five mechanical engineering experts. This gave a total sample size of ten. Three research instruments were used in this study, 1) developed Virtual Learning Environment (VLE), 2) Educational Technology expert's questionnaire (EEQ), and 3) Mechanical Engineering expert's questionnaire (MEEQ). The instruments were validated by experts. The reliability of the instruments was obtained using the Cronbach alpha formula, which yielded a 0.76 coefficient. Four research questions were raised and answered. Findings revealed that educational technology experts and Mechanical Engineering experts rated the developed virtual learning environment high and effective for learning Technical drawing. However, the benefits of virtual learning environments are unquantifiable and incomparable with the cost. The study recommended that the provision of necessary technological facilities should be made by the government and private owners to schools in order to be able to implement and promote further use of technology in education.

Keywords*: ICT, Virtual Learning, Technical Drawing*

1. Introduction

Information and Communication technology is one of the first technology development that is adopted in education. In Nigeria curriculum, starting from primary school to secondary school, information and communication has always been a core course. Vastimir and Dalibar (2019) stated that integrating information and communication technology into education has improve knowledge in the field of interpretation, learning process and for future professional activity. Information and Communication technology is an indispensable part of the contemporary world. Infact, culture and society have to be adjusted to meet the challenges of the knowledge age. Therefore, the school will be indispensable in developing an information and communication technology of any country. In addition, information and communication technology has the potential to prepare student for a lifetime, because information and communication technology can help students to develop their skills, boost their motivation and widen knowledge and information (Grabe & Grabe, 2017, Hussain, 2017).

Information and communication technologies could potentially facilitate the attainment of relevant life skills that support the economic and information development process, if it is carefully integrated into education (Azra & Leonard, 2010). Secondary schools must think globally in order to respond to student's needs, create new relationships, design new programs and rebuild their conceptions on the characteristics on learning environments to encourage innovation, experimentation and teachers' activities. To satisfy these requirements, secondary schools must promote the use of information and communication technology. Electronic learning has been a form of integrated information and communication technology in education. Ahmed (2010) stated that electronic learning is changing the way teaching and learning process is taking place in institutions. Electronic learning has changed the way

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people in Nigeria perceive education, because it has enhanced the quality of teaching and learning.

Selim (2007) broadly defined electronic learning as the delivery of course content via electronic media, such as internet, intranet, extranet, satellite broadcast, audio-video tape, interactive TV and CD-ROM. Electronic learning is divided into different type such as web-supplemented courses, virtual reality, and virtual learning environment. Electronic learning has been practiced in schools and cooperate occupational training contexts as part of lifelong learning. However, with emergence of new open and mobile platforms and web applications, a range of possibilities has opened to facilitate teaching and learning process in a blended environment. As a result, electronic learning has been implemented in all educational system. Docebo (2016) asserted that electronic learning is a growing field. Pumahapinyo and Svwannatthachote (2014), stated that various forms of technology are used to facilitate e-learning, with most applications using a combination of techniques such as blogs, collaborative software, e-portfolios, and virtual classrooms. Particularly for secondary schools, an increasing tendency is to create a virtual learning environment in which all aspects of a course are handled using a consistent and standard interface throughout the institutions (for instance, Moodle, Schoology, Edmodo).

The Virtual Learning Environment (VLE) is a technology that supports learning through face-to-face and virtual meetings (Barajas & Owen, 2000). VLE is characterized by an environment based on computers, use of the internet, interaction between users, exchange of views and access to users to obtain various useful materials (Wilson, 1996). Moreover, users could be in the same room but do not experience any physical contact (Rheighold, 2004). Thus, the VLE enables collaborations as well as learning activities through games (Korićanin, Saračević, Biševac, & Kamberović, 2014). VLE is a software tool that supports the management of education and teaching by using the internet (Trafford & Shirota, 2011). The VLE concept is more comprehensive compared to computer-aided instructions (CAI) as it contains the communication dimension as well as interaction and discussions between teachers and students or among students (Piccoli, Ahmad, & Ives, 2001). In other words, VLE is a web-based learning platform, which is a reality in the education world, that integrates the conventional education concept with the virtual method. Abdullah, Noh, Yusuff, & Mansor (2013), referred VLE as an online classroom and a social space in schools that contains a calendar, social networks, shared workspace and online assessment. VLE also has computer software tools that compliment computerized learning facilities, such as Learning Management System (LMS), Course Management System (CMS), Learning Content Management System (LCMS), Managed Learning Environment (MLE), Learning Support System (LSS) and Learning Platforms (LP) (Shahaimi & Khalid, 2016). Some studies have given another name or concept for VLE, such as e-learning, online learning, distance learning or web-based learning (Ibrahim & Osman, 2017). Whereas, Hamzah & Yeop (2016), agreed with Shahaimi & Khalid (2016), that VLE was LMS with the additional term for VLE as e-learning, Massive Open Online Course (MOOC) or Modular Object-Oriented Dynamic Learning Environment (MOODLE). Individuals who experience virtual learning would also experience permanent changes that involve the mentality, attitude, thinking and behaviour due to receiving knowledge, supervision and access from online learning resources (Mohaidin, 2000).

