Utilization Impact of Zoom Application on Teaching and Learning Among Tertiary Institutions Students in Lagos State, Nigeria

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Abstract

The rise of digital education and increasing reliance on virtual platforms especially during and after COVID- 19 pandemic, zoom as emerged as prominent tool for delivering remote education. Therefore, this study explores the utilization impact of zoom application on teaching and learning among tertiary institutions students in Lagos State. It looks at how higher education institutions use Zoom in their teaching and assesses how it affects learning outcomes, student engagement, and teaching effectiveness. For the study, four research questions and four research hypotheses were developed. The study used a Google Forms questionnaire and was a descriptive survey. One hundred respondents from all departments and faculties at Lagos State University of Science and Technology (LASUSTECH) were chosen using simple random selection. Experts in educational technology validated the tool, and Cronbach's alpha was used to determine its dependability index, which came out at 0.81. The research questions were answered using mean and bar charts, and the research hypotheses were tested using ANOVA.Findings reveal that there is no significant impact between the level of zoom utilization and the categorical variables of awareness, benefits and challenges based on gender. It was recommended that tertiary institutions should prioritize improving infrastructure, such as providing reliable internet access and devices,and to facilitate seamless use of zoom and other online platforms. A blended learning model integrating in-person and virtual methods can also enhance teaching and learning experiences.

Keywords: Utilization, effectiveness, zoom application, teaching and learning, tertiary institution

1. Introduction

As societies increasingly rely on real-time information to stay proactive and mitigate the effects of environmental changes, the proliferation of ICTs, along with the widespread accessibility of the internet and digital networks, promotes innovation and expands opportunities. The advent of ICTs and the ubiquitous connectivity of the internet and networks enhances man's ingenuity and opportunities (Eze & Chinedu, 2018). ICT is a catalyst for both creative destruction and socioeconomic change in human life, especially in the field of education, where academics and consultants have transformed from basic teaching tools to interactive learning environments (Al-Gahtani, 2016). Organizations like higher education institutions invest a lot of money in cutting-edge ICT platforms to navigate and adjust to disruptive technologies in order to remain competitive in modern information systems (IS) industry.

Higher education institutions (HEI) have established rigorous programs to promote the use of technology for successful in-person and online teaching and learning, as well as the development of cognate skills required to make socioeconomic contributions in the knowledge economy. According to Hu and Hui (2012), IT-based innovations (e.g., e-commerce, e-learning, e-payment, e-service, or e-procurement) transform the HEI competitive landscape and reflect the dramatic shift from relatively predictable brick-

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and-mortar operations to a rapidly changing and frequently more unpredictable environment. This can be achieved through the use of the internet.

According to Woolfitt (2015) and Ogunyinka (2012), video makes up the bulk of internet traffic. Videos are sound and motion recordings that can be saved or broadcast live to a variety of devices. Videos are an important part of higher education in industrialized countries; over half of these institutions use integrated video solutions to built their learning management systems for teaching and learning, and approximately 72% of all lecturers in developed countries use videos for their student assignments and more than half of the students could generate videos (Lee, 2016). Therefore, video streaming has proven to be a viable way for higher education institutions.

2. Literature review

Zoom technology (streaming) has been made possible by the accessibility of the internet and technological tools like smartphones and digital cameras. Higher education institutions worldwide have benefited from Zoom technology's ability to assist them follow a globalization strategy that enables them to reach more students regardless of location. According to Palmer (2018), using video streaming in higher education is an economical, time-efficient, and environmentally friendly way to educate and study.

Some universities are experimenting with different types of services for persons who use Zoom technology. Fasae and Adegbilero-Iwari (2015) notice that few people consider the potentially drastic impacts that the adoption of this platform with advanced capabilities may have on their user community, particularly the utilization of digital information resources. As more individuals use zoom technology through technological gadgets, several institutions are now using websites/portals to provide access to zoom technology for effective teaching and learning. This technology has grown in popularity and widespread use, and it is on track to replace traditional teaching and learning methodologies, particularly during and after COVID 19, as a means of effective teaching and learning, as well as access to online information and communication.

