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DEVELOPMENT AND UTILIZATION OF DIGITAL BOARD FOR INSTRUCTIONAL DELIVERY IN PUBLIC TECHNICAL COLLEGES IN AKWA IBOM STATE

Samuel Anietie Ubong
Department of Computer and Robotics Education, University of Uyo, Uyo, Nigeria

Nseabasi Peter Essien (Ph.D)
Department of Computer and Robotics Education, University of Uyo, Uyo, Nigeria

Emmanuel Philip Ododo
Department of Computer and Robotics Education, University of Uyo, Uyo, Nigeria

Abstract
The study was on development and utilization of 'ESUB' digital board for instructional delivery in public technical colleges in Akwa Ibom state. The purpose of this study was to develop and utilize ESUB digital board for instructional delivery in Technical Colleges in Akwa Ibom State. This study was carried out in Technical schools in Akwa Ibom state.the study was guided by three specific purpose of the study. Two designs were adopted in the study, Iterative design and descriptive survey design. The population of the study consisted of 1690 teachers and students from the nine public Technical Colleges in Akwa Ibom State, during 2021/2022 academic session. A sample of 408 comprising 39 teachers and 369 students took part in the study. Simple random sampling technique was used to select the sample size for the study. Three specific purposes and two research questions guided the study. Research questions were answered using mean and standard deviation. The instrument for data collection was a questionnaire titled "Attitude and Interest Towards Utilization of ESUB Questionnaire" (AITUEQ). The instrument was face validated by three experts. Cronbach alpha Statistics was used to determine the reliability coefficient of the instrument, which yielded a reliability coefficient of 0.84. Results from the study revealed that teachers' attitude towards utilization of ESUB software for instructional delivery in Technical Colleges in Akwa Ibom State was positive. Also students' interest towards utilization of ESUB software for instructional delivery in Technical Colleges in Akwa Ibom State is positive. It was therefore recommended that Teachers in Technical Colleges in Akwa Ibom State should endeavour to use ESUB software for instructional delivery to enhance their performance and arouse students interest in instructional delivery process. Also, Students should be motivated by giving opportunity to interact also with the ESUB software in order to enhance interest towards the use of ESUB software for instructional delivery and to enhance their learning performance.

Keywords Development and utilization, Utilization of ESUB Questionnaire, Technical Colleges.

INTRODUCTION

Education is an organized process of transferring knowledge, skills, values and beliefs and is prerequisite for any improvement at individual or social level. Due to technological advancement, new opportunities have emerged to fulfill the process of education. Among them, the strongest representative is the computer, which with its own abilities adds a completely new dimension to the education process. Twiner (2018) defined computer as an electronic device that has the ability to accept data as input, process data and stores it for future references. Computer is essentially a combination of hardware components that require instructions (software) to perform tasks and provide functionality. Without software, a computer would merely be a collection of inert hardware components with no practical use.

Software, also called computer software, is a set of instructions and documentation that tells a computer what to do or how to perform a task. It is the set of instructions that breathes life into the computer, allowing it to carry out a wide range of tasks, from basic computations to complex operations. Software includes all different programs on a computer, such as applications and operating system. Applications are programs that are designed to perform a specific operation, such as a game or a word processor. The operating system (e.g. Mac OS, Microsoft Windows, Android and various Linux distributions) is a type of software that is used as a platform for running the applications, and controlling all user interface tools including display and the keyboard. Software is created, designed, and evolved over time through the software development process.

Software development is the process of creating and designing software. It involves planning, designing, and specifying the functionality of the software; translates the software's design and specifications into executable instructions that the computer can understand and execute; rigorous testing to ensure the software functions correctly and meets its intended objectives; identifying and fixing defects, errors, and issues in the software's code; maintenance and updates; and documentation that includes user manuals, technical specifications, and code documentation. This documentation helps users understand how to use the software and assists other developers who may need to work on the software in the future.

Software could be produced for a variety of purposes for meeting specific needs of a specific client/business; perceived need of some set of potential users; for personal use and increasing market competition (Petersen and Claes, 2019). Software development is the activity that involves process of writing and maintaining the source code, and in the broader sense, the term includes all that is involved between the conceptions of the desired software through to its final manifestation (Oumer et al., 2016). Therefore, software development may include research, new development, modification, reuse, re-engineering, maintenance, or any other activity that results in software products (Macro and Luke, 2017). Essien and Ubong (ESUB) Software teaching board is customized computer software developed by the researcher to aid instructional delivery and improve educational processes.

ESUB Software teaching board is designed to deliver instruction or to assist in the delivery of instruction on a specific topic. This type of software's sole purpose is to support instruction and/or learning. Digital board is a web software which can be run remotely on a computer or smart phone and linked to a data projector to display the written text; it allows direct input via finger or pen so that characters can be easily written on the

board or transformed by the teachers. Digital board offers a wide range of potential benefits for the presentation of instructional material in terms of the relative ease of integration of a large number of presentations and ICT, which, together, provide new opportunities for strengthening pedagogical strategies (Levy, 2019). Interactivity between teachers, students and digital board provides the focus for the analysis of learning and teaching in the context of standard learning environment (Ozhan, 2020). Computer software has been used over the years by teachers to improve instructional delivery in schools.

The term instructional delivery is described by Hornby (2015), as an adjective derived from the concept of instruction and it connotes when someone teaches people something. An instruction has been defined as the last phase of curriculum implementation. This means that when instruction is given in this way, it is meant towards curriculum showing that it is an act of implementation. Jeremiah and Alamina (2017) described instruction as all activities engaged in by the teacher with the aim of facilitating change in the learner behaviour using different kinds of delivery methods. Instructional delivery models on the other hand are methods, strategies, approaches or even techniques that a teacher employs to deliver his/her subject matter to the learners. It can as well be regarded as a representation of a pattern in which a lesson is to be presented (Nwafor, 2017). The process of instructional delivery is based on stated objectives of the lesson, and this provides opportunity for evaluating if the objectives of the lesson have been achieved or not (Buseri and Dorgu, 2015).

Instructional delivery has been seen as the process of showing every activity the teacher and the learners do in a classroom setting. Every effort that the teacher makes in order to have a fruitful time with the students by exposing them to the contents, employing methods and strategies that enable students' interaction with the environment, using resources available and even the evaluation process sums up to mean instructional delivery (Mezieobi, 2019). When a teacher consciously utilizes his training, knowledge, skills and value and relays it in order to change the behavioral position of the learner, the teacher is carrying out instructional delivery. For Etuk and Umoh (2013), instructional delivery is the knowledge of teaching techniques and their application for learning to take place in a flexible manner that would not distort the original intent of the teacher for being in the classroom. Instructional delivery refers to the act of sending information and procedures to be comprehended and adhered to by the receiver (Merriam, 2019). Instructional delivery is the process whereby the teacher (instructor) carefully selects the method and technique for handing down learning experiences to learners through appropriate mediums of communication.