The VLE concept that integrates face-to-face and virtual teaching is called blended learning (Yeop, Wong, & Goh, 2016). Blended learning is a teaching practice that combines the traditional face-to-face teaching mode with the online technology mode related to teaching and learning. The aim is to maximise the understanding of a principle, theory or knowledge. Blended learning is an approach that centres on students, which means that students control their rate of learning as well as use various online technologies. Blended or mixed learning allows teachers to deliver course materials that contain audio, video, animation and simulation. In addition, teachers get to send evaluations online supported by feedback and corrected assignments. And what is most attractive is the interaction through collaboration between teachers and students (Ibrahim & Osman, 2017).

Virtual learning environments have been associated with formal learning and with relationships between teachers, students and school. There is an increasing interest in the virtual learning environments supported by the internet, namely among education institutions, students and teachers. The concept of virtual learning environment (VLE) could be considered as a dynamic concept due to the constant evolution of digital technologies, to its features and potentialities, and to the importance that such environments have within the learning processes. Virtual learning environments have had great relevance in the support and promotion of formal education, since it is in formal education institutions that the educational guidelines and curricula of each country are implemented. However, within a perspective of change and innovation, VLEs may play a paramount role in supporting learning in non-formal and informal contexts. The concept of Innovation, which is used in current society, implies a need for change or renovation, or a need for doing something new. Gašević, Dawson, Rogers and Gasevic (2016) indicated that the

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association of information to students' activities in a VLE with students' performance is moderated by the teaching conditions. The author further affirmed that only the variables number of logs, number of operations done in forums and resources represented significant indicators of students' performance, and that these three variables account for 21% of the variability in students' performance. The differences in the use of technology, especially those related to how students use VLEs, require certain attention before the data logs can be used to create models.

Oxford University press (2015) defined Virtual Learning Environment (VLE) as a system for delivering learning materials to students via the web. These systems include assessments and students tracking features as well as collaboration and communication tools. They can be accessed both on and off campus, meaning that the system can support students' learning even outside the lecture hall, 24hr a day, and 7 days a week. Kurilovas and Diagene (2010) asserted that Virtual Learning Environment is a single piece of software, accessed via standard web browser, which provides an integrated online learning environment. Virtual Learning Environment provide a means to manage the learning experience, communicate the intended learning experience and facilitate tutors and learner's involvement in the experience (Sneha & Nagaraja, 2013).

Virtual Learning Environments are virtual spaces that teacher and students use to percent and share resources, perform activities and interest with one another. These platforms can be used to teach a complete online course or as a supporting feature for face-to- face courses. Virtual learning environment is said to have improve on the weakness of traditional learning methods (Kanaani & Elahi 2012). Virtual learning environment is more realistic and practical when compared to the traditional method of learning. The main goal of Virtual Learning Environment is to ease, motivate and provide learning experiences that go beyond the classroom. Barker and Gossman (2013) stated that Virtual Learning Environment boasts a wide spectrum of research showing positive impacts across different contexts. Virtual Learning Environments has been successfully employed in educational applications and it is at the core of what is known as virtual reality learning environment (Monahan & Bertolotto 2008). Virtual Learning Environment has brought about changes in education all over the world. Curriculums have been adjusted to include electronic learning i.e virtual learning environment. This all means that the kind of education, which was good enough twenty years ago, is not good today (Frumina & West, 2012).

