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Development and Evaluation of Google Course-kit in Teaching Selected Basic Technology Concept in Ilorin Metropolis

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ABSTRACTS

This study is based on the development and evaluation of the Google Course-kit in teaching selected basic technology concepts in the Ilorin metropolis. The study adopted a design and development model type. The population consists of educational technology experts, computer science experts, and basic technology teachers, which were randomly selected to participate. The instrument for data collection was an adapted questionnaire. Descriptive and Inferential statistics were used to answer the research question and test the stated hypotheses with the aid of Statistical Product and Service Solution (SPSS) version 20.0 at a 0.05 level of significance. The findings indicated that postgraduate students had a positive perception of the utilization and ease of use of mobile technologies for learning. No significant difference exists in the postgraduate students' perception of the utilization of mobile technologies for learning based on gender and the field of study. The study concluded that the teaching aids or materials such as Google kits work as a powerful tool in and outside the four walls of the classroom and can be used to enhance the teaching of basic technology in Nigeria, more particularly, Ilorin metropolis. Google kit is appreciated by the teachers and they are ready to use it in the classroom to provide the opportunity for learners to visualize materials that are not readily available in the school and to show the actual meaning of the lesson content.

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1. INTRODUCTION

The importance of education to mankind cannot be over-emphasized, most especially in the critical moment of technological breakthrough. Education is a socially organized and regulated process of continuous transference of socially significant experience from previous to the following generation. Their submission agrees with the National Policy on Education (NPE) which stressed the importance of education as an instrument of change. NPE affirms the need to make education meet the needs of individual citizens and society at large. Education had been recognized as a fundamental right with far-reaching impacts on human development and social progress. Education is the cornerstone of sustainable development and it contributes to building a modern and thriving society (Idowu & Esere, 2013). Education also empowers communities and citizens to fully participate in development and prosperity. Education in its broadest sense is generally acclaimed as a tool that has a germane impact on the mind, character, or physical ability of an individual (Briggs, 2012).

In this era of Information Technology, there is no end to learning particularly to the academics, through the rapid development of Information and Communication Technology (ICT) infrastructures in Nigeria which motivate learners in every educational institution to make use of the internet as a medium of communication (Hamilton-Ekeke & Mbachu, 2015). Mindflash (2016) opined that it is harder to predict how the new distributed, democratized dynamic will change the nature of how or what people are learning. One significant innovative technology to expand teaching and learning mostly in distance education is E-learning. It is the delivery of learning and training through digital resources. It involves learning with the aid of ICT technology but is not yet a full substitute for the traditional method of learning (Behera, 2013). In this 21st century, e-learning has experienced monumental growth as some institutions have separate online campuses in addition to the existing face-to-face environments.

E-Learning is training, learning, education delivered online through a computer or any other digital device. All students and tutors could add and contribute to the learning activities from any geographical location, and a variety of educational opportunities can be constantly shared and retrieved. Through e-learning, both lecturers and students benefit from a streamlined learning process using Open-Source Learning Management System (LMS) as it helps an educator to manage teaching processes, self-paced courses, and blended learning programs. It provides automation that replaces rigorous and expensive manual work, saves time, and enables the instructor to organize content, data, and learners.

LMS uses a variety of tools and functions such as course management tools, online group chat and discussion, homework collections and grading, documentation, course evaluation tracking, and reporting of course or classroom events between various people that participate. Moodle is an example of such LMS. Moodle (Modular Object-oriented Dynamic Learning Environment) is an open-source e-learning platform. Moodle comprises features that can be understood from the six classified main factors, they are Course and Curriculum Design, Administrator Tools, and Instructor Tools. Research has been conducted in LMS and it was concluded that with the various features, LMS should be used in all the nation's universities for the better academic performance of the students at all levels of education. However, there is factor paramount to the utilization of Instructional Technology in general. These factors are socio-cognitive factors and demographic factors. Socio-cognitive factors include personal, behavioral, and environmental variables. Personal and behavior variables are knowledge, competency, attitude, perception, beliefs, and commitment while environment variables are facilities, equipment, and support. For the relevance of LMS within an education context, undergraduates' perceived usefulness, perceived ease of use, attitude,

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and utilization of LMS must be investigated. A person (who finds a technology useful) will use more of the technology as compared to another person who finds it not useful.