In addition to modern hardware and technologies like global positioning systems, Zoom technology can now run sophisticated software that enables teachers and students to engage in advanced interactivity (Ohiwerei & Nden, 2022). In contrast to COVID 19, which has numerous pandemic control protocols, including wearing a face mask and physical distancing, among others, which may make learning challenging due to a lack of adequate infrastructures and facilities, Zoom technology enables universities to better serve students and improve the learning environment. Even from the convenience of their homes and workplaces, as well as while they are on the road using their smartphones or personal digital assistants [PDAs], Zoom technology has made visual communication and information access incredibly quick and easy for students (Ray, 2020).

If higher education institutions wish to offer better quality instruction for both theory and practical work using straightforward instructions via Zoom technology, they must follow this trend and incorporate themselves into the Zoom technology realm. Zoom technology offers considerable flexibility for those who want to take advantage of e-learning in this hard world, especially in the aftermath of the Covid 19 epidemic (Erasmus, 2020). Zoom technology will help students and lecturers succeed in teaching and learning while also remaining current in an increasingly technological/mobile environment. There is a need to be aware of technical developments, look ahead, and plan for the future of online interaction (Erasmus, 2020).

Zoom technology makes learning more comfortable and allows for unrestricted exchanges between students and professors. All it takes is a basic 3G or 4G connection. Zoom technology makes it easier for students who are reluctant to express themselves in class by enabling a wide range of self-expression and study contributions (Ohiwerei & Nden, 2022). Zoom technology is now easier to use and less stressful thanks to mobile technology. Recent advancements in mobile phone technology have made it

possible for mobile devices to carry out tasks that were previously unattainable by portable devices. Android phones have taken advantage of these sophisticated features to connect a huge number of students using Zoom technology (Erasmus, 2020).

In order to guarantee effective teaching and learning, Zoom technology has been widely implemented in institutions worldwide (Rae, 2020). Because Zoom technology has been implemented in a number of sectors, including universities, one would expect a more thorough and integrated application and utilization of technologies and other e-learning platforms, of which Zoom technology is an example, in the provision and utilization of effective teaching and learning. However, since the pandemic forbade large school meetings in a small classroom or learning environment, many higher education institutions have not embraced e-learning for teaching and learning, notably Zoom technology (Ohiwerei & Nden, 2022).

As a result, the main objective of the study was to explore the utilization impact of the Zoom application on teaching and learning among tertiary institution students in Lagos State. The specific objectives of this study is to identify the level of awareness of Zoom Application for teaching and learning in tertiary institutions in Lagos State; to find out the perceived ease of use of Zoom Application for teaching and learning in tertiary institutions in Lagos State; to ascertain the extent to which Zoom is utilized for teaching and learning in tertiary institutions in Lagos State; to identify the benefits of using Zoom as a teaching and learning platform in these institutions; and to explore the challenges encountered in implementing Zoom for educational activities in tertiary institutions in Lagos State.

2.1 Research Questions

The following research questions are raised for the study:

1. What are the awareness levels of male and female students towards utilization of Zoom application for teaching and learning in tertiary institutions in Lagos State?
2. How do male and female students perceive the ease of use of Zoom Application for teaching and learning in tertiary institutions in Lagos State?
3. What benefits do male and female students derive from using Zoom Application for teaching and learning in tertiary institutions in Lagos State?
4. What are the challenges faced by male and female students in using Zoom Application for teaching and learning in tertiary institutions in Lagos State?

2.2 Research Hypotheses

The following null hypotheses were tested at 5% level of significance

HO1: There is no significant impact of students' awareness level of zoom utilization on teaching and learning in tertiary institutions based on gender.

HO2: There is no significant impact of students' perception of zoom utilization on teaching and learning in tertiary institutions based on gender.

HO3: There is no significant impact of the benefits of zoom utilization on teaching and learning in tertiary institutions based on gender.

