

**TECHNOLOGICAL INNOVATIONS AND CURRICULUM DELIVERY IN
ELECTRICAL/ELECTRONIC EDUCATION: LEVELS OF IMPLEMENTATION IN RIVERS
STATE.**

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ABSTRACT

*This study investigated the extent of implementation of technological innovations in curriculum delivery in electrical/electronic education in Rivers State. A survey research design was used for the study. Two research questions guided the study. The population of the study was 160 students and lecturers randomly selected for 4 tertiary institutions in Rivers State (80 students, 80 lecturers). The instrument tagged "Level of implementation of technological innovations in electrical/electronic education in Rivers State (**LITIEE**)" was used for the data collection, designed by the researcher in the modified 4-point likert scale, and was validated by experts. The study revealed that there is low level of Implementation of technological innovations in curriculum delivery in electrical/electronic education in Rivers state. The following recommendation were made among others; State government, tertiary institutions in Rivers State should make policies that will improve the use of technological tools in curriculum delivery including addressing the various challenges identified that are inhibiting full the full implementations. The government, tertiary institutions in Rivers State as well as private sector should also initiate and support the acquisition, installation and maintenance of digital technology equipments and facilities*

Keyword: Technological Innovations, Curriculum Deliver, Electrical/Electronic Education

INTRODUCTION

A technological innovation is a new or improved product or process whose technological characteristics are significantly different from before. Technological innovation has made research, storage, retrieval, transmission, gathering, dissemination, and reception of knowledge easier, cheaper and faster. Technology is expected to completely change the way the curriculum is developed and delivered hence enhancing the quality of higher education. Technological innovations are having a significant impact on educational systems at all levels. Online courses, teaching aids, educational software, social networking tools, and other emerging technologies are disrupting the traditional classroom environment (Grabe & Grabe, 2017).

There is increasing availability of a wide range of technological innovations that has the potential to support and enhance the process of curriculum delivery in elect/elect education in Rivers State institutions of higher learning. Learners expect to use technology for their learning, but this requires the development of information and digital literacy skills to maximize the potential learning opportunities. Learning resources will be increasingly delivered by a variety of mobile devices and also through different immersive and virtual learning environments.

The application of technological innovations in education sectors helps bridge the gap between students and teachers and strengthens the relationships between teachers and students. Educational technology has helped create new and updated educational materials and curriculum and has improved the speed of teaching and learning process. Technological innovation helps make teaching more interactive, more collaborative, and more meaningful and it can help students better engage with course materials. Through technological applications, students are also able to collaborate with their own classmates.

The world today is witnessing huge and rapid technological progress and development that has not been witnessed before in various sphere of life, which made us unable to do away with modern technology in our daily life, whatever the circumstances may be.

The progress and development of technological innovations is a new paradigm shift in human life which includes many technologies; tangible and intangible devices that contribute to supporting and developing the sector of life in general and the educational sector in particular. The advantages of technological innovations are not only limited to lecturers but also improve students problem-solving skills and helps them improve the skill of thinking and creativity (Web, Jones, Barker, & Schaik, 2020).

STATEMENT OF THE PROBLEM

Despite the effectiveness of technological innovations and their positive impact on the process of curriculum delivery, observations have shown that there are still many technological innovations that yet to be adopted in teaching and learning in electrical/electronic education in Rivers State's tertiary institutions. Therefore, there is need to develop appropriate plans to effectively employ technological innovations into curriculum delivery process and also considers the factors that hinder effective integration as well as attempt to overcome challenges facing the level of its implementation. Thus, the researcher deems it fit to investigate the level of implementation of technological innovation in elect/elect education of Rivers state.

PURPOSE OF THE STUDY

The main purpose of this study is to determine the level at which technological innovations are implemented into curriculum delivery in electrical/electronic education in Rivers State. Specially, the study tends to determine:

1. The level of implementation of technological innovations in curriculum delivery in electrical/electronic education in Rivers State.
2. The extent to which the implementation of technological innovations has improved efficient curriculum delivery in electrical/electronic education in Rivers State.

RESEARCH QUESTIONS

The following two research questions guided the study:

1. To what extent is technological innovations implemented in curriculum delivery in electrical/electronic education in Rivers State?
2. To what extent has the implementation of technological innovations improved efficient curriculum delivery in electrical/electronic education in Rivers State?