To approach Google Course-kit, it is important to make references to the similar and most familiar platform for teaching and learning which is Google Classroom. Google Classroom is a free web service, developed by Google for schools, that aims to simplify creating, distributing, and grading assignments in a paperless way. The primary purpose of Google Classroom is to streamline the process of sharing files between teachers and students. Google Classroom combines Google Drive for assignment creation and distribution, Google Docs, Sheets and Slides for writing, Gmail for communication, and Google Calendar for scheduling. Students can be invited to join a class through a private code, or automatically imported from a school domain. Each class creates a separate folder in the respective user's Drive, where the student can submit work to be graded by a teacher. Mobile apps, available for iOS and Android devices, let users take photos and attach to assignments, share files from other apps, and access information offline. Teachers can monitor the progress of each student, and after being graded, teachers can return work along with comments.

The Google Course-kit is a free toolkit that allows instructors to use Google Docs and Drive to collect assignments, give faster and richer feedback to students and share course material within the Learning Management System already being used. It is an integration with Canvas that enables faculty to create and grade assignment submissions using Google tools but record grades in Canvas. Google Course-kit enables instructors to create new assignments, receive completed student work, and grade within their existing LMS. Google Course-kit includes two tools. The first one is for the teacher to embed their course material straight away from the Google drive into the LMS. The second is for the teachers to use Google Docs and Drive to collect students' work and give them timely feedback within the school's LMS.

ADDIE model is one of the most used traditional models in the development of e-learning systems. It consists of five phases: analysis, design, development implementation, and the evaluation of the previous phases is reviewed and revised. The phase is reviewed and evaluated before it is delivered to the next stage. The process of analysis and design of eLearning systems faces many challenges such as lack of design of e-learning environments, different requirements, and inability to choose appropriate educational strategies that provide the best use of available learning resources, as well as lack of proper design models or design templates to develop e-learning systems (Hammami *et al.*, 2012).

In developing a Google Course-kit using the ADDIE model, analysis on why the Google Course-kit should be developed must be done. This is to expose the need to be met by the Google Course-kit. Furthermore, a design must be developed to give a blueprint of what the Google Course-kit would look like. Thereafter, developing the Google Course-kit requires putting together every component and element to make up and give structure to the Google-course kit such as Google Docs and Drive. In addition, the Google Course-kit must be implemented to meet the need of which it was developed. Finally, the evaluation must be done to know the effectiveness of the Google Course-kit as LMS. Google Course-kit is a suite of tools developed by Google that provides integration between Google Drive which encompasses the Google tools and LMS like canvas. The Google Course-kit is designed to allow instructors and students to take full advantage of the collaborative content creation, review, and editing tools built into Google Docs sheets and slides.

In this study, we will be examining the development and evaluation of the Google Course-kit in teaching basic technology concepts in the Ilorin metropolis. The basic technology is the only core subject among the prevocational subjects of the Junior Secondary School in Nigeria,

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involves the academic practical study of materials, and sources of energy with the ultimate intention of applying knowledge from the study to provide a comfortable environment for man. The study of basic technology helps to reduce ignorance about technology. Among the prevocational subjects in the junior secondary school curriculum, are practical agriculture, home economics, business studies, and basic technology. However, there is no study related to this that has been conducted in Ilorin metropolises particularly. This indicates the gap that is study wants to fill.

2. LITERATURE REVIEW

2.1. The Concept of ICT in Education

In this 21st century, the term "technology" is an important issue in many fields including education. This is because technology has become the knowledge transfer highway in most countries. Technology integration nowadays has gone through innovations and transformed our societies that have changed the way people think, work, and live. As part of this, schools and other educational institutions which are supposed to prepare students to live in "a knowledge society" need to consider technology integration in their curriculum (Ghavifekr *et al.,* 2012).