HO4: There is no significant impact of the challenges of zoom utilization on teaching and learning in tertiary institutions based on gender.

3. Methodology

3.1 Methods

The study was a descriptive survey with a questionnaire distributed via Google Forms. This poll includes all students at Lagos State University of Science and Technology (LASUSTECH) in Ikorodu, Lagos State, Nigeria. The researcher chose LASUSTECH because of its proximity. The study answers four research questions and tests four research hypotheses without any manipulation.

3.2 Participants

A simple random selection method was used to select 100 respondents from various departments/faculties at Lagos State University of Science and Technology. The sample distribution across faculties is given below: Science (31 responses), Agriculture (14 replies), Engineering (9), Social Sciences (8 respondents), and Other (38 respondents). To collect data on the impact of using the Zoom program, the researchers built a structured questionnaire using Google Forms. Five components make up the questionnaire: Section A asked about demographics, including respondents' age, gender, department, and professor; Section B asked about awareness of the Zoom application; Section C asked about using Zoom for teaching and learning; Section D asked about the advantages of using Zoom; and Section E asked about the difficulties of using Zoom.

3.3 Procedure

The instrument was validated by two experts in educational technology, measurement, and assessment; it was adjusted and re-adjusted in accordance with instructions prior to use in the study. A pilot study was conducted with 25 LASUSTECH students who were not part of the study's sample but had similar characteristics. Cronbach's alpha yielded a dependability value of 0.81 to show the extent of reliability of the instrument. The researchers visited the sampled school (LASUSTECH) to explain the study, its goals, and to help participants obtain and complete the Google Forms survey. The visit also provided an opportunity to answer any questions and encouraged active engagement, which led to a high response rate.ANOVA was used to test the research hypotheses, and mean and bar charts were used to answer the research questions.

3.4 Results and analysis

Research Question 1: What are the awareness levels of male and female students towards utilization of Zoom application for teaching and learning in tertiary institutions in Lagos State?
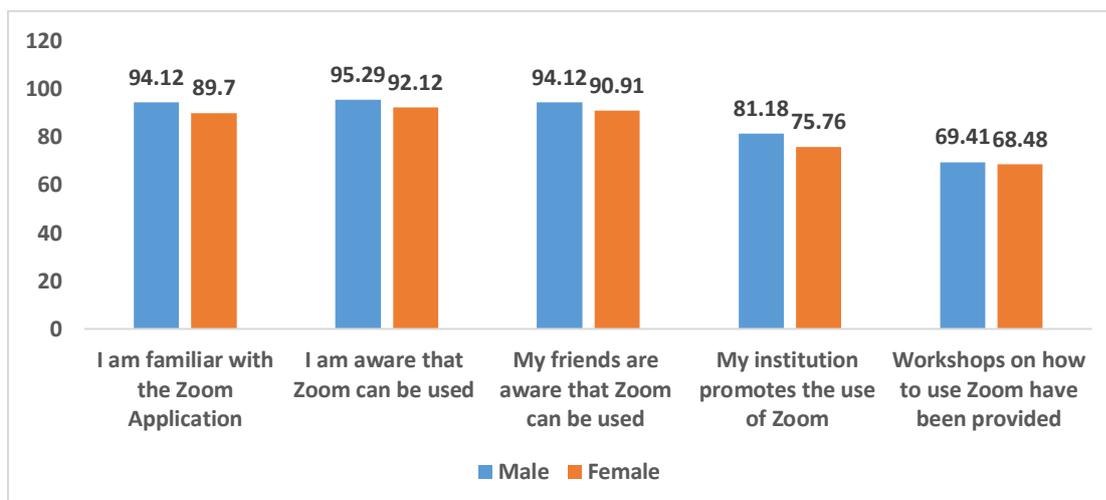

Figure 1. Awareness levels of the Zoom application for teaching and learning in tertiary institutions in Lagos State

Figure 1 shows that male and female students had 94.12% and 89.7% familiarity with using Zoom for teaching and learning objectives, respectively. Zoom is widely used for live virtual classes and meetings, with 95.29% and 92.12% awareness, 94.12% and 90.91% knowledge of friends' awareness, 81.18% and 75.76% knowledge that the institution promotes its use for academic activities, and 69.41% and 68.48% knowledge of institution-based workshops on Zoom's use. It means that students in higher institutions in Lagos State are well informed of how to use Zoom for workshops and meetings.