HYPOTHESES

The null hypothesis was tested at 0.05 level of significance:

1. There is no significant difference in the respondents' means ratings of both students and lecturers on the level of implementation of Technological innovation in curriculum delivery in electrical/electronic education in rivers state.

RESEARCH METHODOLOGY

The design for the study was descriptive (survey). The population of the study was 160 students and lecturers randomly selected from 4 tertiary institutions in Rivers State (80 students, 80 lecturers). Instrument for data collection was a structured questionnaire titled "Level of implementation of technological innovations in elect/elect education in Rivers State (**LITIEE**)" designed by the researcher in the modified 4-point likert scale. The instrument was validated by three experts, two from school of education and one from department of Electrical/Electronic education both at federal college of education (technical) Omoku. The administration of the instrument was personally carried out by the researcher with the aid of two research assistants.

LITERATURE REVIEW/ CONCEPTUAL FRAME

Curriculum Delivery

Curriculum delivery refers to how lecturers (Curriculum Implementers) deliver instructions and assessment through the use of specified resources provided in a curriculum. Curriculum designs generally provide instructional suggestions, scripts, lesson plans, and assessment options related to a set of objectives. Such designs focus on consistency to help lecturers successfully implement and maintain the curricular structure in order to meet various objectives (Salmon, 2015). Understanding the beliefs and concerns of educators can provide insights into whether curriculum delivery will meet with success or failure.

TECHNOLOGICAL INNOVATIONS

Technological innovations refer to new technologies in the service of learning and/ or learner support (Laurillard, 2016). It includes the delivery of content via the Internet, intranet, audio- and video-tape, satellite broadcast, interactive TV and CD-ROM (Boon et al, 2005). Technologies can be used in three main ways in universities and colleges: technology enhanced classroom teaching; distance education (in a bid to reach more students who cannot gain access to conventional universities); and distributed learning (a mix of deliberately reduced face to face teaching and online learning also called 'the mixed mode' or 'flexible learning'). E-learning can help to encourage learner centeredness (Salmon, 2015).

SOME TECHNOLOGICAL INNOVATIONS FOR EFFICIENT CURRICULUM DELIVERY

1. Multimedia Projector Machines

This is one of the multimedia equipments that have the capability to make power point presentation using the computer system. In this process, it synchronizes or combines different media when the user is delivering lectures, seminar, or research projects to an audience. A typical example is the LCD projector;

An **LCD projector** is a video gadget that uses liquid crystals that show motion pictures, images, or computer information on a screen. The projector is the best alternative to use since it has quality products and is cheap to acquire. Besides, LCD has advantages like to deliver quality lumen output at a cheaper cost in comparison with a DLP projector. It can also give amazing brightness with less energy consumption on the contrary to other projectors. The LCD projector is used in school by instructors as a lecture supplement, with a presentation of PowerPoint alongside a computer. These enable instructors to give well-organized notes, and also students can take important notes with the skill to comprehend essential information. Instructors can use projectors to display videos in the classroom because of making learning to be fun and deepen perception. A learner is attentive when visual and sound senses are involved at the same time rather than being passive. The use of LCD projectors gives learners a clear demonstration of a particular topic. The instructor can connect the projector to a webcam or desktop to give a demonstration to a big audience.

2. Interactive Smart Board

An interactive smart board, also known as an electronic whiteboard, is a classroom tool that allows images from a computer screen to be displayed onto a classroom board using a digital projector. The teacher or a student can "interact" with the images directly on the screen using a tool or even a finger.

With the computer connected to the internet or a local network, teachers can access information around the world. They can do a quick search and find a lesson they used previously. Suddenly, a wealth of resources is at the teacher's fingertips.

For teachers and students, the interactive white board is a powerful benefit to the classroom. It opens up the students to collaboration and closer interaction to the lessons. Multimedia content can be shared and used in lectures, keeping students engaged.

A typical example is the smart board;

A **SMART Board** is one brand of interactive whiteboard. The SMART Board is connected to a computer and works with a projector. The projector displays what is open on the computer and, rather than using a mouse or keyboard (although you can use those also), the SMART Board is a touch screen, which allows you to manipulate anything on the screen using your fingers. It is similar to how you would use a tablet or iPad. Special pens are included in a SMART Board to make writing in different colors quick and easy.

