LECTURERS AND UNDERGRADUATES' ATTITUDES TOWARDS ONLINE TEACHING IN OYO STATE, NIGERIA: IMPLICATIONS FOR SCIENCE EDUCATION TEACHING IN THE POST COVID-19 PANDEMIC ERA

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Abstract

This article investigated the attitudes of some Science education lecturers and students towards online teaching strategy. The study was carried out in one of the public universities in the southwest, Nigeria. The undergraduates involved in the study were those pursuing Bachelor of Science Education degrees in Biology, Chemistry, Physics, Mathematics and Integrated Science and the science education lecturers that were teaching the students as at the time of the study. The study adopted a descriptive survey design of the ex-post facto type. The sample comprised 75 Science education lecturers and 75 science education students of the university selected through simple random sampling technique. A valid and reliable Online Teaching Attitudinal Scale (Criterion related validity = 0.78 and r = 0.86) was used to collect relevant data for the study. Data were analyzed by using frequency count and t-test statistics. Results of findings showed that a higher proportion of the lecturers exhibit positive attitude towards online teaching while a higher proportion of the students possess a negative attitude towards online teaching. It also revealed insignificant difference between the attitudes of science education lecturers and students in terms of their attitudes towards online teaching. In addition, there is no significant difference in the attitudes of male and female students towards online teaching. The study recommended that there was the need for both the university lecturers and their students to develop positive attitudes towards online teaching. It also recommended that university authorities should provide necessary digital tools and encourage digital training among university staff especially science education lecturers. . The university authorities should provide necessary digital tools and encourage digital training among university staff especially science education lecturers.

Key words: Online teaching, undergraduates, attitudes, science education lecturers, science education students, pandemic

Introduction

Online teaching has gained popularity due to its accessibility, flexibility, and cost-effectiveness. It involves asynchronous lectures and blended classes, with various strategies developed to teach online classes (Ally-Charles et al., 2024; Gustin & Vasquez, 2017; Kopczynski & Silvia, 2023). However, teachers often face challenges due to lack of student feedback and simplified approaches to promoting participative behaviour. Online teaching strategies can vary depending on the subject and assignment type, and some classroom practices are equally relevant in both online and face-to-face interactions. The shift to online teaching platforms during the COVID-19 pandemic highlighted the need for educators to adapt their teaching methods and effectively utilize online platforms.

The COVID – 19 has brought about tremendous changes around the world and this has given rise to the digitalization of education process through online teaching and learning as well as its introduction into the educational programmes of universities. In order to stem the spread of COVIC – 19 pandemic, many nations and indeed institutions have moved many of their operations online. Since the arrival of the pandemic, universities have been introducing digitalized strategies to teaching and learning. This step has resulted into adaptation problems for both students and teachers. Some of the problem areas according to Leontev (2023) include teachers' lack of digital skills with its attendant effects on lesson preparation as well as conduct of online classes. In contrast, Passey et al (2018), Raimi (2022), Raimi, Babayemi, Umanah and Akpan (2024) pointed out the consequences and benefits of the introduction of online teaching which is manifested in the fact that many of the lecturers were found to be competent in the use of digitalized techniques of teaching. This was made possible as a result of the current situation, although preparing for online teaching consumes more time than preparing for similar physical classes.

Ethical challenges have arisen due to the need for students to have online learning readiness (OLR), which is based on their preferences and technological confidence. The debate centered on whether teachers could demand students have their cameras on during lectures, leading to Zoom fatigue. Some educators used different approaches, while others argued that non - verbal cues are important for learning and rapport building. Traditional education has been transformed into online learning (OLE) in synchronization with the new technology era to improve education (Wang, 2023; Xie et al., 2018). The rapid development of information technology and emerging technologies like the Internet of Things has led to new technologies and methods to promote education equilibrium. Effective classroom interaction is essential for improving teaching effectiveness and quality.