Research Question 2: How do male and female students perceive the ease of use of Zoom Application for teaching and learning in tertiary institutions in Lagos State?
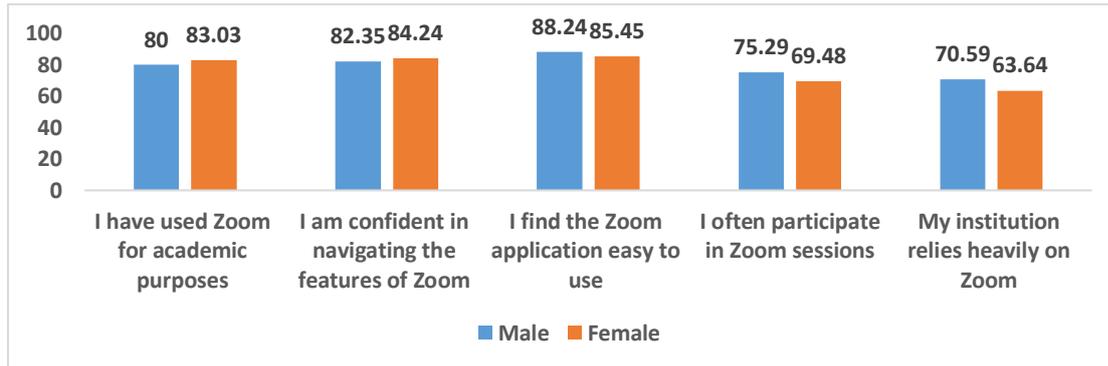

Figure 2. Students' perception of the ease of use of Zoom Application for teaching and learning in tertiary institutions in Lagos State.

Figure 2 shows that male and female students have 80% and 83.03% perceptions of using Zoom for academic purposes, respectively; 82.35% and 84.24% confidence in navigating Zoom's features during a virtual class; 88.24% and 86.45% ease of using Zoom application for teaching and learning; 75.29% and 68.48% participation in institution-based Zoom sessions; and 70.59% and 63.64% reliance on Zoom for remote teaching and learning by institutions. This suggests that students believe the Zoom Application is simple to use for teaching and learning in tertiary institutions in Lagos State, including navigation and regular involvement in workshops.