In a Virtual Learning Environment (VLE), some education providers may use open source Learning Management System like module, a tutor, Eliademy, canvas or Chamilo while others may opt into commercial ones or establish their own. The function perform by Learning Management System (LMS) in a virtual learning environment are execution and lessons delivery. Antonacci (2008) asserted that engagement in Virtual Learning Environment enable student to experience learning opportunities that would not normally be easily accessible, including role playing, operating stimulated equipment, designing and building things or creating simulation of physical or procedural processes. Through these activities they claim students engage in higher levels of cognitive functioning such as interpreting, analyzing, discovering, evaluating, acting and problem solving. Virtual Learning Environment have recently emerged as an important topic in education theory and practice (Weller, 2007).

A well-maintained virtual learning environment should enable student of all learning styles to receive the best possible education in a way that they may not in an exclusively lecture based environment. Educational systems based on the web are being used by an increasing number of universities, schools and companies, not only to incorporate web technology into their courses, but also to complement their traditional face-to-face courses. These systems gather a great quantity of data which is valuable to analyse the course contents and students' use Valsamidisa,, Kazanidisa, Petasakisa, Kontogiannisb, and Kolokithaa (2014). Learning environments based on the use of technology and digital resources are mediators in the learning process through the activities they allow. This is due to the fact that they facilitate interaction and interrelation within a continuous communication process, thus enhancing the construction and reconstruction of knowledge and meanings as well as the formation of habits and attitudes within a framework that is common to all the ones involved in the educational process Becerra, García, & Chávez, Ambiente de aprendizaje (2015). Virtual Learning Environment can be used to teach courses such as technical drawing, biology, chemistry and so on.

Laguador, (2014) defined Technical drawing as a means of clearly and succinctly communicating all of the information necessary to transform an idea or a concept into reality. It is the act and the discipline of composing plans that visually communicate how something can be manufactured or constructed. Technical drawing is an important form of technological and engineering communication in science, technology, industry and vocations (Mikhailov, 2006). Without technical drawings, the engineering field would have been a discipline of enormous guesswork (Madsen, 2012). Technical drawing allows engineers to create designs, calculate forces and stresses on structures

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which contribute to the quality of products. The ability to know and work with technical drawings will not only make someone a good engineer or teacher, but it is a necessary skill on the way to becoming an expert in the profession. Therefore, the role of technical drawing in every aspect of engineering and technology is vital. Technical drawing is a course of study within the technical and engineering education fields.

Technical education aims to develop the individual through the provision of experiences directly related to technology and engineering. It improves an understanding of various aspects of industry, technology and vocations while developing in students' specific manipulative and cognitive skills and improve students' capacity and ability (New South Wales, 2007). Generally, technical drawing is the language used in engineering and technical fields; it is important that all stakeholders such as technical teachers, drafters, designers, engineers, machinists, electricians, and builders understand this language (Hablitzel, 2007). When properly understood, the discipline of technical drawing helps the technical teacher and other stakeholders in simplifying their jobs using 3D and 2D drawing and sketches in a virtual environment.

Significant studies have been carried out during previous years on various aspects about the use of computers and the Internet by male and female students to identify gender disparities. Mishra et al. (2005) identified the gender gap in their study and found that 61.5% of males and 51.6% of females used the Internet, and 83.1% of males and 61.3% of females faced the problem of slow Internet connections. In the year 2007, Li and Kirkup concluded that men tend to use email and "chat" rooms more than women do, men play more games on computers, and men are more confident in their computer skills than women are. However, the gender inequality is stronger in the British group than in the Chinese one. Similarly, Afonso . (2012) studied 2,175 users of the Electronic Document Management System (EDMS) and found that gender only moderates performance expectancy towards behavioral intention, as males are argued to be more result oriented than females. The use of virtual learning environments for learning is very significant to build knowledge on Technical drawing concepts.

The National Policy statement on Technical /vocational education noted that Technical drawing education should ensure adequate laboratory and skills, meaningful and relevant knowledge to everyday life while ensuring reasonable and functional scientific attitude. To ensure the full realization of these interesting objectives, the contents and contexts of the syllabus place great emphasis on field studies, guided discovery, laboratory techniques and skills coupled with conceptual thinking. Unfortunately, available evidence has revealed that students' performance in Technical drawing has been quite discouraging (WAEC 2013-2017). Despite the fact that Technical drawing is one of the simplest to comprehend among the vocational subjects, the level of academic achievement is nonetheless not much different from other vocational subjects among the students. In addition, most of the schools lack adequate equipment, insufficient laboratory conditions, limited time allocated for practical course, and overcrowded classroom environment which makes laboratory activities unconducive. Although the identified problem was not specifically tied to the simulated classroom in science teaching but recent emphasis in virtual learning open an avenue for making relevant trials on simulation models. Hence, if students' skills will be enhanced on subject like Technical drawing, development and evaluation of Virtual Learning Environment for learning selected technical drawing concept in Ilorin is inevitable.