The COVID-19 pandemic has prompted institutions to adopt online or blended learning, resulting in increased

interest in online teaching. This shift has prompted a study on stakeholders' attitudes towards online teaching, particularly in science education. These studies revealed positive attitudes among medical and engineering students, but challenges like technical support and lack of interaction persist (Al-Fraihat et al., 2020; Khechine et al. (2020). The spontaneous and widespread adoption of online technologies in educational process is somehow an ambitious task which is not unconnected with the goal to overcome resistance to organizational change, developing ideas of trust and cooperation in this sense, the views and attitudes of teachers and students become significant because the perception and attitude to online class are crucial for motivation and learning.

In the context of science education, several studies have investigated the effectiveness of online teaching in different science subjects. For example, a study by Gustin and Vasquez (2017) found that online teaching was as effective as traditional face-to-face teaching in a chemistry course. In other related studies, Raimi (2022) and Raimi et al (2024) also affirmed the efficacy of the use of online teaching in different aspects of Chemistry at the undergraduate levels. Another study by Xie et al. (2018) reported that online teaching was effective in improving students' understanding of biology concepts. However, there is a need to investigate the attitudes of science education lecturers and undergraduates towards online teaching in specific contexts.

Theoretically, the study used a phenomenological framework to understand the experiences of online teachers during the COVID-19 pandemic. Phenomenology, a philosophical tradition, focuses on understanding human experience by analysing how people perceive and make sense of the world. It emphasised the context and how it shapes individual experiences. The study uses phenomenology to understand educators' perceptions and interpretations of their new teaching environment, suspending preconceived notions and beliefs. This approach provides a useful framework for understanding and supporting educators in this new teaching environment like online teaching.

This study also adopted the Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and Community of Inquiry (CoI) models to understand the attitudes of science education lecturers and undergraduates towards online teaching in Oyo town, Nigeria. Fred Davis introduced the Technology Acceptance Model (TAM) for his doctoral project in 1986. TAM, a modification of the Theory of Reasonable Action, is designed especially for simulating individuals' adoption of technology or information systems. TAM explains how individuals adopt and use technology based on perceived usefulness and ease of use which invariably influences their attitudes. In an effort to forecast behavior, Icek Ajzen created the Theory of Planned Behavior (TPB) (Ajzen, 1991). TPB explains attitudes towards technology based on attitude towards the behavior, subjective norm, and perceived behavioral control. Garrison, Anderson, and Archer's model (2000, 2001) identifies three presences: social presence, cognitive presence, teaching presence and cognitive presence, focusing on meaningful interactions and the ability to create and verify meaning. The COI model explains the process of online learning and the role of social, cognitive, and teaching presence in creating a meaningful learning experience. The study aims to explain the challenges and opportunities of

online teaching and learning, as well as the role of social, cognitive, and teaching presence in creating a positive learning experience that engender both the lecturers and students attitudinal disposition to science education.

Empirically, Kopczynski and Silvia (2023) emphasized the importance of reimagining online learning for academic performance in higher education. The pandemic has increased accessibility and scalability, making online learning crucial for economic development, experiential learning, critical thinking, and student success. Despite challenges, online learning is expected to remain. Wang (2023) study explores the impact of AI, cloud computing, and 5G on online education, revealing that these technologies enhance learning time, place, and interest, and suggest high-efficiency interaction modes can improve synchronous classroom teaching quality. Asroriyah et al. (2023) utilized Telegram Quiz Bot to teach English structure material to high school students, achieving 90% correct answers, highlighting the need for user-friendly learning resources during the pandemic.

Ally-Charles et al. (2024) posited that the University of Guyana has made progress in Online Learning Environments, but challenges like inadequate ICT infrastructure, lack of training, and examination integrity resistance persist, necessitating more professional development and face-to-face proctoring. Ye (2024) investigates the integration of mobile interaction technologies in entrepreneurial education, focusing on creating a collaborative learning team environment model for knowledge building and identifying strategies for improved learning outcomes. In the same vein, Svihus (2024) in his study on online teaching in higher education revealed that experienced teachers, despite facing challenges, promoted participation and adapting to the new normal through strategies like asynchronous resources, role play, and external tools.

Statement of the Problem

The COVID-19 pandemic has forced many institutions to shift to the use of online or blended learning. This has led to a growing interest in online teaching. Science education is one of the fields that has been affected by this shift, and there is a need to investigate the attitudes of science education lecturers and undergraduates towards online teaching. Despite the growing interest in online teaching, there appear to be limited researches on the attitudes of science education lecturers and undergraduates towards online teaching at the universities' level in Nigeria, particularly in Oyo state.