In the context of this study, Instructional delivery refers to the way teachers use to teach and present information to learners effectively. It encompasses various strategies and approaches such as the use of computer software aimed at facilitating learning and understanding. Effective instructional delivery is crucial in traditional classroom settings. It is the sending of learning experiences in technical education courses to learners in Technical Colleges with the aid of a computer software such as ESUB. A few years ago, precisely late 20th Century and early 21st Century, technological advancements changed the face of instructional delivery. Information and Communication Technology (ICT) has come in vogue in the instructional delivery (teaching and learning) process in institutions of learning including secondary schools (United Nations Education Scientific and Cultural Organization (UNESCO, 2018). This could have also changed the attitude of teachers and student interest towards its utilization for instructional

process. Teachers and students may resist (attitude) adopting ICT tools and methods in their teaching due to a fear of change or a lack of confidence in the technology. Teachers may be accustomed to traditional teaching methods and be reluctant (interest) to utilize to use the technology due to the belief that traditional instructional delivery is more effective than ICT-based approaches, leading to resistance (Mezieobi, 2019).

Attitude is defined as the way teachers accept or reject the idea of teaching and learning with the use of ICT tools in the classroom, while they are preparing instruction which need to be implemented during the course of teaching in the classroom and while they are learning to better equip themselves to bolster delivering better educational instructions to the students in a learning environment (Kreijns et al., 2022). Also, attitude cannot be discussed without touching the factors that can impact it such as perception, beliefs, awareness, confidence and competency of teachers about ICT and ICT tools concerning its usage and applications in educational contents (Oladosu, 2022). Furthermore, according to Kreijns et al, (2022) attitude is a person's overall feeling of how favorable or unfavorable the result of a particular behavior is. The intended result of improving student and teacher productivity cannot be achieved if the attitude of teachers towards the use of ICT tools is not properly understood before trying to apply any technology. Information and Communication Technology (ICT) is highly useful in instructional delivery. It has the potential to significantly enhance the teaching and learning process in education by improving communication between teachers and students. This helps in clarifying doubts, sharing resources, and providing feedback in a timely manner; technology such as videos, animations, and interactive diagrams can make complex concepts more accessible and easier to understand; facilitating interactive and engaging learning experiences. Through technology presentations, simulations, and educational software, students can interact with the content, making it more dynamic and interesting.

Yusuf and Balogun (2018) posited that interest is a mental predisposition to an act that is expressed by evaluating a particular entity with some degree of favour or disfavour. Individuals, generally have interest that focuses on objects, people or instruction. Interest is an acquired tendency to act in specific ways either positive or negative. Interest refers to one's positive or negative feeling of wanting to know or learn about a concrete subject, interest is developed, moldable, observable and they vary with experience of the stimulus objects and with social rules, norms or institution (Binder and Niederle, 2020). High level of interest in the use of computer could be associated with ease of use of the technology. Based on the above definition interest can be seen as a general feeling about something or situation. Psychological findings have proven that interest and behaviour are linked together they have roots in emotions, interest influences behaviour; they represent the way in which interact with learning environment (Lou and Dixon, 2018).

Interest can be observed in three components, such as affection, behaviour, and cognition. Huskinson and Haddock (2020) stated that affection refers to feelings of an individual associated with an attitude, cognition refers to individual beliefs or attributes associated with an attitude, and behavior refers to past behavior or behavioral intentions relevant to an attitude. If students' interest in ICT, that ICT is a good medium for achieving a productive learning is high, the technology integration can be realized more easily and successfully (Malahi and Mohamed, 2019).

Before the emergence of Information Technology, teachers in technical schools used chalkboard and

whiteboards to engage with students and manually present instructions to students. This made the instructional process more experiential. Gillen (2018) defined a whiteboard (also known by the terms marker board, dry-erase board, dry-wipe board, and pen-board) as a glossy, usually white or black surface for making non-permanent markings. Whiteboards are analogous to blackboards, but with a smoother surface allowing rapid marking and erasing of markings on their surface. The popularity of whiteboards increased rapidly in the mid-1990s and they have become a fixture in many offices, meeting rooms, school classrooms, and other work environments.

ESUB digital board tools which may improve instructional delivery include text writer, downloader, draw, eraser, and undo/redo command. Text writer is a feature of software teaching board that allows a teacher to write text with his/her finger on the Software Digital Board. It is powered by a JavaScript library called hammer.js which uses a touch gesture to fire a draw event. The touch-action property determines if and how a user can interact with an element on screen via touch input using the browser's default features. For example, panning or zooming. Touch events are a Web API that allows the browser to interpret finger or stylus interactions on touch screens or trackpads. Touch-action allows a teacher to inform the browser of the application's intent before any event listeners are triggered.

Download tool also known as save tool is a feature of ESUB digital board that allows written content on the board to be downloaded or saved to a local device. When a teacher or student writes on the board, both sides can see it. The lesson materials can be displayed and used inside the board (with the teacher setting the pace of the class), notes from the class are digitized, can be saved with one click and shared with all students after the class. The download tool is powered by a JavaScript Library known as socket.io which enables real-time bidirectional event-based communication. According to Pimentel and Nickerson (2013) socket.io works on every platform, browser or device, focusing equally on reliability and speed. It enables real-time, bi-directional communication between web clients and servers. It has two parts: a client-side library that runs in the browser, and a server-side library for node.js. Both components have an identical Application Programming Interface (API). Socket.IO primarily uses the web socket protocol with polling as a fallback option, while providing the same interface. Although it can be used as simply a wrapper for web socket, it provides many more features, including broadcasting to multiple sockets, storing data associated with each client, and asynchronous I/O.

Draw is a feature of ESUB Digital board that allows the teacher to draw shapes on the board. This feature is powered by a JavaScript library known as paper.js. It is a vector graphics scripting, and the vector part is important. There are two basic types of graphics, vectorized and rasterized. Rasterized graphics are the pictures from digital camera: big rectangles with maps denoting the color of each pixel. Blurry dots are seen when the pictures are enlarged. Vector graphics are like connect-the-dots pictures: they're sets of lines and shapes that give instructions on how to draw the image at any size. Using vector graphics, a teacher can make an image of the letter Z really big and it will still look sharp. If a teacher turned it into a rasterized graphic by taking a picture of it and then blowing it up, the letter would get all blurry. Vector graphics libraries make resizing, rotating and moving objects easy. They're also much faster, because the program has instructions for drawing each object instead of needing to figure it out.