2. Method

The study adopted a design and development research which dealt with the design, development, validation and use of models. The development and evaluation of a virtual learning environment incorporated Technical drawing concepts as instructional content. The researcher adapted Significant Learning-Integrated Course Design Model developed by Dee Fink (2003) to meet different learning styles, needs and participation of individual learner to facilitate individualistic activities. Principles of online design was also used to guide the designing and development of this virtual learning environment. The population of this study was made up of all lecturers in University of Ilorin. The target population consisted of all lecturers in Educational Technology and Mechanical Engineering. Specifically, 5 Educational Technology experts and 5 Mechanical Engineering expert were randomly selected for the study. In all 10 experts participated in the study. Moreover, the experts were made up of five Educational Technology experts randomly selected in the Department of Educational Technology, University of Ilorin, Ilorin, Nigeria and five Mechanical Engineering expert randomly selected in University of Ilorin, Ilorin, Nigeria. The five (5) experts from the Educational Technology Departments were selected based on the premises that; they have been involved in the teaching of various Educational Technology concepts which includes technical drawing and the five experts of Mechanical Engineering experts were selected based on the premises that they have been involved in the teaching of Technical Drawing. The data collected were analyzed using descriptive statistics. Three research

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instruments were used for this study, these are: developed Virtual Learning Environment (VLE), Educational Technology expert's questionnaire (EEQ) and Mechanical Engineering expert's questionnaire (MEEQ).

A virtual learning environment (VLE) in this study is a Web-based platform for the digital aspects of technical drawing, usually within educational institutions. They present resources, activities and interactions within a course structure and provide for the different stages of assessment. VLEs also usually report on participation; and have some level of integration with other institutional systems. For teachers and instructors who edit them, VLEs may have a de facto role as authoring and design environments. The environments includes ;The course syllabus, aadministrative information about the course: prerequisites, credits, registration, payments, physical sessions, and contact information for the instructor, a notice board for current information about the ongoing course,the basic content of some or all of the course; the complete course for distance learning applications, or some part of it, when used as a portion of a conventional course. This normally includes material such as copies of lecture in the form of text, audio, or video presentations, and the supporting visual presentations, aadditional resources, either integrated or as links to outside resources. This typically consists of supplementary reading, or innovative equivalents for it,self-assessment quizzes or analogous devices, normally scored automatically, formal assessment functions, such as examinations, essay submission, or presentation of projects. This now frequently includes components to support peer assessment, Support for communications, including e-mail, threaded discussions, chat rooms, Twitter and other media, sometimes with the instructor or an assistant acting as moderator, aditional elements include wikis, blogs, RSS and 3D virtual learning spaces, links to outside sources – pathways to all other online learning spaces are linked via the VLE (Virtual Learning Environment), mmanagement of access rights for instructors, their assistants, course support staff, and students, documentation and statistics as required for institutional administration and quality control, aauthoring tools for creating the necessary documents by the instructor, and, usually, submissions by the students, Provision for the necessary hyperlinks to create a unified presentation to the students,Interactive online whiteboard for live virtual classes.Virtual learning environment on technical drawing was validated by three Educational Technology experts in the departments of Educational technology. To test the reliability of the instruments, pilot test was conducted within the target population but outside the school sampled for the study. The results obtained from pilot test conducted was used for reliability test. The instruments were administered to five (5) Educational Technology experts. Cronbach alpha formula was used with the aid of statistical package for service solution (SPSS) to determine the reliability coefficient of the instruments which yielded 0.76.

3. Result and Discussion

3.1. Result

a. What are the processes involved in the development of Virtual Learning Environment (VLE) on technical drawing concepts?