Research Question 3: What benefits do male and female students derive from using Zoom Application for teaching and learning in tertiary institutions in Lagos State?
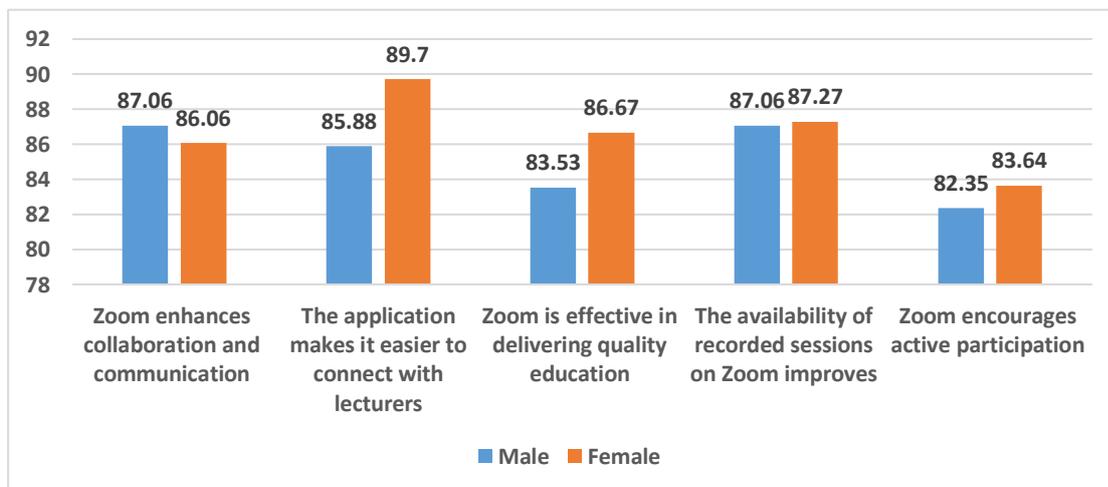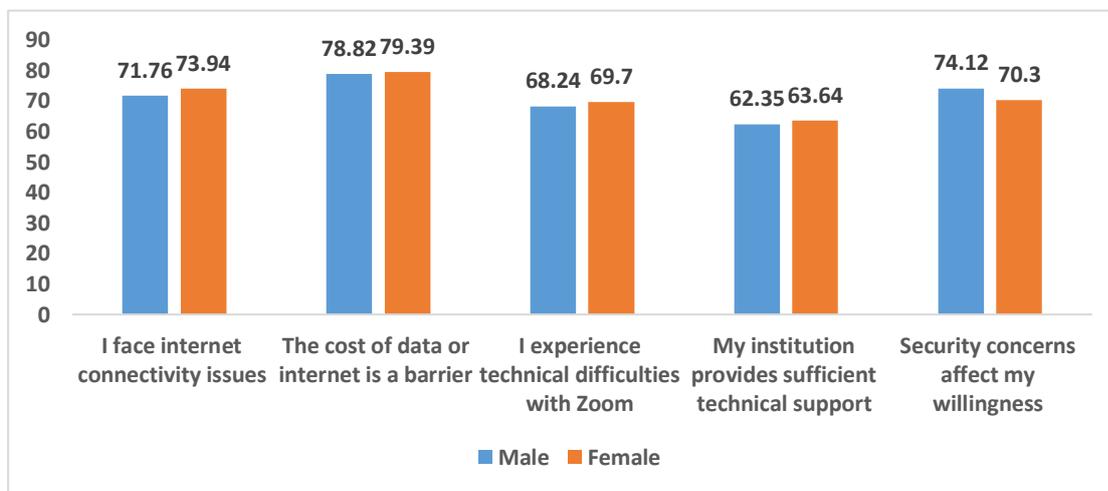

Figure 3. Benefits derived by students from using Zoom application for teaching and learning in tertiary institutions in Lagos State

The findings in Figure 3 showed that both male and female students thought Zoom had 87.06% and 86.06% capacity to improve collaboration and communication in teaching and learning, respectively; 85.88% and 89.7% capacity to facilitate connections with lecturers and students regardless of location; 83.53% and 86.67% capacity to facilitate the effective delivery of high-quality education during remote sessions; 87.06% and 87.27% capacity to make recorded sessions available to improve the learning experience; and 82.35% and 83.64% capacity to promote active participation in virtual classes. These findings indicate that students gain a variety of advantages when they use the Zoom application for teaching and learning, including: improved collaboration and communication, easier connection with lecturers, quality education, availability of recorded sessions, and encouragement of active participation.

Research Question 4: What are the challenges faced by male and female students in using Zoom Application for teaching and learning in tertiary institutions in Lagos State?

Figure 4. Challenges faced by students in using Zoom Application for teaching and learning in tertiary institutions in Lagos State

The data in Figure 4 shows that male and female students experienced internet connectivity issues 71.76% and 73.94% of the time, respectively; 78.82% and 79.39% cited the cost of internet data as a barrier to effectively using Zoom; 68.24% and 69.7% reported experiencing technical difficulties with Zoom during teaching and learning sessions; 62.35% and 63.64% reported not receiving enough technical support for Zoom users; and 74.12% and 70.3% reported security concerns that affected their willingness to use Zoom. It is evident that students typically encounter significant internet, data, technical, and security challenges when using Zoom for teaching and learning. Figure 4 shows that male and female students experienced internet connectivity issues 71.76% and 73.94% of the time, respectively; 78.82% and 79.39% cited the cost of internet data as a barrier to effectively using Zoom; 68.24% and 69.7% reported experiencing technical difficulties with Zoom during teaching and learning sessions; 62.35% and 63.64% reported not receiving enough technical support for Zoom users; and 74.12% and 70.3% reported security concerns that affected their willingness to use Zoom.