Undo/Redo is a feature of software teaching board that uses websocket bidirectional communication technique to undo or redo user's actions.

Websocket is an application layer protocol which provides a full duplex and persistent way of communication between client and server over a single underlying TCP connection. It is an upgrade over HTTP protocol. Pimentel and Nickerson (2013) maintain that WebSocket keeps the connection open and allows the data/messages to be passed back and forth between client and server. This helps achieving a real-time data transfer to and from the server; it provides many more features, including broadcasting to multiple sockets, storing data associated with each client, and asynchronous input/ output.

Eraser is a Software Teaching Board tool that enables a teacher to clear/wipe unwanted content on the board by swiping two fingers on the board or clicking on the eraser button, however, the cleared content can still be reversed using the undo tool. Erasing on the board is faster as compared to the traditional chalkboard. It is powered by clearReact() method in JavaScript. According to W3C (2021), this method performs pretty well than others for clearing the canvas. Software development process was followed in the development of ESUB. Software development process involves planning, designing, and specifying the functionality of the software; translates the software's design and specifications into executable instructions that the computer can understand and execute; rigorous testing to ensure the software functions correctly and meets its intended objectives; identifying and fixing defects, errors, and issues in the software's code; maintenance and updates; and documentation that includes user manuals, technical specifications, and code documentation. This documentation helps users understand how to use the software and assists other developers who may need to work on the software in the future. The ESUB digital board tools could be utilized for effective instructional delivery in Technical Colleges in Akwa Ibom State.

Statement of the Problem

Teaching, as an occupation, involves imparting knowledge by the teacher to the learners. To enhance this, methods of visually presenting information to students are used. Traditionally, school teachers used chalks to write on chalkboards. The chalk produces a lot of dust which accumulates on surfaces and computer systems. This caused many schools to substitute the chalkboards with whiteboards. The whiteboard marker pen inks have organic solvents which can cause many health hazards including the central nervous toxicity, respiratory effects and eye irritation (Malik, Ajaz and Jumani, 2016). Use of technology in education has come a long way since the earliest times of human civilization. This ranges from slates, blackboards, green and brown boards, white board and then the computer.

Both chalkboard and traditional whiteboard that are widely used in schools have significant drawbacks such as health hazards, inability to save contents written on them, wiping cannot be done quickly as it wastes and consumes teacher's time, in most cases it confines a teacher to a particular spot in the classroom, it is not highly visible and does not focus students' attention in classroom. Therefore, there is need to move from "chalk and talk" method to more innovative information and technological enriched approaches for meaningful instructional delivery. Some educators hold the perception that ICT-based instruction is less effective or that it leads to lower learning outcomes, contributing to negative attitudes. Students share the belief that traditional teaching methods are more effective than ICT-based approaches because they perceive ICT as a disruption to their established routines, leading to resistance (Malahi and Mohamed, 2019).

The light of the forgone inspired the researcher's interest to develop and utilize ESUB Digital board that will not only improve instructional delivery

but eliminate health hazards associated with the use of whiteboard marker pens and chalkboards.

Purpose of the Study

The main purpose of this study was to develop and utilize ESUB digital board for instructional delivery in Technical Colleges in Akwa Ibom State. Specifically, the study sought to:

i. Develop the ESUB digital board for instructional delivery in Technical Colleges in Akwa Ibom State using software development process.

ii. Determine teachers' attitude towards utilization of ESUB digital board for instructional delivery in Technical Colleges in Akwa Ibom State.

iii. Determine students' interest towards utilization of ESUB digital board for instructional delivery in Technical Colleges in Akwa Ibom State.

Research Questions

The following research questions were used to guide the study:

i. What is the teachers' attitude towards utilization of ESUB digital board for instructional delivery in Technical Colleges in Akwa Ibom State?

ii. What is the students' interest towards utilization of ESUB digital board for instructional delivery in Technical Colleges in Akwa Ibom State?

METHOD

Design of the Study

The research design adopted for this study were iterative design model and Survey design. Iterative design model is a design model in cycle that accommodate new changes to software requirement at every cycle. Survey research design use data obtained from a sample in an investigation to document, describe and explain what is in existence or non-existence, or the present state of a phenomenon being investigated. The designs were considered most appropriate for the study because iterative design model allow for testing in every cycle before going to the next cycle and requirement changes are allowed after every cycle. Also, survey design was used because the researcher exploited the information that were obtained from the respondents (teacher and students) in drawing inference from the responses on the implementation of ESUB software digital board

System Modeling

System modeling is the process of developing abstract models of a system, with each model presenting a different view or perspective of that system. It is about representing a system using some kind of graphical notation, which is now almost always based on notations in the Unified Modeling Language (UML). Models help the analyst to understand the functionality of the system; and are used to communicate.

Models can explain the system from different perspectives:

i. An external perspective, where the analyst models the context or environment of the system.

ii. An interaction perspective, where the analyst models the interactions between a system and its environment, or between the components of a system.

iii. A structural perspective, where the analyst models the organization of a system or the structure of the data that is processed by the system.

iv. A behavioral perspective, where the analyst models the dynamic behavior of the system and how it responds to events.

ESUB Iterative Model

Essien and Ubong (ESUB) digital board is a web application which was designed and modeled with standard tools of software engineering. The system model is the process of defining the modules,

interfaces and the architecture of the system. The model adopted for this system is the Iterative model.

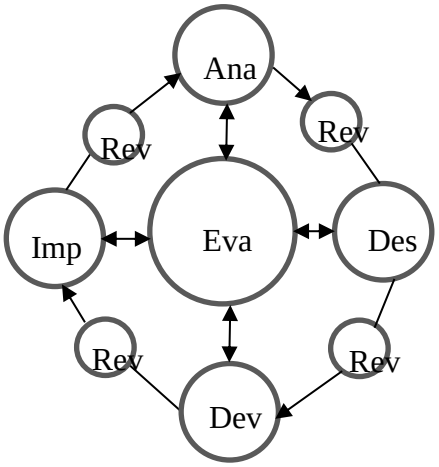

Figure. 3.1: Iterative Model for software development
Source: Malik, Ajaz and Jumani (2016)

The phases of the model are:

Analysis: In order to understand the infrastructure of the classroom, this phase required data related to the design-process which was collected by using questionnaires and interviews. Also, the identification of the problems, opportunities, goals and objectives will be addressed in this phase.

Design: After identifying the goals and objectives in the previous phase, it is necessary to start the design and structure the system to meet and fit teaching requirements. Also, the system design helps in defining overall system requirements.

Development: The actual process of creating and developing the design. The system is developed to address the performance gap identified in the analysis and design phases.