Integration of ICT in education refers to the use of computer-based communication that incorporates into daily classroom instructional process. In conjunction with preparing students for the current digital era, teachers are seen as the key players in using ICT in their daily classrooms. This is due to the capability of ICT in providing a dynamic and proactive teaching-learning environment. While, ICT integration aims to improve and increase the quality, accessibility, and cost-efficiency of the delivery of instruction to students, it also refers to benefits from networking the learning communities to face the challenges of current globalization (Albirini, 2006). The process of adoption of ICT is not a single step, but it is an ongoing and continuous step that fully supports teaching and learning and information resources (Young, 2003).

Technology integration in education generally means technology-based teaching and learning process that closely relates to the utilization of learning technologies in schools. Due to the fact that students are familiar with technology and they will learn better within the technology-based environment, the issue of ICT integration in schools, specifically in the classroom is vital. This is because, the use of technology in education contributes a lot in the pedagogical aspects in which the application of ICT will lead to effective learning with the help and supports from ICT elements and components (Jamieson-Procter, 2013). It is right to say that almost all ranges of subjects' starting from mathematics, science, languages, arts, and humanistic and other major fields can be learned more effectively through technology-based tools and equipment. In addition, ICT provides help and complementary supports for both teachers and students where it involves effective learning with the help of the computers to serve the purpose of learning aids (Jorge *et al.,* 2003). Computers and technology do not act as a replacing tool for quality teachers instead they are considered as an add-on supplement needed for better teaching and learning. The need for ICT integration in education is crucial, because, with the help of technology, teaching and learning is not only happening in the school environment but also can happen even if teachers and students are physically in distance. However, ICT integration is not a one-step learning process, but it is a continual process of learning that provides a proactive teaching-learning environment (Young, 2003).

ICT can be used in various ways where it helps both teachers and students to learn about their respective subject areas. Technology-based teaching and learning offer various interesting ways which include educational videos, stimulation, storage of data, the usage of

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databases, mind-mapping, guided discovery, brainstorming, music, World Wide Web (www) that will make the learning process more fulfilling and meaningful (Finger & Trinidad, 2002). On the other hand, students will benefit from ICT integration where they are not bounded to the limited curriculum and resources, instead, hands-on activities in a technology-based course are designed to help them to stimulate their understanding of the subject. It also helps teachers to design their lesson plans in an effective, creative and interesting approach that would result in students' active learning. Previous researches proved that the use of ICT in teaching will enhance the learning process and maximize the students' abilities in active learning (Finger & Trinidad, 2002; Jorge *et al.,* 2003; Young, 2003; Jamieson-Procter *et al.,* 2013).

2.2. The Concept of Google Course-kit in Instruction

Google Course-kit is an internet-based service provided by Google as an e-learning system. This service was designed to help teachers create and distribute tasks to the students in a paperless way. Users of this service must have an account in Google. In addition, Google Course-kit can only be used by schools that have Google Apps for Education. Google Course-kit was used to facilitate the interaction of a professor or teacher with a student or students in the virtual world (Liu & Chuang, 2019). Lecturers freely hand out a scientific assessment and provide an independent assignment to the students (Wijaya, 2018). In addition, professors can also open space for online discussion for students. Google Course-kit utilization can be made through multiple platforms, i.e., through computers and mobile phones. The LMS usage is free of charge so that utilization can be performed as needed. Google Course-kit is an application that allows the creation of classrooms in cyberspace. Google Course-kit can be used as a means for the distribution of tasks, assignments submission as well as assessment. One of the sophistications of this application is that it can be used collaboratively with other groups. There are so many advantages of using Google Course-kit as one of the LMS (Izenstark & Leahy, 2019).

Google Course-kit has been very helpful for enhancing teachers' workflow. It provides a set of powerful tools that make it an ideal system to use with students (Janzen, 2020). Google course is a free tool that helps instructors' grade more efficiently and give students richer feedback on their assignments. It also helps teachers save time, keep classes organized, and improve communication with students. It is available to anyone with Google Apps for Education, a free suite of productivity tools including Gmail, Drive, and Docs. Within this short period that it was created, it has managed to host over 30 million assignments turned in by teachers and students indicating that Google Classroom is being widely endorsed within the education community. Google Course-kit is meant to help teachers manage the creation and collection of student assignments in a paperless environment, basically leveraging the framework of Google Docs, Drive, and other Apps. According to, the course kit allows teachers to spend more time with their students and less time on the paperwork, and it is now even better.