3. Audio Enhancement Solution

Audio enhancement uses beam-forming microphones to output optimal speaking volumes and frequencies. While in use, the microphone array detects where sounds are coming from, their volume and their frequency. The array interprets these audio signals and removes the ones that are interfering with the speaker's voice. What's left is the important audio, including the teacher's lesson. If necessary, this audio is amplified so it is easy for people to understand without the teacher needing to raise their voice.

4. Teleconferencing systems

This is one of the multimedia devices available for instructional purposes. A teleconference is any electronically delivered two-way conversation, especially when involving groups at separate locations. It is an efficient means of educating corporate and educational institutions. Examples are;

A. Zoom Classrooms

Zoom classrooms are online learning environments that allow instructors to live-stream class sessions or pre-record them and share them with students at a later date. Zoom is compatible with desktop computers, tablets and mobile devices for students. The platform has features that allow instructors to share their screens, applications and files with students for straightforward learning experiences.

Zoom classrooms refer to teaching and learning spaces accessed through Zoom that allow institutions and instructors to facilitate distance learning. Zoom also has breakout rooms to break up students into small groups for projects and Question & Assessment tools to monitor student progress.

B. Google Meet

Google Meet is a relatively recent application, was launched in April 2020 to all users, free of charge. Google Meet is a video conferencing app. It is the education version of Google's Hangouts platform. The solution enables users to make video calls with up to 100 users per high-definition video meeting. Google Meet provides easy-to-use, reliable, and secure video conferencing to connect your school community with video for classes.

C. Microsoft Teams

This virtual meeting platform is also used by hundreds of students nationwide, launched since 2017 becoming better known by the education sector since the year 2019, as well as providing a good integrated teaching and learning space (Salmon, 2015).

D. Adobe Connect

This is a highly flexible, comprehensive virtual meeting system that requires no client downloads, and works with nearly any electronic device. Customization options are almost limitless, and branding for your organization is easy. Presentation spaces can be saved and reused, or a customized URL can be set for persistent, instant access to meeting rooms. Meetings can be recorded, reused, and distributed. Nearly any type of file can be stored and used for presentations: documents, audio, video, animation, presentation software, and others. A variety of learning assessments may be used from within the online classroom, including quizzes, simulations, and engagement monitoring.

E. Skype

This is an intuitive video and voice calling platform available as an app or downloads for any mobile device or computer. Skype is compatible with some televisions and gaming consoles, and there is a beta browser version (Skype for Web). The desktop version allows up to ten users to participate

simultaneously, and each can share their screen, chat, send pictures and documents, and talk using camera and microphone. Skype to Skype calls are free, though both users must have a Skype account. Free calls are limited to four hours per call, ten hours per day, and 100 hours per month.

RESULT

Research Question 1

To what extent is technological innovations implemented in curriculum delivery in elect/elect education in Rivers State?

Table 1: mean response of students and lecturers on the extent to which technological innovations has been implemented in curriculum delivery in electrical/electronic education in Rivers State.

S/N	Item Description	SA	A	D	SD	Mean	Remark
1.	Installation of internet facilities and digital library,	02	10	36	52	1.62	Rejected
2.	Incorporate video and multimedia into lessons and presentations,	04	14	51	31	1.91	Rejected
3.	Use of technnologies to conduct Distance learning through controlled learning pathways (teleconferencing,vitual meeting etc),	08	10	37	45	1.81	Rejected
4.	Use of technological tools (like;PCs) by the lecturers in creating lesson contents and materials	34	37	13	15	2.88	Accepted
5.	Installation of digital learning facilities (Computer-Aided Instruction/learning , LCD projectors, smart boards etc) in classrooms ,	80	15	5	-	2.84	Accepted
6.	Effective use of technological gadgets in the classroom	6	8	28	58	1.62	Rejected
Aggregate Mean						2.11	Rejected

The result of the study in table 1 shows that a items number 1, 2, 3, and 6 had weighted mean scores below the criterion means of 2.50 which indicated that there is little or no implementation of technological innovations into curriculum delivery in elect/elect education in Rivers State of Nigeria. Item number 4 and 5 rated 2.88 and 2.84 respectively which agrees that lecturers makes use innovative tools like the personal computer (PCs) in the preparation of lesson contents, and secondly there is installation of technological tools and equipments in classroom, though not adequate enough for effective usage/implementation. In summary, with an aggregate mean of 2.11, which is below the criterion mean of 2.50, students and lecturers accepted that there little or no effective implementation of technological innovation in curriculum delivery in electrical/electronic education in Rivers State.