Implementation: In the implementation phase, it is the time to decide how to deliver lesson to the learners. The process is based on the performance of the analysis phase.

Evaluation: This phase can be done for the previous phases; individually or all of them together. One of the evaluation strategies is using a combination of self-evaluation and learner-evaluation. Limitation and quality of the system will appear in this phase.

Adopted Model **Formulated Model**

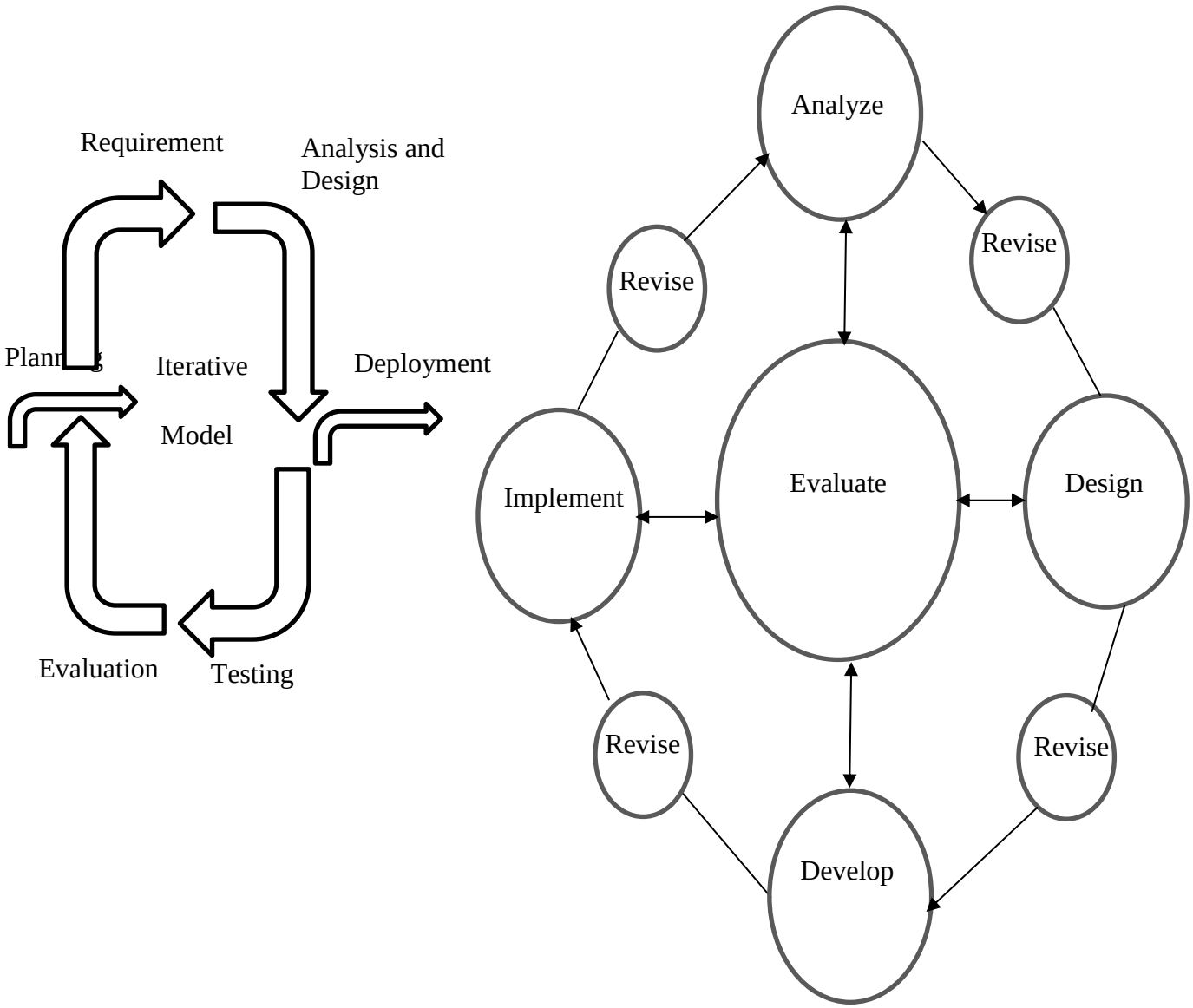

Figure. 3.2: ESUB Iterative Model
Source: Malik, Ajaz and Jumani (2016)