2.3. Application of Google Course-kit in Education

There is limited literature related to Google Course-kit and its effectiveness. Shaharanee *et al.* (2019) analyzed Google Course-kit active learning activities. They used TAM (Technology Acceptance Model) to study the effectiveness of the activities posted on the platform. Results of 100 students revealed that comparative performance was far better in the areas of communication, interaction, perceived usefulness, ease of use, and overall students' satisfaction. Similarly, Espinosa *et al.* (2019) researched to evaluate the functionality of

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Google Course-kit as LMS. The study found that cost was the primary reason for the adoption. Collaborative learning through assignments was viewed as an extremely effective tool for enhancing student engagement.

Research in Taiwan used Google Course-kit with the integration of peer tutor mechanism for 6th-grade students. Students held a positive perception regarding the use of Google Course-kit. The learning objectives were also achieved. Integration of learning analytics with Google Course-kit is believed to be a major limitation of the emerging tool. So far, to the best knowledge of the researcher, all the research conducted on Google Course-kit has indicated a positive response from the students. None of the research has focused on taking into account the teacher's perceptions of the effectiveness of the Google course-kit. The role of teachers in the adoption of any new learning methodology should not be ignored as they are the central figure in the transformation of educational practices. Among newly developed online applications, Google Course-kit is an especially promising tool for collaboration. Google Course-kit allows individuals to work on a common task without restrictions often imposed by traditional face-to-face contacts (Conner, 2019; Holliman & Scanlon, 2006; Perron & Sellers, 2019; Thompson & Coovert, 2019). It reduces the demands for interaction abilities. Additionally, Google Docs is accessible to the general public, regardless of location, as long as the internet is available (Oishi, 2007).

When learners start utilizing Google Course-kit services, they gain from their association with the facilitator and their encounters on utilizing taking in administration frameworks from the facilitator. Learners can learn at their opportunity without association and push from others, learning happens whenever with no time constrain given the learner has association with web availability. Skills and knowledge are not impacted to them only through in contact classroom hours, yet rather through an e-learning platform through a joint effort with the others. This is referred to by Lin and Jou (2013) as a test inclusion in getting. The diverse types of this hypothesis have been utilized in educating and learning, with the focal point of moving far from instructor-focused philosophies to learner-centered pedagogies.

The utilization of technological innovations has been thought to be powerful in disseminating instructions, however, some part of the world has concentrated on the adequacy of Google Course-kit use in teaching and learning as a tool concentrating on the focus of learning instructional methods. Technology innovation permits a few exercises for use in and outside of the classroom. It advances community-oriented learning and influences learners to know what is occurring around them and to have the capacity to make future expectations. In help of the above conclusions, a study on the utilization of Web 2.0 tools and above by Ajjan and Hartshorne (2008), who evaluated the familiarity with employees in the utilization to help in-class learning, found that employees felt that the device which was under scrutiny could enhance learning.

2.4. Studies on Instructional Models

The instructional model is an effort to organize and facilitate learning to improve the ability of individuals to construct knowledge and develop creative thinking. Learning can be interpreted as a process of interaction between individuals and their learning environment to strengthen social, intellectual, and conceptual skills so that they are adaptive to global change. Several studies have been carried out on instructional models, their importance, and their effects on the learning activities of students. The results of interviews with students and lecturers of PGSD in 2016, found that the learning that was used is a direct learning model. Lecturers actively explain the material, question, and answer, presentations with limited space for dialogue. The impact of student achievement is low and the emergence of anxiety

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and reluctance of students to social studies. Lecturers should be more creative and innovative in choosing learning models that match the material characteristics. The study of Bastas (2015) explained that the active role of students in learning can increase learning motivation, performance, critical thinking skills, and problem-solving. Thus, interactive learning can stimulate learning activities and improve the quality and learning outcomes.

One model of instruction that can improve the learning activities of students is the reciprocal instruction model. The reciprocal learning model is a reflection of constructivist learning theory. Individuals build understanding through interaction with other people and their environment. Furthermore, reciprocal instruction provides an opportunity to explore content learned through dialogue in the classroom. This model requires the active role of students to build their thinking processes so that they can be creative in learning. Interactive dialogue between fellow students and also between lecturers and students with questioning strategies, explaining, concluding, and predicting, is characteristic of reciprocal models. Through this dialogue, students are not required to memorize concepts and facts, but they must understand and find relationships between concepts and facts so that they can construct their cognitive abilities critically.