Research Questions

The study sought to answer the following research questions.

i. What are the attitudes of science education lecturers and undergraduates towards online teaching?
ii. Is there any difference between the attitude of science education lecturers and science education undergraduates?

Research Hypotheses

i. There is no significant difference in the attitudes of science education students and lecturers towards online teaching.
ii. There is no significant difference in the attitudes of male and female science education teachers towards online teaching.
iii. There is no significant difference in the attitude of male and female science education undergraduates towards online teaching

Delimitation of the study

The study was delimited to science education teachers who taught science undergraduate students in one of the

public universities located within Oyo state, in the southwest Nigeria. . Only 400L undergraduate science education students took part in the study. Specifically, only undergraduate who were running courses in Biology, Chemistry, mathematics, Physics and Integrated science education were involved in the study.

Methodology

The study employed a descriptive survey design of the expo -facto type. This design was deemed appropriate because the study did not involve manipulation of variables or data collected. It only involved gathering and analysis of data. The sample for the study comprised 150 subjects made up of 75 lecturers and 75 science undergraduates. The science education lecturers were drawn from among the most senior and middle hierarchies of academic staff in the university while the students were drawn from among the 400 level undergraduates who were already preparing for their final semester examinations in the university at the time of carrying out this study. Simple random sampling technique was used to select 15 students across the five main programmes that make up science education in the university. The student participants were those pursuing their career in science education, Physics, Biology, Chemistry Integrated science and Mathematics. It is expected that this category of students will be able to provide adequate responses to the items of the research instrument Online Teaching Attitudinal Scale (OTAS). Both male and female Science education teachers participated in the study. Only one valid, reliable and relevant instrument was used to collect relevant data for the study. The instrument used is the Online Teaching Attitudinal Scale (OTAS). The OTAS is a 30 - item Ato-Wikinson's (1979) modified by Raimi (2002) Science Attitude Inventory. The instrument was made up of statements which are relevant to online teaching. Each OTAS item was rated a 4 – point likert scale ranging from strongly agreed (SA) to strongly disagreed (SD). Items which indicate positive attitude were rated on points ranging from 4, 3, 2, 1 i. e. 4 for strongly agreed and I for strongly disagree while the scoring pattern for each item which indicates a negative attitude were oppositely graded (i.e, 4 for strongly disagree to 1 for strongly agree). The instrument was subjected to further reliability test by administering items on a group of 100 science education lecturers and students in a private university within Oyo state. A test re-test reliability coefficient for the instrument was found to be 0.91. Criterion related validity of the OTAS obtained gave 0.75. The instrument was administered on the 12th week of the semester just before the commencement of second semester examination. The responses were collected from the respondents within twenty hours for the purpose of collation and analysis. The data collected were analysed using descriptive statistics and t -test.

Results

Table 1: Demographic Analysis of the study

Table 1a: Gender of the Respondents

Group	Gender				Total	
	Male		Female			
	N	%	N	%	N	%
Lecturers	21	28	54	72	75	100.00
Undergraduates	25	33.3%	50	66.7	75	100.00

Table 1a shows the classification of respondents based on gender. It shows that 21 (28%) of the participating lecturers are males while 54 (72%) are females. In the same vein 25 (33.3%) and 50 (66.7%) students participated in the study.

Research question 1: What are the attitudes of science education lecturers and undergraduates towards online teaching?

Table 1b: Altitude of Respondents towards online Teaching

Group	Attitude				Total	
	Positive		Negative			
	N	%	N	%	N	%
Lecturers	39	52.00	36	48.0	75	100.00
Students	34	45.33	41	54.7	75	100.00

Table 1b shows the analysis of the collected data based on attitude towards online teaching. It shows the demographic classification of science education lecturers and students towards online teaching. Analysis of the data collected revealed that out of the seventy-five (75) science education lecturers who participated in the study, thirty-nine 39 (52%) are adjudged as having positive attitude towards online teaching while 36 (48%) have negative attitude towards online teaching. Similarly, out of 75 science education students that took part in the study, 34 (46.57%) have positive attitude while 41 (53.42%) have negative attitude towards online teaching. The result were obtained by finding the mean attitude values for both the teachers and students after pooling all the attitude scores together and finding the mean attitude score for science teachers and students in each of the cases, attitude scores that fall within the mean and above were considered as having positive while all scores below the mean value were adjudged as negative attitude towards online teaching.