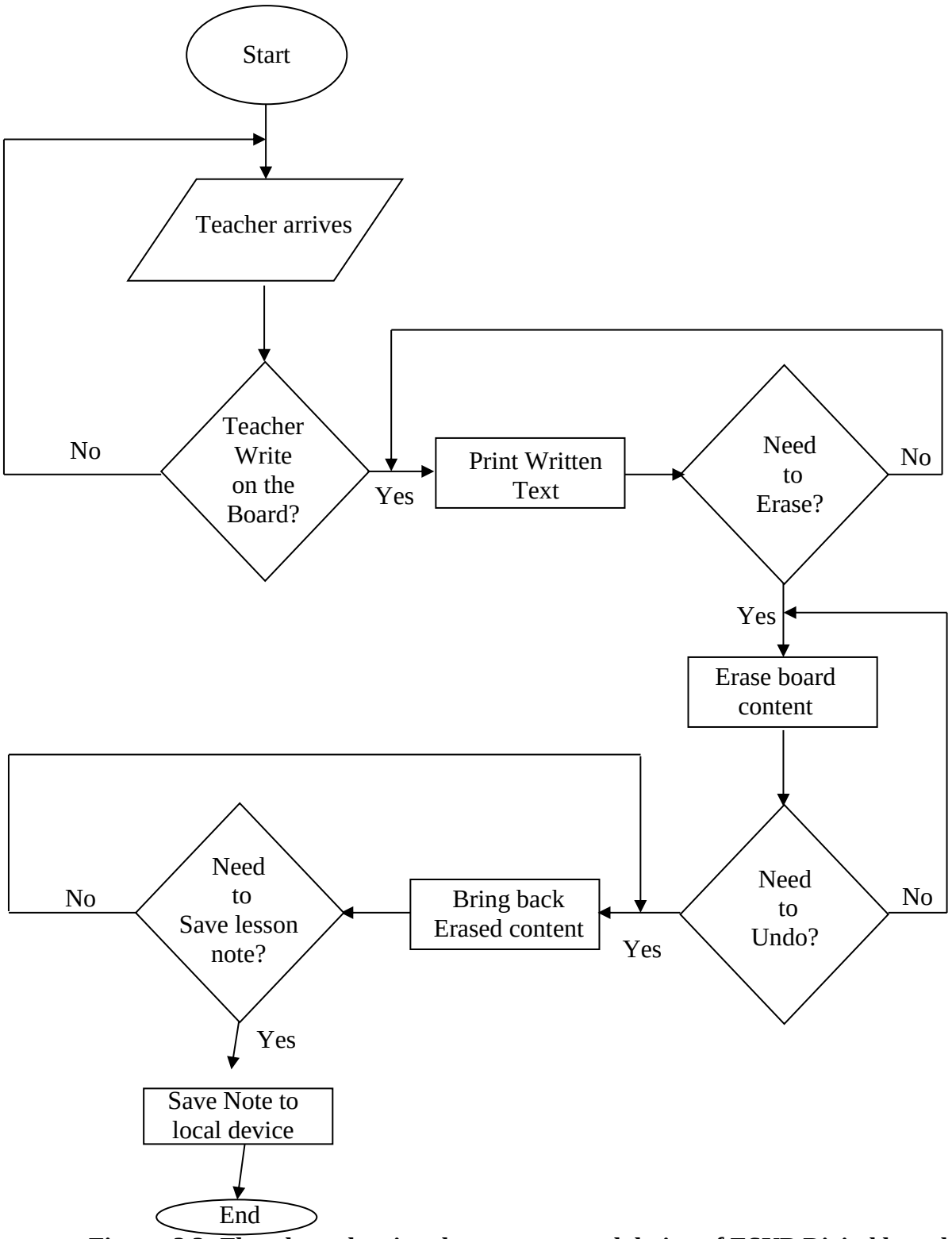

Figure. 3.3: Flowchart showing the structure and design of ESUB Digital board
Source: Researcher (2023)

System Analysis

System analysis is an important aspect of the research. The requirements for developing ESUB System are analyzed and these requirements are very essential to implement the system.

Hardware Requirement: The following are the minimum requirements for the system to work:

i. Minimum 1GB of Random-Access Memory (RAM)

ii. Minimum 250GB of Hard disk

iii. Minimum Intel Pentium Processor 1.5ghz

iv. A monitor, Keyboard, CPU / Laptop

v. A mouse

vi. Internet connection

Software requirements:

i. Working Operating System (Windows 7/8/8.1/10, MacOS, Ubuntu, Android and iOS)

ii. A web browser (preferably Chrome/Firefox/Opera mini)

iii. Text Editor (VSCode, Sublime Text, Bracket)

iv. Docker Desktop (If you want to run it locally)

System Design

System design is an important phase of system development process. The system is studied to the minute details and analyzed. The detailed study of the operation performed by the system and the relationship within and outside the system is done. The system is viewed as a whole and the inputs of the system are identified. The system design shows the blueprint of any system that is to be developed. It gives the detail about every component of the system that is to be built. ESUB was used in the classroom to deliver instructions.

Text Writer Tool Module: This module allows the user to write on the screen using his/her finger. Text writer is a feature of software digital board that allows teachers to write text with his/her finger on the board. It is powered by a JavaScript library called hammer.js which uses a touch gesture to fire a draw event. The touch-action property determines if and how a user can interact with an element on the screen via touch input using the browser's default features.

Draw Tool Module: This is the module in which user draw shapes on the board. This feature is powered by a JavaScript library known as paper.js.

Downloader Tool Module: Download tool also known as save tool is a feature of ESUB digital board that allows written content on the board to be downloaded or saved to a local device in PNG image file format. This is the module in which when a teacher or student writes on the board, both sides can see it. The lesson materials can be displayed and used inside the board (with the teacher setting the pace of the class) and notes from the class are digitized, can be saved with one click and shared with all students after the class.

Eraser Tool Module: This is the module that clears screen or delete it contents and any output generated. It does not clear the user's history of commands, however. The commands and outputs can still be reversed using the undo tool

Undo/Redo Tool Module: This is a module for erasing the last change done to the document, revert it to an older state.

Programming

This section concerned about the programming languages used for the design and the implementation of this project. The ESUB digital board was developed to provide a computerized process that is stress free, reliable and quick through the use of JavaScript computer programming language, Cascading Style Sheet (CSS) for styling, and it is structured by Hypertexts Markup Language (HTML).

Survey Research Design

This study also adopted a survey research design. Survey research design use data obtained from a sample in an investigation to document, describe and explain what is in existence or non-existence, or the present state of a phenomenon being investigated. This design was considered most appropriate for the study since the researcher exploited the information that were obtained from the respondents (users) in drawing inference from the responses on the implementation of ESUB software digital board.

Area of the Study

The area of the study was Akwa Ibom state, which is one of the 36 states in Nigeria. It has 31 Local Government Areas. The Akwa Ibom State Ministry of Education is tasked with monitoring the education sector of the state. The people are highly educated because of the present of good educational institutions in this area starting from the primary, secondary schools both public and private, and many higher institutions. The choice of Akwa Ibom State for this Study was based on the State Government Dakkada initiative, the 'Dakkada Philosophy' meaning, to arise in Ibibio harped on arousing the creativity, innovativeness, excellence, integrity and hard work in the people.

Population of the Study

The population of the study consisted of 1690 teachers and students from the nine public Technical Colleges in Akwa Ibom State, during 2021/2022 academic session (Appendix 1).

Sample and Sampling Technique

A sample of 408 comprising of 39 teachers and 369 students took part in the study. Simple random sampling technique was used to select the sample size for the study. 24% of the population was used as sample size using Taro Yamane formula (See appendix 1). The selection process was done using cap and draw method. The selection was done without replacement in order to give all members of the population equal opportunity to be selected.

Instrumentation

A researcher made instrument titled "Attitude and Interest Towards Utilization of ESUB Questionnaire" (AITUEQ) was used in collecting data for the study. The instrument contained items on teachers' attitude towards utilization of ESUB software and students' interest towards utilization of ESUB software. The instrument was built on a four-point scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

Validation of the Instrument

Face validation was conducted for the instrument. The instrument was given to three experts for validation. One of the experts was from the department of Computer and Robotics Education, another from the department of Industrial Technology Education and one was from Educational Evaluation in the Department of Educational Foundations, Guidance and Counseling. During the validation process, none of the items written were deleted, but suggestion was given on rewording five items on the instrument. The corrections were effected on the instrument before submitting it to the supervisor for approval to be used in collecting data for the study.

Reliability of the Instrument

To determine the reliability of the instrument, the instrument was administered to 20 teachers and 50 students in a Technical college in Cros River state who were not part of the study sample. Cronbach alpha Statistics was used to determine the reliability coefficient of the instrument, which yielded a reliability coefficient of .84. According to Nachmias and Nachmias (2019), instruments with positive coefficient of .70 and above are considered reliable. Therefore, the instrument was considered reliable for use in collecting data for the study.