Hypotheses Testing

HO1: There is no significant impact of students' awareness level of zoom utilization on teaching and learning in tertiary institutions based on gender.

Table 1. Awareness of Zoom utilization for teaching and learning in tertiary institutions in Lagos State

		Sum of Squares	df	Mean Square	F	Sig.
Awareness	Between Groups	16.496	1	16.496	2.644	.107
	Within Groups	611.544	98	6.240		
	Total	628.040	99			

The first null hypothesis was not rejected because the results in Table 1 [F(1, 98)=2.64; p>0.05] did not demonstrate a significant effect of students' awareness level of Zoom utilization on teaching and learning in tertiary institutions based on gender, indicating that male and female students are similarly aware of the use of Zoom for teaching and learning, as supported by Figure 1.

HO2: There is no significant impact of students' perception of zoom utilization on teaching and learning in tertiary institutions based on gender.

Table 2. Impact of perception of Zoom utilization for teaching and learning in tertiary institutions in Lagos State

		Sum of Squares	df	Mean Square	F	Sig.
Perception	Between Groups	7.578	1	7.578	.529	.469
	Within Groups	1405.062	98	14.337		
	Total	1412.640	99			

Table 2's outcome [F(1, 98)=0.53; p>0.05] revealed no discernible effects of students' perceptions of Zoom use on gender-based teaching and learning in higher education. Similarly, the second null hypothesis was not disproved. Figure 2 confirmed this conclusion by demonstrating that male and female students' perceptions of using Zoom for teaching and learning are very similar.
HO3: There is no significant impact of the benefits of zoom utilization on teaching and learning in tertiary institutions based on gender.

Table 3. Impact of the benefits of Zoom utilization for teaching and learning in tertiary institutions in Lagos State

		Sum of Squares	df	Mean Square	F	Sig.
Benefits	Between Groups	3.115	1	3.115	.467	.496
	Within Groups	653.725	98	6.671		
	Total	656.840	99			

The third null hypothesis was not rejected because the results in Table 3 [F(1, 98)=0.47; p>0.05] did not demonstrate a significant gender-based impact of Zoom's benefits for teaching and learning in tertiary institutions. This conclusion was reinforced by Fig. 3, which demonstrated that male and female students share a somewhat similar belief in the advantages of Zoom for teaching and learning.

HO4: There is no significant impact of the challenges of zoom utilization on teaching and learning in tertiary institutions based on gender.

Table 4. Challenges of Zoom utilization for teaching and learning among tertiary institution students in Lagos State

		Sum of Squares	df	Mean Square	F	Sig.
Challenges	Between Groups	.158	1	.158	.014	.907
	Within Groups	1118.602	98	11.414		
	Total	1118.760	99			

Table 4's outcome [$F_{(1, 98)}=0.47$; $p>0.05$] shown that the difficulties associated with using Zoom had no discernible effect on gender-based teaching and learning in higher education. The third null hypothesis was thus not disproved. This conclusion was corroborated by Fig. 4, which demonstrated that using Zoom for teaching and learning presents comparable difficulties for male and female students.

3.5 Discussion

Male and female students in Lagos State's tertiary institutions are equally aware of the use of the Zoom application for teaching and learning, according to the findings. It means that students at Lagos State's higher education institutions understand how to use Zoom for workshops and meetings. The results are consistent with that of Ohiwerei and Nden (2022) and Aljaraideh et al. (2024), who found no significant difference in Zoom knowledge or usage between male and female students.Both genders reported high levels of familiarity and comfort with the platform, indicating that gender has no significant impact on Zoom awareness or adoption for educational purposes. While the Federal Republic of Nigeria [FRN] (2022) report, produced in 2022, claimed that the usage of digital technologies, such as Zoom, has expanded dramatically in tertiary education in Lagos State. According to the poll, greater Zoom awareness and usage have had a significant affect on student engagement and learning performance.