Research Question 2:

To what extent has the implementation of technological innovations improved efficient curriculum delivery in electrical/electronic education in Rivers State?

Table 2: mean responses of students and lecturers on the extent to which the implantations of digital technology in electrical/electronic education has improved efficient curriculum delivery in Rivers State.

S/N	Item Description	SA	A	D	SD	Mean	Remark
7.	Improved digital literacy and skill among teachers, students and citizen.	20	09	41	30	2.19	Rejected
8.	Improved lecturer quality both in terms of teaching and research.	09	26	37	28	2.16	Rejected
9.	Improved collaborative and Active learning among educators and learners.	26	15	15	44	2.23	Rejected
10.	Improved creative learning environment	28	08	20	44	2.20	Rejected
11.	Improved access to course content	23	20	39	18	2.48	Rejected
12.	Improved educational outcome	12	28	33	27	2.25	Rejected
Aggregate mean						2.25	Rejected

the result of the study in table two shows that all the items had weighted mean scores below the criterion mean of 2.50 and were adjudged as the extent to which the use of technological innovations in elect/elect education has had little or no improvement on efficient curriculum delivery in Rivers State tertiary education. In summary, with an aggregate mean of 2.25, below the criterion mean of 2.50, students and lecturers has shown that there is little or no improvement in educational outcome being the resultant effect of the inadequate integration and implementation of technological innovation in curriculum delivery in electrical/electronic education in Rivers State tertiary Institutions. Thus; there is no Improved digital literacy and skill among teachers, students and citizen, no Improved teacher quality both in terms of teaching and research, no improved collaborative and Active learning among educators and learners, no improved creative learning environment, no improved access to course content, and Improved educational outcome.

Testing the Hypothesis

Null Hypothesis

There is no significant difference in the respondents' means ratings of both students and lecturers on the level of implementation of Technological innovation in curriculum delivery in electrical/electronic education in rivers state.

This null hypothesis was tested using t-test 0.05 level of significance.

The results are indicated in Table 3

1. Table 3: Means, Standard Deviations and t-test for both the students and lecturers responses on the level of implementation of Technological innovation in curriculum delivery in electrical/electronic education in rivers state.

Category	N	Mean	SD	df	t-test	t-crit	α	Decision
Student	80	0.66	.84	158	0.17	1.96	0.05	NS
Female	80	0.74	.97					

Data in Table 3 shows that the t-test calculated of 0.17 is less than the t-critical value of 1.96 at 158 degree of freedom at 0.05 level of significance. Since the calculated value is less than the t-critical value, the null hypothesis is accepted. This implies, therefore, that there is no significant

difference in the mean responses of students and lectures on the level of implementation of technological innovation in curriculum delivery in electrical/electronic education in Rivers state. The null hypothesis was therefore accepted while alternate hypothesis was not retained.

DISCUSSION OF FINDINGS

The result of the analysis in table 1 & 2 show that students and Lecturers in electrical/electronic education in Rivers state agreed to low level of implementation of technological innovation in curriculum delivery. The findings of this study were in agreement with the findings of web et al (2020),Grabe & Grabe (2017) who aimed at determining the levels of Technological usage in instructional delivery. Furthermore, the result of hypothesis revealed that there is no significant difference in the mean responses of students and lecturers on the level of implementation of technological innovations in curriculum delivery in electrical/electronic education in Rivers state.

CONCLUSION

This study showed that technology-based curriculum delivery is more effective in compare to traditional classroom. This is because, using technological tools and equipment will prepare an active learning environment that is more interesting and effective for both lectures and students. The result of this study showed that tertiary institutions in Rivers States had installed some technological tools and equipments like computers and related peripherals. However they are not adequate for full technological implementation in the process of curriculum delivery due to the fact that most technological equipments are very few, faulty and even not available in most tertiary institutions such as the smart boards, smart tables, LCD projectors, Zoom classrooms etc. Generally, there is low extent of implementation of technological innovation into curriculum delivery in elect/elect education in Rivers State of Nigerian which really needs to be addressed.

RECOMMENDATIONS

- State government, tertiary institutions in Rivers State should make policies for increasing the use of technological innovations in curriculum delivery through addressing the various challenges identified that are inhibiting full implementation.
- The government, tertiary institutions in Rivers State as well as private sector should support the acquisition, installation and maintenance of technological tools and facilities.

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