Method of Data Collection

The researcher obtained permission from the principal of selected Technical Colleges to implement the ESUB system in the school. The experiment with the ESUB system last for eleven weeks of second term 2021/2022 academic session. The teachers were selected to implement the system. The researcher holds discussions with the teachers on what the study aims to achieve and the manner for carrying out the study with emphasis on the implementation of the ESUB system. The researcher during the first meeting with the teachers in the first week, sensitized the teachers on about the ESUB system for teaching and learning. The researcher provides an overview of ESUB system and explained how it works and the modality for using it for teaching and learning. The researcher made the teachers understand that they can use their mobile device, computers or laptops in the teaching process. The teachers utilized the ESUB system for teaching from the second week to the tenth week. On the eleventh week, copies of the questionnaire were administered to teachers and students to elicit information on their attitude and interest towards the utilization of ESUB software digital board for instructional delivery. The copies of the questionnaire were retrieved on the spot, which ensured one hundred percent returned rate. The questionnaire collected were coded and ready for analysis.

Method of Data Analysis

Data collected for the study were analyzed using mean and standard deviation to answer the research questions. The remark was gotten as follows:

Strongly Agree (SA)	-	-	3.50 – 4.00
Agree (A)	-	-	2.50 – 3.49
Disagree (D)	-	-	1.50 – 2.49
Strongly Disagree (SD)		-	.00 – 1.49

Mean score from 2.50 and above was accepted as positive or high while mean scores below 2.50 was taken as negative or low response.

RESULTS

This section presents the result of the data analyses based on the objectives and research questions of the study. The result of the analyses is presented in tables as shown below:

System Development

The system (ESUB) development is the implementation of the system design for instructional delivery in Technical colleges in Akwa Ibom state. ESUB was fully implemented in HTML, CSS and JAVASCRIPT for standard web development. All the (Html, CSS, and Javascript) files of the project are categorized respectively in a folder that can be distributed to any system with its dependencies and can be hosted or uploaded on-line for real life implementation. Also, a server (either online or offline) must be installed for the system to work on any system.

The interface was developed on a port 3080 on the localhost (localhost:3080) and it has well styled clickable buttons which performs several functions such as text writer, eraser tool, drawing tool, undo/redo and downloading functions for user satisfaction.

Text writer tool: It allows teachers to write text with his/her finger on the board.

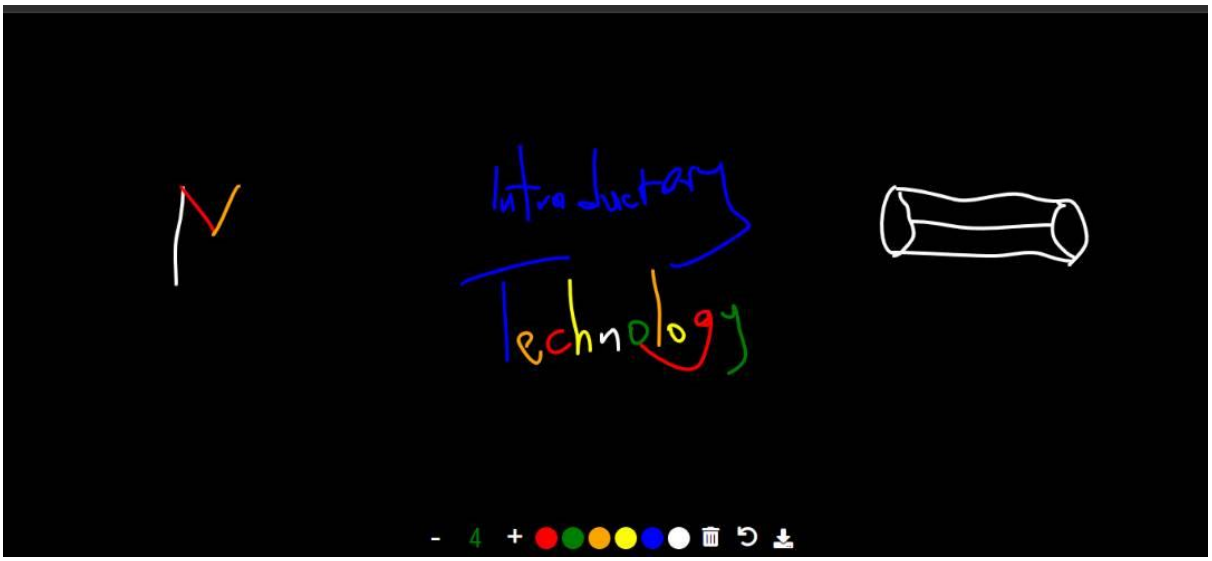

Figure 4.1: Text writer tool
Source: Researcher (2023)

Eraser tool: ESUB software digital board uses eraser tool to clear screen or delete it commands and any output generated. It does not clear the user's history of commands, however. The commands and outputs can still be reversed using the undo tool.

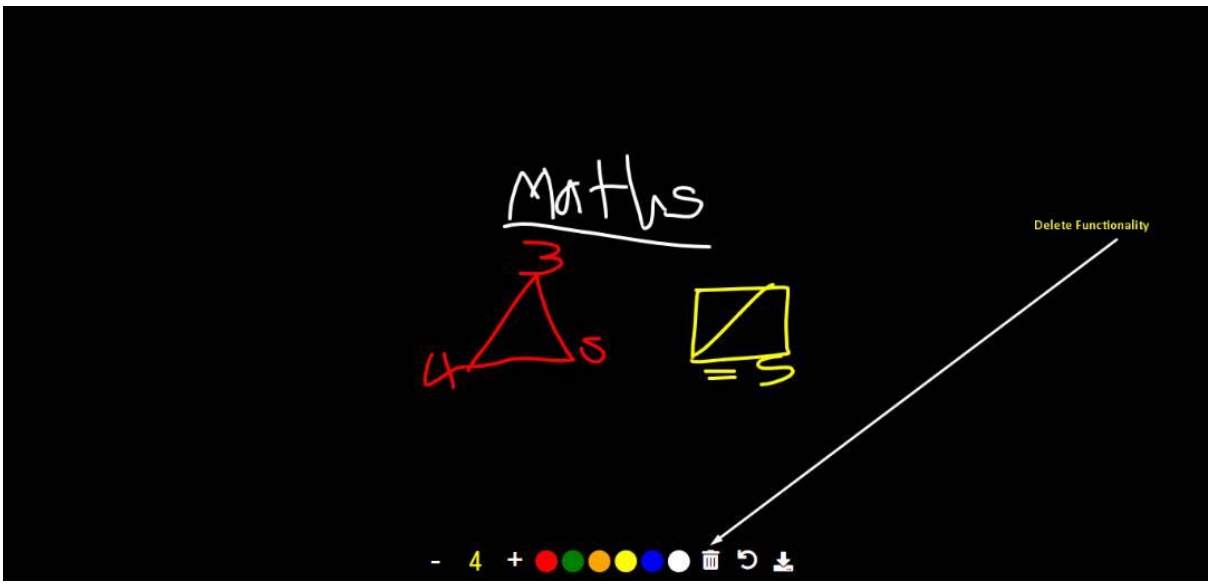

Figure 4.2: Eraser tool
Source: Researcher (2023)

Drawing tool: It allows a teacher to draw shapes on the board.

