Efficacy of Cisco Webex in Instructional Delivery of Educational Technology Contents among Undergraduate Students of University of Calabar, Nigeria

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Abstract

The study examined the efficacy of Cisco Webex in Instructional Delivery of Educational Technology Contents Among Undergraduate Students of University of Calabar, Nigeria. One research question and one null-hypothesis were formulated to guide the study. The quasi-experimental design was adopted for the study using pre-test post-test non-randomized control group design. The sample consisted of 80 final year students of Educational Technology of 2024/2025 academic session. The only instrument used for data collection was a 20-items researchers developed performance test in educational technology. Result obtained from the research question was analyzed using descriptive statistics of mean and standard deviation while the hypothesis was analyzed using ANCOVA. The result showed that the calculated F-value was significant at $P<0.05$ which is less than 0.05 level of probability ($F=104.858$, df 2/7, $P<0.05$). The implication of this result showed that the null hypothesis was rejected. Which mean that the use of Cisco Webex in instructional delivery significantly impacted on students' academic performance in Educational Technology more than the face-to-face instructions. Cisco Webex has the potential to enhance students' academic performance by facilitating interactive, accessible and collaborative learning environment. It is therefore recommended that Cisco Webex Technology should be probably integrated in teaching and learning of Educational Technology, staff and students should be probably expose to this platform to achieve optimal learning outcomes in Educational Technology.

Keywords: Efficacy, Cisco Webex, Instructional delivery, Educational technology

Introduction

The evolution and subsequent adoption of technology has considerably transformed the education sector, offering novel paradigm to a more collaborative, interactive, flexible and seamless online learning. According to Ebenezer (2022), technology integration provides productive teaching and learning in order to increase learners creative and intellectual capacities. One of such technologies or tools is Cisco Webex. Cisco Webex is a cloud-based platform which supports webinars, virtual meetings, remote and interactive learning experiences. Its adoption has gained greater prominence tertiary institutions in Cross River State, especially following the eruption of the

Corona Virus pandemic which ravaged the global community causing closure of schools disruption of school calendars and increased dropout rate. The use of this platform promotes the need for flexible educational frameworks.

In the University of Calabar, it has become the norm that lectures should be 40% online and 60% face-to-face. This policy may not be unconnected with some institutional challenges such as inadequate classroom space, limited physical infrastructure and the urgent need to enthrone quality education. These and other factors propel the need to boost technology-driven education in tertiary institutions. According to Ral and Ral (2021), Cisco Webex offers a suite of tools that align with the pedagogical needs of educational technology programme. Admittedly, however, what makes Cisco Webex stand out as a robust platform for instructional delivery of educational technology contents, is more likely its suite of tools – digital whiteboards, screen sharing, breakout rooms, and real-time communication and assessment. Ral and Ral (2021) affirm that these tools align with the pedagogical needs of educational technology programmes.

Cisco Webex allows participants or learners to communicate, interact and collaborate in real-time. It is a video-conferencing tool that facilitates real-time communication across different locations. According to Flemming et al (2020), the usage of Cisco Webex in instructional delivery has improved students' engagement, flexible learning opportunities and equally enhanced their academic performance.

Harrington and Lofredo (2019), maintain that students using Cisco Webex in their classes reported higher levels of engagement of participants compared to those in the traditional classroom setting. Cisco Webex usage promote interaction. Interaction among learners and instructors. This interaction is a vital component of effective online learning experience. Studies conducted by Eze and Okeke (2002) show that Cisco Webex features, like real-time video-conferencing screen sharing and interactive tools like polls and quizzes have improved students' engagement in online learning classes, collaborative group work and active learning. According to lumide and Daramola

(2021), institutional readiness can significantly influence the effectiveness of Cisco Webex as an institutional platform.

According to Ral and Ral (2021), Webex enables real-time video and audio communication which mimics the normal face-to-face classroom interactions. Its other features like raise hand, chat and polls increase students' participation, engagement and keeps student active. All these promote students' learning outcomes, and active engagement in the pedagogical process in the long-run. It breakout rooms feature allow students to be divided into smaller discussion groups, encouraging peer-to-peer interaction and cooperative learning.

Cisco Webex is a powerful video-conferencing tool for the delivery of educational contents among undergraduate students of Educational Technology in time and space. It is a video-conferencing and online meeting platform that facilitates communication and remote collaboration among learners. According to Ekpo-Eloma (2025), Cisco Webex is a web-conferencing and video-conferencing platform which allows users or participants to collaborate and communicate online through audio and video meetings, screen sharing, file sharing and messaging.