2.5. Contents and Objectives of Basic Science Technology in Nigeria Education Curriculum

Technology which is the only core subject among the prevocational subjects of the Junior Secondary Schools in Nigeria involves the academic and practical study of materials, and sources of energy with the ultimate intention of applying knowledge from the study to provide a comfortable environment for man. This study of Technology helps also to reduce ignorance about technology.

The basic technology is a subject in Junior Secondary School which exposes students to basic ideas and concepts of technology and skills development in the various subject areas that make up the subject. Federal Government of Nigerian in 2004 stipulated that a prevocational course (basic technology) be studied in Junior Secondary School that is aimed at instilling an appreciation of technology, creation of awareness; acquisition of knowledge, work habits, and attitude as well as orientation to basic manipulative skills. The National Policy on Education in 2004 expressed some concern about correcting the society's attitude to technology as well as providing trained manpower at the sub-professional level for the technological development of the country.

The basic technology is expected to be a foundation on which future technological development and skills can be built either in technical colleges or secondary schools or tertiary institutions for those who will proceed to higher levels. It is a practice-oriented course where the practical application of day-to-day learning is enforced for proper technological awareness and skill development. The practical aspect of the course will lead to basic manipulative skills, acquisition of work habits, and attitude in the hope to be taught as practical topics using equipment and tools.

Basic technology is taught in many secondary schools from the first year to the third year without any practical or demonstration lesson. He said that this ugly situation has been attributed to many reasons which range from unqualified teachers to lack of equipment. The basic technology is the only core subject among the prevocational subjects of the Junior Secondary School in Nigeria, involves the academic practical study of materials, and sources of energy with the ultimate intention of applying knowledge from the study to provide a comfortable environment for man. The study of basic technology helps to reduce ignorance about technology. Among the prevocational subjects in the junior secondary school

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curriculum, are practical agriculture, home economics, business studies, and basic technology.

Basic technology gives opportunities to students to use tools and machines, which are used in the industrial process. This helps to develop good attitudes towards technology and industry. Through introductory technology, students are helped to explore the various areas of technology towards making an intelligent career choice. Introductory technology does not in any way provide training for specific occupations nor aims at developing competencies. The focus of the provocation courses such as introductory technology was to expose students at the junior secondary school level to the world of works through exploration. Such exposure will enable junior secondary school students to make intelligent consumption patterns.

2.5. Application of Instructional Model for Learning

The advent of information technology and globalization heralded various sophistication in the learning and teaching environment. As the learning environment evolves, the students are becoming increasingly desperate for individualized learning that allows them to construct their knowledge path. The significant changes occurring in teaching and learning needs compel a new learning concept that ensures learner-centered, with flexible modes of content configuration, and adaptive delivery and assessment. An effective learning content design is not driven by the advancement of technology. It has to be rooted in sound learning theories and appropriate instructional strategies**.** Effective instruction entails the careful blending of planning, task analysis, experience, needs of intended learners, and technical considerations. Hence, a good instructional design can revolutionize conventional classroom instruction, making learning more effective (see **Figure 1**). There are various instructional models. However, for this study, we will be examining two models concerning their learning application. They are; ASSURE model and the ADDIE model.