VLE was designed and developed based on the Significant Learning-Integrated course Design Model that was developed by Dee Fink (2003). The model is made up of three phases with twelve steps. The phases are: Initial Design Phase, Intermediate Design Phase and Final Design Phase. The Principles of Online Design developed by Florida Gulf Coast University (2006) was used as guiding principles in the development of the package with ADDIE model to evaluate the package. The researcher worked hand in hand with the computer experts, software developers, and educational technologists to design and develop the VLE. The procedure for development and evaluation was as follows:

a. Needs Assessment: This provided the data to document the need for a new approach or another paradigm shift in learning: VLE was incorporated as new strategy into teaching and learning process.
b. Target Audience: Educational Technology experts and mechanical engineering experts of the University of Ilorin were the target audience. The course was offered by all students study technical drawing in Ilorin metropolis.
c. Course Contents: The content chosen was one of the topics in Educational Technology in line with Technical drawing concept.
d. Instructional Recourses: The following instructional resources were used: Tablet phones, Computers, Projectors, Relevant Books on Technical Drawing and Journals in Educational Technology were used as instructional resources in the study.
e. Establish what must be learnt or tasks. The tasks are mainly for instruction which will help specify the requirements for the project.

The researcher considered the following in the development of the virtual learning environment.

Design stage

a. The documentation of the instructional course manual, visual and technical design strategy was documented (as shown in appendix c).

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b. Identification of instructional objectives: These objectives were made known to the students, and at the end of each unit, tasks were provided for students (as shown in appendix c).
c. The following instructional strategies that enhanced the attainment of the intended objectives in the domains (cognitive, affective, and psychomotor) were applied (as shown in appendix c).
d. Determination of the sequence and structure for media requirements based on the hardware and software requirements, as well as for the illustration and animation that would be most effective in the attainment of stated objectives.

The development stages

The development of the virtual learning environment (VLE) was done by drafting the Subject Matter Content Manual (SMCM). This was transformed into a more manageable form (units 1-6). Thereafter, copies of the SMCM were given to the researcher's supervisor and two experienced educational technology lecturers who are presently course lecturers in the Department of Educational Technology at the University of Ilorin for the subject content validation. The content of the SMCM was coded for programming instruction by computer experts, instructional designers, web developers using MacroMedia Flash (development environment) macromedia time line and frames. The platform for the development of the VLE was the HTML: CorelDraw and Microsoft word were used for texts and graphics, macromedia fireworks were used for texts, graphics and buttons, while MacroMedia Flash was used for animations. The VLE that was developed provided instructions in form of texts, animations and illustrations. The researcher gave directives on how the content of the SMCM should be sequentially arranged and the illustration that were included in the package. The professional opinions and suggestions of the web developer experts bordering on the functionality, language, interface and navigation that could make the package adequate for instruction was adhered to.

b. How do educational technology experts rate the developed virtual learning environment for teaching a selected technical drawing concept?

Research question one sought to find out the internet facilities available in secondary schools. The result obtained indicated that schools make no provision for internet facilities, likewise the government does not supply computers and its accessories to the school for helping teachers enhance their instruction skills and as a result of this, the respondents' response on the availability of e-library and sufficient internet centres in the school was low, and thereby teachers are not allowed to use the e-library any time. Research question two sought to find if secondary school teachers in Ilorin utilize internet facilities for instruction. The result of the mean value showed that the teachers can operate computer very well, know the functions of all the buttons in the keyboard and can run various applications on the computer but many teachers lack sufficient knowledge of computer input devices, so they don't use the internet to prepare lesson plan. The influence of gender on teachers' utilization of internet facilities for instruction examined. The results of the t-test established no significant difference between male and female teachers' utilization of internet facilities for instruction. In support of these findings, the findings of Olagunju (1996) also established that there was no significant difference between the male and female teachers' use of computer for teaching and learning.

Based on the findings of this study, the following implications were drawn: The findings have strong implication on the teaching process in Nigeria. It is an indication that there would be great improvement in the teaching and instruction process generally at all secondary schools if teachers could have access to internet facilities and fully utilize those facilities. Also, based on the hypothesis testing teachers' utilization of internet facilities based on gender, the result showed that there was no gender influence. Therefore, if schools and government make provision for internet facilities in schools, it could be of great help for teachers to be more competent in their use of the internet irrespective of their gender.