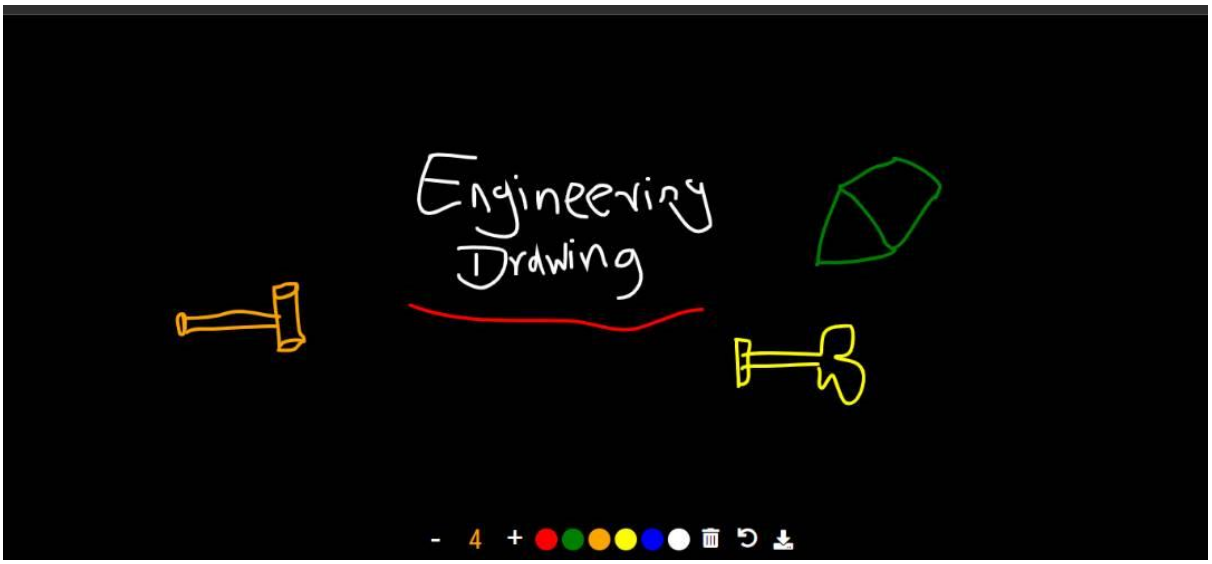

Figure 4.3: Drawing tool
Source: Researcher (2023)

Undo/Redo tool: It erases the last change done to the document, revert it to an older state.

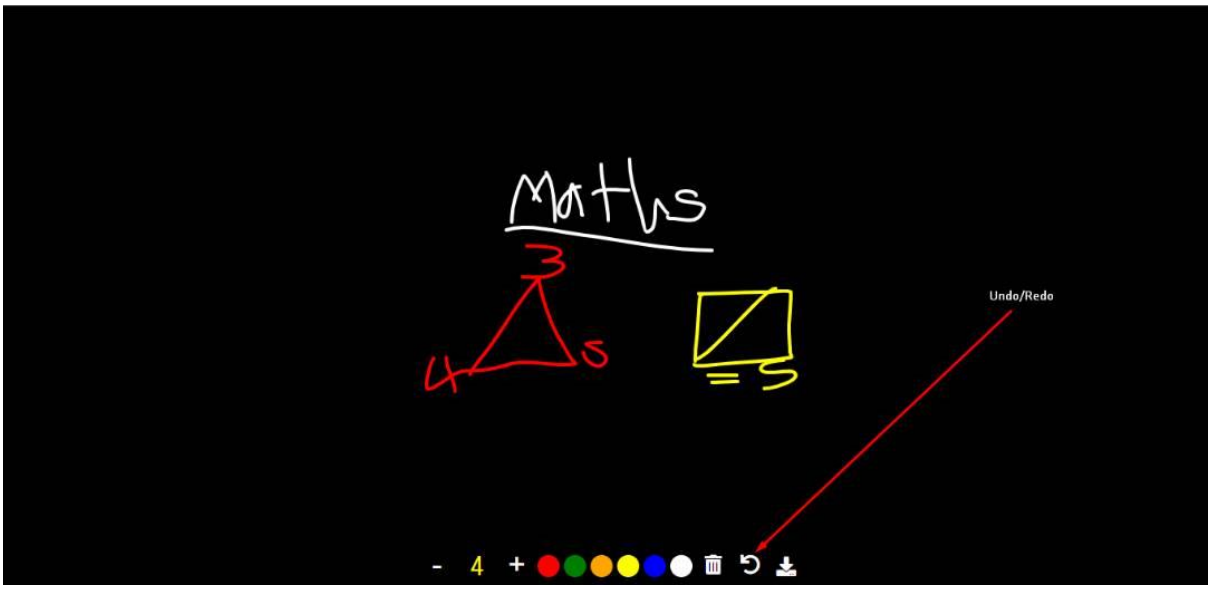

Figure 4.4: Undo/Redo tool
Source: Researcher (2023)

Download tool: Download tool also known as save tool is a feature of ESUB software teaching board that allows written content on the board to be downloaded or saved to a local device in PNG

image file format.

Research Question 1

What is the teachers' attitude towards utilization of ESUB software for instructional delivery in Technical Colleges in Akwa Ibom State?