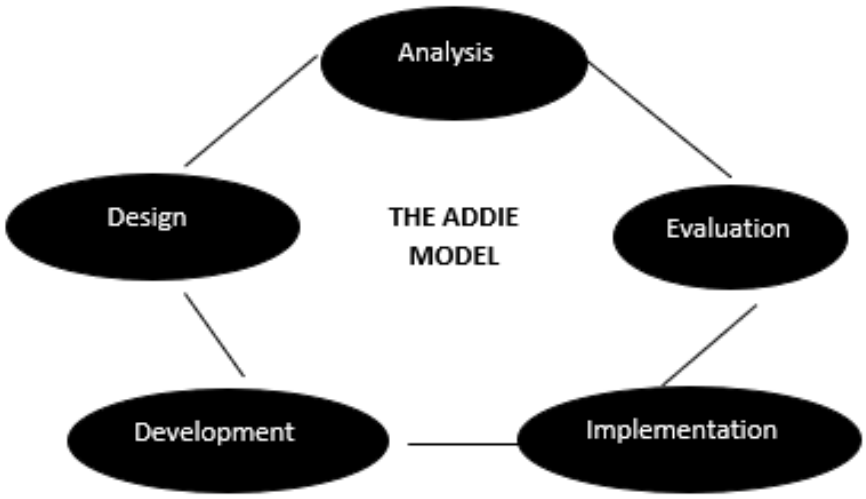

Figure 1. An ISD Model Featuring the ADDIE Processes (Source: Grainger, 1988).

3. METHODS

This study adopts the development and evaluation of Google Course-Kit in teaching selected Basic Technology for Educational Technology experts, Computer Science experts, and Basic Technology experts who would also participate in this study. The population sample for this study consists of all Educational Technology experts, Computer science experts, and Basic science in the Ilorin metropolis. The target population consists of all Educational

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Technology experts and Computer science experts in the University of Ilorin and Basic Technology teachers in the Ilorin metropolis. In the research, five Educational Technology experts, five Computer Science experts, and five Basic Technology experts were purposively selected for this study. The experts where been selected on the premise that they have been teaching the subject over the years.

3.1. Research Instruments

The instrument for data collection was an adapted questionnaire titled "Development and evaluation of Google Course-kit in teaching selected basic technology concept in Ilorin metropolis". The instrument was divided into three sections (A, B, and C). Section A addressed the Educational Technology Experts; Section B elicited information on Computer sciences Experts perceived usefulness of Google Course-kit for teaching; Section C examined the Basic Technology Teachers on the use of Google Course-kit. The questionnaire responses for the sections were rated on a 4-point Likert scale mode: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

3.2. Validity and Reliability of the Instruments

Validity explains how well the collected data covers the actual area of investigation. Validity means "measure what's intended to be measured". The instrument was validated for face and content validity by the researcher's supervisor and three other lecturers within the Department of Educational Technology, University of Ilorin, Ilorin, Nigeria. The instrument was validated by the researcher supervisor and other three Educational Technology experts for face and content validity. Their corrections where been modified and were antically analyzed, thus carefully considered before the final production of the Google Course-Kit. Some of the expert's observations were durability and user friendly, typographical error, the boldness of shot text, contents, and technicality of the Google Course-Kit. Reliability concerns the extent to which a measurement of a phenomenon provides a stable and consistent result. Reliability is additionally concerned with repeatability. For example, a scale or test is claimed to be reliable if repeat measurement made under constant conditions gave the same result.

3.3. Procedure for Data Collection

The data collection was conducted after getting approval from the Head of the Department of Educational Technology. The researchers reached the consent of the respondents to fill in the rating scale. Before the respondents fill in the rating scale, the researcher briefed the respondents on how to go about it and was allowed to ask questions in the process in case they did not understand something. This briefing was the part of data quality assurance measures that was ensured that accurate and reliable data is gathered. The retrieval of the rating scale was made by the researchers immediately.

A total number of 15 respondents will be selected for five Educational Technology exports. Computer Science Experts and five Basic Technology Experts will be purposively selected for the study to determine the ease of access to the lessons.

3.4. Ethical Consideration

Ethical consideration was maintained through the period of data collection. The researcher ensured that respondents were not coerced to fill out the questionnaire and respondents were allowed to participate voluntarily. Also, utmost confidentiality and secrecy of the respondents were maintained during the administration, collation, and report of research findings.

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3.5. Data Analysis Techniques

The data collected were analyzed employing descriptive and inferential statistics. The descriptive design may be a research design that aims to explain the participant or a phenomenon of the study. Moreover, it aims to answer the question which focuses on the demographic information of the study. This defines respondent characteristics, data trends, and comparison of groups validating existing conditions and duplicating research. To analyze the target of the study which were determining the characteristic of the participants concerning socio-demographic characteristics, perceived usefulness, and perceived simple use of mobile technology among postgraduates' students for learning, descriptive statistics were used.