Cisco Webex has very unique features that make it stand out uniquely from other video-conferencing platforms. These include:

1. A seamless integration with apps like Microsoft Office 365, Google Drive, etc
2. Advanced video and audio quality.
3. Capacity to lock meetings, control participants audio and video.
4. Robust security features like end-to-end encryption.
5. Its breakout sessions allow for smaller group discussions.
6. Its interactive polls and quizzes can be used to evaluate learnt concepts in real time.
7. The digital whiteboard of Cisco Webex promotes dynamic and interactive teaching and learning.

According to Harrington and Lofredo (2019), students using Cisco Webex in their classes reported higher levels of engagement of participants compared to those in the traditional classroom

settings. The use of Cisco Webex in instructional delivery promotes interactive and inclusive learning. Instructor-students interaction is a vital components of effective online learning experiences. Cisco Webex facilitates real-time communication between instructors and instructees which promote immediate feedback and clarification of concepts, all of which promote optimal learning outcomes. Sharma et al., (2001) examined the relationship between students' usage of Cisco Webex and their academic performance. The result showed a positive relationship between the frequency of use of Cisco Webex usage and their academic performance.

Studies conducted by Eze and Okeke (2002) show that, Cisco Webex features such as real-time video-conferencing, screen sharing and interactive tools like polls and quizzes have improved students' engagement in online classes, collaborative group work and active learning. Nasakwo and Ali (2023) carried out a quasi-experimental study comparing the academic performance of students utilizing Cisco Webex to those exposed to the traditional face-to-face instruction. The study showed that students exposed to Cisco Webex instructional strategy performed better than those taught using face-to-face strategy. Udo and Nkang (2021) looked at the course completion rates among Educational Technology students who used Cisco Webex. The Central Prop of this study focused on the efficacy of Cisco Webex in the delivery of Educational Technology contents and improved academic outcomes of students sustainably exposed to the platform.

Ayodele and Ibrahim (2022) maintain that the incorporation of file sharing, video collaboration and breakout sessions in Cisco Webex create a more collaborative learning environment which profoundly increase students engagement. And, students who engage in Webex-based group projects demonstrate better knowledge of course material, greater excitement for learning which lead to enhanced academic performance.

This study, therefore, sought to examine the efficacy of Cisco Webex in instructional delivery of educational technology contents among undergraduate students of the University of Calabar. It further seeks to investigate how the platform improves engagement and students' learning outcomes and suggesting ways of improving its usage.

Theoretical Framework of the Study

This theory is grounded on the Technology Acceptance Model (TAM) as espoused by Fred Davis (1989). TAM explains how users (students) come to accept and use a given technology. According to the theory, two basic factors influence an individual to adopt a technology. These factors are, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), Perceived usefulness is the degree to which a person believes that using a particular technology would enhance their performance. Perceived ease of use is the degree to which a technology will be user-friendly (effortless).

In the context of this study, Perceived Usefulness relates to how much students and instructors believe Cisco Webex improves the teaching and learning of Educational Technology. Perceived Ease of Use could reflect how easy Cisco Webex can be navigated and used effortlessly during instructional delivery. Thus TAM provides a theoretical basis for assessing users' attitude towards Cisco Webex, which directly impacts its efficacy in instructional delivery. This theory is grounded in Community of Inquiry framework.

The Community of Inquiry (CoI) was propounded by the trio of Garrison, Anderson and Archer in (2000). According to theory, three elements, namely: Integration of Teaching Presence (TP), Cognitive Presence (CP) and Social Presence (SP), determine, to a large extent, how learners construct and confirm meaning through distanced reflection and discourse it emphasizes the importance of teaching presence, social presence and cognitive presence in online learning environment.

The Community of Inquiry emphasizes critical thinking, problem-solving and collaborative learning. According to this framework, a community of learners are thus engaged in meaningful discussions, share ideas as well as construct knowledge together. Social presence entails a sense of community and connection with each other; cognitive presence suggests learners engaged in critical thinking, problem solving and instruction of knowledge; teaching presence entails instructors facilitates the learning process, providing guidance and critical thinking.

The implication of this framework is that it helps in facilitating online learning environment through Cisco Webex. It supports engaging and collaborative learning.