Male and female students in Lagos State tertiary institutions had similar evaluations of the ease of use of the Zoom application for teaching and learning. This implies that students perceive the Zoom application is straightforward to use for teaching and learning in Lagos State's tertiary institutions for academic goals, navigation, and frequent workshop participation, but this has had no significant impact on usage. The findings are consistent with that of Ohiwerei and Nden (2022) and Aljaraideh et al.'s (2024) studies, which found that male and female students had similar perceptions of Zoom's ease of use. The study employed a Likert scale to assess impressions, and the results showed that both genders assessed Zoom's ease of use as equally high, implying that gender had no major influence on opinions about Zoom's usability. While Bashar et al. (2023) discovered that students assessed Zoom's usability positively, this perception had no meaningful effect on frequency of use. Internet access, device availability, and institutional restrictions had a greater impact on utilization rates.

Findings on the benefits of using the Zoom application for teaching and learning in tertiary institutions in Lagos State show that male and female students had similar ideas about Zoom's benefits for teaching and learning. Students gain immensely from utilizing the Zoom application for teaching and learning since it improves collaboration and communication, makes it simpler to connect with lecturers, delivers excellent education, provides access to recorded sessions, and encourages active involvement. The findings are consistent with Zarzycka et al.'s (2021) study, which found that Zoom improved collaboration and communication amongst male and female students. Breakout rooms, chat functions, and screen sharing were very useful for group tasks and conflicts. Ohiwerei and Nden (2022), Fasinro et al. (2022) and Adefuye et al. (2023) found that having recorded sessions was a

significant advantage of using Zoom. Both male and female students valued the flexibility to repeat lectures and catch up on missed courses, which increased their comprehension and recall of the material.

According to research on the difficulties male and female students encounter when using Zoom applications for instruction and learning in Lagos State's higher education institutions, these difficulties are comparable. When using Zoom for teaching and learning, students clearly face significant internet, data, technological, and security challenges. Despite being widely reported problems, poor internet access, user fatigue, engagement, and digital literacy had no discernible effect on zoom usage. Mahfud and Winnarko (2023), Ajibade et al. (2022) and Ohiwerei and Nden (2022) found that insufficient internet connectivity was a major obstacle for both male and female students. According to the study, poor internet connections frequently interrupted live sessions, which reduced the overall standard of the educational process. Although After using Zoom for a long time, both male and female students reported user fatigue and engagement concerns, according to Ali's (2024) findings. According to the study, a lack of exercise and extended screen time decreased motivation and focus.

4. Conclusion and Recommendations

Based on the study's findings, it was concluded that the level of awareness of Zoom Technology for Teaching and Learning at Lagos State University of Science and Technology (LASUSTECH) was high to a large extent; students find it easy to use Zoom Technology for Teaching and Learning; the level of use of Zoom Technology for Teaching and Learning among undergraduates was relatively low; and Zoom Technology for teaching and learning had several benefits for students. The survey also found that using zoom technology for learning has emerged as a great resource for encouraging learning and preparing young people to participate in a global economy. Based on the results of this study, the following recommendations were made:

1. Tertiary institutions should emphasize infrastructure improvements, such as providing reliable internet access and equipment, to enable seamless use of Zoom and other online platforms.

2. Awareness campaigns and user training programs should change the emphasis from basic awareness to advanced abilities that improve the use of Zoom features like as breakout rooms, polls, and collaboration tools.

3. Subsidized internet access for students and instructors in areas with poor connectivity, as well as collaboration with technology companies to provide students with low-cost devices.

4. Institutions should encourage the use of supplementary platforms to reduce reliance on a single tool and solve issues like digital fatigue. A blended learning technique, which mixes in-person and virtual methods, can also enhance teaching and learning outcomes.

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