Moreover, the various specific statistical tools like frequency, percentage, mean, and variance were utilized to measure the quantitative variables to give an overview descriptive of the respondents in analyzing the info for socio-demographic characteristic, gender, the field of study, perceived usefulness, and perceived simple use of Google Course-kit for teaching. The data collected was analyzed using descriptive statistics. Mean, Frequency, and standard deviation were used to analyze the research questions. The data collected and analyzed in this section represents the variables of focus for the study and background information on the development and validation of a Google kit in basic technology for upper basic schools in the Ilorin metropolis. The demographic information in which data were collected and analyzed includes respondents' gender and educational qualification obtained which are presented in **Table 1**.

4. RESULTS AND DISCUSSION

4.1. Results

4.1.1. Research Question One: What are the Processes Involved in the Development of a Google Kit in Basic Technology for Upper Basic Schools in Ilorin Metropolis?

The development of a Google Kit in basic technology for upper basic schools in the Ilorin metropolis was carried out using the Product Oriented Model which is a front-end system design with four phases (Course Outline, Selection of Media, Development/ Production of material, and Course Delivery). The course outline was selected from the Basic technology syllabus. The images and audio files were downloaded from open-sourced websites most especially Google.

4.1.2. Research Question Two: How do Educational Technology Experts Rate the Developed Google Kit on Basic Technology for Upper Basic Schools in Ilorin Metropolis?

To answer research question two, an educational technology expert rating guide was used in the validation of the developed Google Kit in basic technology for upper basic schools in the Ilorin metropolis. The data were analyzed using mean, while the grand mean was used to determine the validation rate developed Google Kit on basic technology for upper basic schools in the Ilorin metropolis. The benchmark of 3.0 of a 5-point Likert scale was adopted. Results of the analysis are shown in **Table 1** and interpreted as thus:

Table 1 indicates the mean of educational technology experts on a developed Google Kit on basic technology for upper basic schools in the Ilorin metropolis. The table revealed that the grand mean score of educational technology experts' rating of a developed Google Kit on basic technology for upper basic schools in the Ilorin metropolis is 4.60 which is higher than the benchmark of 3.00. This implies that the developed Google Kit was well structured and every expectation in the developed Google Kits was achieved.

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Table 1. Mean of Educational Technology Experts on a Developed Google Kit on Basic Technology for Upper Basic Schools.

S/N	Statement	Mean
1	The content is structured in a clear and understanding manner.	3.00
2	The package is user-friendly.	4.00
3	Keys for accessing different units.	4.67
4	Package color mixture is appealing to learn.	3.47
5	Screens are designed in a clear and understanding manner.	4.67
6	The quality of the text, illustrations, and graphics is good.	4.67
7	High contrast between graphics and background is retained.	4.33
8	The content has durability.	5.00
9	The content can be updated and/or modified with new knowledge.	4.33
10	The update, modifying, and adding procedures are relatively easy for the average user.	4.33
	Grand Mean	**4.60**

4.1.3. Research Question Three: What are the Computer Science Expert Rating of the Developed Google Course-Kit on Selected Basic Technology Concepts?

To determine validation of computer science experts in upper basic schools to the developed Google Kit. A subject content validation questionnaire was used. The data collected were analyzed mean, while grand mean was used to determine the overall rating of computer science experts in upper basic schools to the developed Google Kit. The benchmark of 3.0 of a 5-point Likert scale was adopted. **Table 2** indicates the mean responses of computer science experts in upper basic schools to the developed Google Kit. Using a benchmark of 3.0, the grand mean result revealed that the mean score for each of the ten items on the questionnaire is above 2.5, while, the grand mean score of the ten items is 3.64. This indicates that the computer experts rated the Google Kit positive.

Table 2. Mean Rating of Computer Science Expert Rating the Developed Google Kit.