Table 1: Summary of mean responses on teachers' attitude towards utilization of ESUB software for instructional delivery

S/N	Items	N	Mean	SD	Remarks
1.	I am comfortable with the ESUB	285	2.7474	.87976	Agree
2.	I have the confident to move text about in ESUB	285	2.6140	.75420	Agree
3.	I enjoy the readability of text in ESUB	285	3.0772	.80993	Agree
4.	I enjoy drawing precise objects with ESUB	285	2.8807	.66062	Agree
5.	I feel happy Returning to previous activities with ESUB	285	3.2561	.78341	Agree
6.	I am comfortable using ESUB because of ease of cleaning	285	3.0842	.81357	Agree
7.	I feel making out time to explore ESUB	285	2.6175	.74426	Agree
8.	I am comfortable trying out new things with ESUB	285	3.1333	.65792	Agree
9.	I like to use the text writing tool for clarity of text	285	2.8561	.66370	Agree
10.	The neatness of the board after cleaning makes me feel happy.	285	2.8561	.66370	Agree
	Grand mean		2.907		Agree

Source: Researcher (2023)

The summary of the result of mean and standard deviation of the teachers' attitude towards utilization of ESUB software for instructional delivery in Technical Colleges is presented in Table 1. It is shown that the mean range of the items falls between 2. 61 and 3.25 and the standard deviation range between 0.65 and 0.87. This is evidence that the teachers agree to the items on teachers' attitude towards of utilization ESUB software for instructional delivery in technical colleges in Akwa Ibom State. The grand mean of 2.907 shows that the teachers' attitude towards utilization of ESUB software for instructional delivery in Technical Colleges in Akwa Ibom State is positive.

Research Question 2

What is the students' interest towards utilization of ESUB software for instructional delivery in Technical Colleges in Akwa Ibom State?

Table 2: Summary of mean responses on students' interest towards utilization of ESUB software for instructional delivery

S/N	Items	N	Mean	SD	Remark
1.	I excieted with the clarity of text in ESUB	285	2.6667	.94447	Agree
2.	The of text presentation in ESUB fascinating	285	2.7579	.66156	Agree
3.	The readability of text in ESUB makes me curious during instructional delivery	285	3.3298	.74351	Agree
4.	I usually prefer object drawing in ESUB	285	3.2211	.70978	Agree
5.	I am attracted to ESUB because of the maintenance of information originality	285	2.7825	.69837	Agree
6.	I like the ease of access to information in ESUB	285	2.8772	.72845	Agree
7.	I usually like the ease of cleaning the board	285	3.2982	.72590	Agree
8.	I like the neatness of the board after cleaning	285	3.4982	.50088	Agree
9.	I am actively involving during learning with ESUB	285	2.8842	.67443	Agree
10.	I am excieted with the speed of cleaning ESUB board	285	2.9263	.70074	Agree
	Grand mean		3.018		Agree

Source: Researcher (2023)

The summary of the result of mean and standard deviation of the students' interest towards utilization of ESUB software for instructional delivery in Technical Colleges is presented in Table 2. It is shown that the mean range falls between 2. 66 and 3.49 and the standard deviation range between 0.50 and 0.94 This is evidence that the students agree to the items on students' interest towards of utilization ESUB software for instructional delivery in technical colleges in Akwa Ibom State. The grand mean of 3.018 shows that the students' interest towards utilization of ESUB software for instructional delivery in Technical Colleges in Akwa Ibom State is positive.

Findings

Based on the data collected and analyzed in the study, the following findings were made with respect to the research questions that guided the study:

i. Teachers' attitude towards utilization of ESUB software for instructional delivery in Technical Colleges in Akwa Ibom State shows a positive attitude.

ii. Students' interest towards utilization of ESUB software for instructional delivery in Technical Colleges in Akwa Ibom State shows a positive interest.

DISCUSSION

Based on the data collected and analyzed in the

study, the following findings were made with respect to the research questions and hypotheses that guided the study:

The analysis of the responses to research question 1 presented on Table 4.1 revealed that teachers' attitude towards utilization of ESUB software for instructional delivery in Technical Colleges in Akwa Ibom State shows a positive attitude. Analysis of the attitude of teachers toward ESUB software utilization for instructional delivery is accepted as an indicator of positive attitudes in Technical Colleges in Akwa Ibom State. This result can be interpreted that teachers realize the benefits of ESUB software use for instruction delivery in Technical Colleges. This finding is in agreement with the observation of Al-Zaidiyeen, et. al (2019) that in the present age of information explosion, more academics, departments, schools, colleges and universities are resorting to using computers and the internet in teaching and learning activities. The application of ESUB software due to its great capabilities and the speed to get lessons delivered in an interesting way to attract the attention of the students is of great importance. Teachers may realize this benefit through the use of smartphones, Android phones tablets and I-Phone, and so on. The positive attitude of teachers towards the use of ICT for quality instructional delivery will obviously change the image of the classroom for the twenty-first century. This finding is very obvious as it buttresses the important of utilization of ESUB software for instructional delivery in Technical Colleges. Obviously with the utilization of the ESUB software for instructional delivery, learning will be very interesting and effective.

The analysis of the responses to research question 2 presented on Table 4.2 revealed that students' interest towards utilization of ESUB software for instructional delivery in Technical Colleges in Akwa Ibom State shows a positive attitude. If student does not have interest during instructional delivery the attention of that student will be distracted during instructional delivery. This is an indication that the students also share the same views with their teachers. The students are interested in the use of ESUB software and how lesson is being achieved in a very short period of time with little effort. This finding is in line with Eze, et, al (2021) who found a positive interest in the attitude of learners in secondary schools. The present study also concurs with Yusuf and Balogun (2018) who noted that students have generally positive attitude towards the use of Interactive White Boards in language instruction and are aware of the potential uses of this technology. Binder and Niederle (2020) who reported that students have positive attitude to ICT tools and the students prefer to write using a computer rather than pen and paper. Similarly, Lou and Dixon (2018) study revealed that students perceive integrated E-learning software approach to be an important approach in their learning. Students have positive attitude towards the integrated E-learning software approach. Huskinson and Haddock (2020) noted that students who viewed communications technologies positively can use them to enhance their learning experience. This positive interest is an important indicator of willingness and first step in effective technology utilization in general.

CONCLUSION

From the findings obtained from the study, it cloud be concluded that Utilization of ESUB Software for Instructional Delivery in Technical Colleges in Akwa Ibom State, Nigeria shows a positive result. Especially in the areas of teachers' attitude and students interest. It is therefore very important that teachers teaching in technical colleges in Akwa Ibom State be encouraged to uphold good attitude towards the Utilization of ESUB Software for Instructional Delivery and students studying in

technical colleges be motivated during instructional delivery to maintain the positive interest towards the Utilization of ESUB Software for Instructional Delivery.

Recommendations

The following recommendations are made based on the findings of the study.

i. Teachers in Technical Colleges in Akwa Ibom State should endeavours to use ESUB software for instructional delivery to enhance their performance and arouse students interest in instructional delivery process.

ii. Students should be motivated by giving opportunity to interact also with the ESUB software in order to enhance interest towards the use of ESUB software for instructional delivery and to enhance their learning performance.

iii. The development of ESUB digital board should be funded by the State Technical School Board for deployment in Technical schools.

iv. Training should be given to the developer of the software on the topics contained in Technical school curriculum, this will aid them to develop ESUB digital board that is effective in the classroom.

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