Table 1. Educational Technology Experts Rate the Developed Virtual Learning Environment for Teaching a Selected Technical Drawing Concept

S/N	ITEMS	Mean Rating
1	The content is structured in a clear and understandable manner.	3.40
2	The structure allows learners to move around freely in Different units.	3.60
3.	The structure of the package permits learners to advance, review, see example, repeat the unit, or escape to explore another unit.	3.60
4	The package facilitates learning by doing	3.20
5	The package allows learners to work on their own pace.	3.60
6	The package allows learners to discover information Through active exploration.	3.60
7	The quality of the text, image, and graphics are good	3.60
8	The package provides printing	3.80

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S/N	ITEMS	Mean Rating
	capabilities	
9	The presentation of information can captivate the attention of student	3.90
	Grand Mean	3.90

Table 1 indicates the mean responses of Educational Technology experts on the developed virtual learning environments. Using a bench mark of 3.0, the grand mean result revealed that the mean score for each of the ten (9) items on the questionnaire is above, while, the grand mean score of all the ten (10) items is 3.90. This indicates that Educational Technology experts rate the developed virtual learning environments suitable for learning.

c. What is the evaluation of technical drawing expert on the developed virtual learning environment for teaching a selected technical drawing concept?

Table 2. Evaluation of Technical Drawing Expert on the Developed Virtual Learning Environment

S/N	ITEMS	Mean Rating
1	The content of the course material you have been given to go through conforms to standard.	3.76
2	The subtopics have been sequentially and coherently arranged.	3.78
3.	The language used in the course manual is simple and easy for both teachers and students.	3.67
4	The diagram in the package are clear and capture attention.	3.65
5	The content is sufficient to achieve the obtained objectives for the selected topics in Technical drawing.	3.47
6	The evaluation questions for each lesson are relevant for the attainment of the lesson objectives.	3.87
7	The students self evaluation questions are relevant to the Student understanding of the course content.	3.60
8	The package facilitates learning by doing.	3.45
9	The package promotes collaborative learning.	3.33
10	The package allows learners to work on their own pace.	3.33
	Grand Mean	3.95

Table 2 indicates the mean rating of Mechanical engineering experts on a developed virtual learning environment in technical drawing. The table revealed that the grand mean score of the mechanical Engineering experts' rating of the developed virtual learning environments in Technical drawing is 3.95 which is higher than the benchmark of 3.00. This implies that the developed virtual learning environments in Technical drawing was well structured and every expectation in the developed virtual learning environments was achieved.

d. What are the cost of the developed virtual learning environment for teaching a selected technical drawing concept?

Table 3. Cost Implication of Developed virtual learning environment for teaching a selected technical drawing concept

S/N	Activities	Rate	Amount
1.	Internet connectivity data for downloading Technical drawing materials, images from google.com	N600/ Per Gigabyte	N1200
2.	Editing of downloaded images	N20/Per Instrument	N700
3.	Uploading and Synchronising of images to produce a virtual learning environment	N40/ Per Slide	N1505
4.	Miscellaneous		N2000
	Total		**N5405**

Table 3 indicates that the total sum of five thousand, four hundred and four naira (N5404) only was the cost estimate for the development of the virtual learning environments. The benefits of the virtual learning environments are unquantifiable and incomparable with the cost.

3.2. Discussion

The findings of this study on the developed and evaluate Virtual Learning Environment for learning selected Technical drawing concept in Ilorin metropolis revealed that educational technology experts and Mechanical Engineering expert rated the developed virtual learning environment high and effective for learning Technical drawing. This finding agreed with the previous findings of Nesbit (2007) whose study pointed out that mobile learning effectiveness and efficiency in consonants with students needs. Similarly,

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studies with similar outcomes abound in the literature, for instance Yusuf, Fakomogbon, Mejabi, Tella and Bolaji (2017) established that the design of instructional content for mobile learning environments requires simplicity in terms of screen interface, user interactivity and feedback mechanism. Also, Oputa (2014) developed an interactive digital game on phonics for early childhood education and reported an overall pupil's high achievement in phonics.

4. Conclusion

The results obtained from the data gathered and analysed in the study indicated that the developed Virtual Learning Environment satisfied the standard required when evaluated after being exposed to experts. The results also showed that the developed Virtual Learning Environment covered the required selected Technical Drawing concept. The developed Virtual Learning Environment was used and found effective for learning selected Technical Drawing concept. The developed Virtual Learning Environment was able to save some menial costs which arises from the traditional teaching. Experts also noted that the platform has proper content planning and it state the objectives properly.

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