S/N	Items	Mean
1	The structure of the package allows learners to use the live binder to explore, learn, understand basic computer concepts.	3.41
2	The package is user-friendly.	3.23
3	Keys for accessing different units.	3.43
4	Package color mixture is appealing to learn.	3.22
5	The level of content and vocabulary are appropriate for the intended audience.	3.62
6	It is easy to understand the concept because of the information presented.	3.34
7	The content has durability.	3.34
8	The package can be used on different platforms.	3.32
9	The package allows learners to learn at their own pace.	4.20
10	The illustrations used in the units of instruction are very clear.	3.31
	Grand Mean	**3.44**

4.1.4. Research Question Four: What are the Basic Technology Expert Rating of the Developed Google Course-Kit on Selected Basic Technology Concepts?

Table 3 indicates the mean responses of Basic Technology experts in upper basic schools to the developed Google Kit. Using a benchmark of 3.0, the grand mean result revealed that the mean score for each of the ten items on the questionnaire is above 2.5, while, the grand

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mean score of the ten items is 3.22. This indicates that the Basic Technology experts rated the Google Kit positive.

Table 3. Mean Rating of Basic Technology Expert Rating to the Developed Google Kit.

S/N	Items	Mean
1	The topic content reading and activities are relevant to the objectives stated.	3.32
2	The instruction will enable the students to achieve the main objectives.	3.33
3	The illustrations used in the units of instruction are very clear.	3.13
4	The evaluation questions enhance the memory of the students.	3.12
5	The level of content and vocabulary are appropriate for the intended audience.	3.22
6	It is easy to understand the concept because of the information presented.	3.24
7	The content has durability.	3.14
8	The package can be used on different platforms.	3.12
9	The package allows the learner to learn at their own pace.	4.20
10	The package encourages discussion and collaboration among learners.	3.31
	Grand Mean	**3.22**

4.1.5. Research Question Five: What is the Cost to Develop a Google Kit on Basic Technology for Upper Basic Schools in Ilorin Metropolis?

In answering research question 4, the researcher calculated the total amount of the money spent in the development of a Google Kit on basic technology for upper basic schools in the Ilorin metropolis. The activities involved 4 steps, the rate at which they were executed and the amount spent on each activity were tabulated and presented in **Table 4**.

Table 4 indicates that the total sum of five thousand, four hundred and four nairas (N12,505) only was the cost estimate for the development and validation of a Google Kit to teach Basic technology in upper basic schools in the Ilorin metropolis. The benefits of the Google Kit are unquantifiable and incomparable with the cost.

Table 4. Cost Implication of Developed Google Kit in Basic Technology for Upper Basic Schools.

S/N	Activities	Rate	Amount
1	Internet connectivity data for downloading Basic technology instruments images from google.com	N600/ Per Gigabyte	N10000
2	Editing of downloaded images	N20/Per Instrument	N700
3	Uploading and synchronizing of images to produce a photo-series	N40/ Per Slide	N1505
	Miscellaneous		N2000
5	**Total**		**N12,505**

4.2. Discussion

Findings revealed that the development of a digital photo-series in basic technology for upper basic schools in the Ilorin metropolis can be done using the Product Oriented Model which is a front-end system design with four phases (Course Outline, Selection of Media, Development/ Production of material, and Course Delivery). These findings made a significant effort to build on the ADDIE model and postulated that the design of instruction and classroom instructional materials should be based on a whole system that focuses on the interrelationship between contexts, content, learning, and instructional technique.

Findings also revealed that the developed Google Kit for Basic technology was well structured and every expectation in the developed Google Kit was achieved. The researchers

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posited that a Google Kit showed higher scores on standardized measures of achievement, and also rated higher on as an attitude instrument. Not only is there evidence for achievement, but also evidence for improvement in attitude. The researcher opined those visual materials have been an important component of the classroom over the years, and teachers have a positive reaction to the use of visual materials in the classroom. The researcher claimed that visual materials such as film strips, pictures, slides, and pass-around objects are mostly liked and utilized by teachers in the classroom compared to other instructional materials. Thus, visual materials such as Google Kit are considered a useful tool for teachers in almost every trend of classroom instruction.

5. CONCLUSION

The study concluded that the visual aids or materials such as goggle kits work as a powerful tool in the classroom and can be used to enhance the teaching of basic technology in Nigeria, more particularly, the Ilorin metropolis. Google kit is appreciated by the teachers and they are ready to use it in the classroom to provide the opportunity for learners to visualize materials that are not readily available in the school and to show the actual meaning of the lesson content.

6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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