Statement of the Problem

The integration of digital tools in tertiary education has remain largely unexplored among undergraduate students at the University of Calabar. Empirical evidence exists on its impact on students' engagement, understanding, and academic performance raising concerns about its efficacy and suitability in instructional delivery of educational technology. Cisco Webex, a robust and widely adopted video-conferencing and collaboration tool, has been utilized at various levels of education to support remote learning and virtual instruction. At the University of Calabar, the adoption and effective use of Cisco Webex in instructional delivery of learning contents, promoting students' engagement and improving learning outcomes among undergraduate students of educational technology have not been fully explored.

Whereas, this platform offers features such as screen sharing, real-time communication, recording capabilities and breakout rooms, challenges like internet connectivity, limited digital literacy among students and lack of pedagogical adaptation by instructors my impede its functionality. Consequently, there is an urgent need to investigate if Cisco Webex truly facilitates effective instructional delivery of educational technology content, and whether it presents more challenges or prospects in the context. University of Calabar is the central prop of this investigation.

Currently, there is a conscious paradigm shift from the traditional face-to-face mode of instructional delivery to the adoption of digital tools to facilitate effective and result-oriented learning in tertiary institutions. Currently, Cisco Webex has become a popular tool for online learning of Educational Technology courses in tertiary institutions. In the University of Calabar its adoption is relatively new. To this extent, its efficacy in instructional delivery is yet to be fully estimated. It is, however, possible that it could transforms the educational landscape of the entire institution. The basic question remains, to what extent can the use of Cisco Webex enhance students' academic performance in Educational Technology.

Purpose of the Study

The purpose of this study is to investigate the impact of Cisco Webex on undergraduate students learning outcomes in Educational Technology.

Research Question

What is the mean difference in the academic performance scores of Educational Technology students taught with Cisco Webex and those taught using face-to-face strategy?

Hypothesis

There is no significant mean on the academic performance scores of Educational Technology students taught using Cisco Webex and those taught using face-to-face strategy.

Methodology

The quasi-experimental design was adopted for this study, using pre-test post-test non-randomized control group design. It is a design in which an independent variable is directly manipulated to measure its effect on the dependent variable, and participants are not randomly assigned to comparative groups.

Sample and Sampling Techniques

The sample for the study consisted of all the eighty (80) final year students of Educational Technology of 2024/2025 academic session. The purposive sampling technique was adopted. All the final year students were purposively sampled because they may have had full blown experience about online and have been sufficiently exposed to video-conferencing tools such as Cisco Webex in the course of their programme.

Instrument for Data Collection

The only instrument used for data collection was a 20-item researcher developed performance test on Educational Technology. The instrument consisted of three options A-C. One option served as the correct answer, while the other two options served as detractors.

Validity of the Instrument

The face and content validation of the instrument was established by forwarding it two experts, one in Educational Technology, and the other in Research. Their comments, scrutiny and suggestions were noted and corrections made. These accounted for the validity of the research instrument.

Reliability of the Instrument

The reliability of the instrument was determined using to the split-half method. The twenty (20) instrument was administered on twenty (20) Educational Technology CES students not involved in the study. The scores obtained were divided into two halves (odd numbers and even numbers) items. Pearson Product Moment Correlation Coefficient statistical tool was used for analysis, and a reliability coefficient of .89 was obtained, showing that the instrument was good and reliable for use.

Experimental Procedure

The intact class of eighty (80) was assigned to two classes of experimental and control using the seriation in the class list. Group A served as the Experimental Class taught using Cisco Webex App, and group B served as control group taught using face-to-face instruction. Immediately the twenty (20) item Educational Technology Performance Test (ETPT) was administered to the two groups, and at the end of the 20 minutes, the test was collected, collated and analyzed.

Group A was taught Educational Resource Centre using Cisco Webex App. Group B (control) was taught the same topic using the traditional face-to-face strategy. Then the test previously administered to them was re-administered, this time was as post-test. As usual, the scores were collated and analyzed.

Method of Data Analysis

Data obtained from the test were analyzed using mean and standard deviation to answer the research question, while Analysis of Covariance (ANCOVA) was used to analyze the hypothesis at 0.05 level of significance, using the SPSS Version 23.0.

Results and Discussion

All the results obtained are analyzed and discussed here.

Research Question

What is the mean difference in the academic performance scores of Educational Technology students taught with Cisco Webex and those taught using face-to-face strategy?

Table 1: Showing difference mean and standard deviation scores of students taught using Cisco Webex and face-to-face strategy

Group	Strategy	N	Pre-test		Post-test		Gain score
			$\bar{X}$	SD	$\bar{X}$	SD	
Experimental	Cisco Webex	40	32.25	4.23	72.83		40.58
Control	F2F	40	24.43	7.48	48.95		24.52

The results in Table 1 above show that the mean gain score of Educational Technology students exposed to Cisco Webex App was 40.58 as against those taught using face-to-face strategy scoring 24.52. The implication is that students taught using Cisco Webex App outperformed those taught using face-to-face strategy.

Hypothesis

There is no significant mean on the academic performance scores of Educational Technology students taught using Cisco Webex and those taught using face-to-face strategy.

Table 2: Summary of ANCOVA on the difference in performance scores of students using Cisco Webex and those taught using face-to-face strategy.

Source	Type IV sum of squares	df	$\bar{X}$sq	F	Sig.	Partial Eta squared
Corrected model	11641.075	2	5820.538	93.121	.000	.707
Intercept	9528.552	1	9528.552	152.444	.000	.664
Pre-test	240.763	1	240.763	3.852	.050	.048
Group	6554.166	1	6554.166	104.858	.000	.577
Error	4812.912	77	62.505			
Total	313037.000	80				
Corrected total	16453.988	79				

a. Rsquared = 0.707 (Adjusted Squared = 700)

Table 2 shows that the calculated F-value for group (Cisco Webex and face-to-face) is 104.858 at 2 and 77 degrees of freedom, and P<0.05. The calculated F-value was significant at P<0.05 which is less than 0.05 level of probability (F=104.858, df 2/7, P<0.05). The implication of this result is that the hypothesis was rejected. This means that there is a significant difference between the mean score of Educational Technology students taught with Cisco Webex App and those taught face-to-face strategy.

Discussion of Findings

Based on the result of the study. It can aptly be deduced that leveraging Cisco Webex in instructional delivery of Educational Technology has great impetus to provoke effective learning and positive learning outcomes. Little wonder there is a gradual but sustained paradigm shift from the traditional expository (face-to-face) strategy to the integration of technologies, softwares and application in contemporary pedagogy, like Cisco Webex web based conferencing App.

The findings of this study corroborates the position of Harrington and Lof Loffredo (2019) that students using Cisco Webex in their classes reported higher levels of engagement of participants compared to the face-to-face approach, and improved academic performance.

Similarly, Mishra and Yadar (2021) contend that given the robust features of Cisco Webex like virtual collaboration and communication, interactivity, chats, file sharing have the capabilities of engaging virtual classroom. In a study conducted by Sharma et al. (2021), it was reported that there is a perfect correlation between the frequency of use of Cisco Webex and students' academic achievement. It is for its immense benefit in education that Hodges et al (2020) call for the use and recording of Cisco Webex sessions for interviewing and offering technical support to students facing connectivity challenges to enable all shades of students maximize the potentials of this platform in the pedagogical process.

In the same vein, Ayodele and Ibrahim (2022) aver that Cisco Webex integration of file sharing, video collaboration and breakout sessions create a more collaborative learning environment which increase students engagement. And, students who engage in Webex-based group projects demonstrate better knowledge of course material, greater excitement for learning which lead to enhanced academic performance.

Conclusion

Cisco Webex has continued to be a vital web conferencing tool for effective delivery of Educational Technology undergraduate students in the University of Calabar and elsewhere. It enhances collaboration, engagement, flexibility, personalized learning and students' academic performance and retention of learnt concepts. It can equally enhanced students' access to an amazing and interactive learning experiences and environment.

Leveraging Cisco Webex for instructional delivery of Educational Technology in the University of Calabar can pay off creditably with students' learning and interacting productively with each other seamlessly. Therefore, for improved performance in Educational Technology, its usage should be encouraged.

Recommendations

Based on the usefulness of Cisco Webex, the following recommendations are made:

1. There should be a comprehensive training of both Lecturers and students on the use of this software to ensure that they are familiar its features for optional usage.
2. There should adequate infrastructural provision of facilities and infrastructure like Cisco Webex and digital connectivity to promote effective utilization of these softwares.
3. As a deliberate policy, Lecturers and students should be encouraged to use online resources like Cisco Webex. This can be achieved by designing Educational Technology instruction to be 60% online, and 40% face-to-face.
4. There should be full-blown internet connectivity within the school environment to ease digital operations among staff and students and reduce cost.

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