Test of Hypotheses

Ho 1: There is no significant difference in the attitudes of science education students and lecturers towards online teaching.

Table 2 Comparison of Science Teachers and Science Students Attitudes towards Online Teaching

Attitude Towards Online Teaching	N	$\bar{X}$	S. D	Df	t	Sig.	Decision
Lecturers	75	.67	3.46	148	1.09	0.276	NS
Students	75	.65	2.97				

Result of data analysis in the Table 2 compares the attitude of science teachers and science education students towards online teaching. Results of data analysis using statistics t-test revealed that there is no statistic significant difference between the attitude of science education teachers and science education students towards online teaching. This observation was arrived at because the calculated t-value (1. 09) was found to non-significant at 0.05 level of significance. ($t = 1.09$; $df = 148$; $p > 0.05$). Therefore, H_O1 is accepted.

Ho 2: There is no significant difference in the attitudes of male and female science education students towards online teaching.

Table 3. Attitude of Science Education Staff towards Online Teaching Based on Gender

Attitude Towards Online Teaching	N	$\bar{X}$	S. D	Df	t	Sig	Decision
Male Staffs	21	52.9	4.15	73	1.11	0.05	NS
Female Staffs	54	59.89	3.15				

Table 3 shows the result of data collection of the attitude of science education staff based on gender. The result reveals that there is no statistic significant difference between male and female students in terms of their attitudes towards online teaching. This is because the t-value (1.11) is not significant at 0.05 level of significance ($t = 1.11$; $df = 73$; $p > 0.05$). Therefore, H_O2 is accepted.

Ho 3: There is no significant difference in the attitude of male and female science education undergraduates towards online teaching.

Table 4. Comparison of Science Education Students' Attitude Based on Gender

Attitude Towards Online Teaching	N	$\bar{X}$	S. D	Df	t	Sig.	Decision
Male Students	25	63.95	2.85	73	1.25	0.214	NS
Female Students	50	65.7	2.8				

In Table 4. The result of the comparison of the attitudes of male and female science education students towards online teaching. The result shows that there is no statistic significant difference between male and female science students relative to their attitudes towards online teaching. This observation was arrived at because the observed t-value (2.02) is higher than the calculated t-value (1.25) is not significant at 0.05 level of significance ($t = 1.25$; $df = 73$; $p > 0.05$). Therefore, H_O3 is accepted.

Discussion of Findings and Implications

One major finding of the study is that substantial number of science education students exhibit negative attitude towards online teaching. Moreover, the number of science education teachers that were adjudged as having negative attitude towards online teaching also appear to be on the high side. This finding corroborates an earlier finding in a related study by Wang 2023, Xe et al., 2018 where they observed that teachers and students alike still prefer the conventional physical classroom interaction to the use of online or ICT based classroom mode. It is also in line with the findings of Hilary, Kabir and Obowu (2023) when they observed in their study that a higher proportion of senior secondary school teachers in Port Harcourt metropolis possess positive attitudes towards e - learning. This implies that, to an extent, the teachers showed some level of readiness in adapt to the use of e – learning in their classroom interaction. The implication is that about average number of lecturers that possess negative attitudes is that students will find it difficult to adapt to the changing world of technology and digitalization of science teaching and learning. This problem of adaptation was observed in an earlier study carried out by Leontev (2023) in his study on teachers and students' attitudes towards

online classes at a technical university where he observed that university teachers have problem adapting to online teaching because of low level digitalized knowledge. He also found that lack of digital tools and suitable infrastructures in the university impacted negatively on the attitudes of teachers and students towards online teaching. Similar findings were reported by Masalimova et al (2024), Veenstra Cott (2025), Raj et al (2025) higher online instruction was linked to lower performance and negative attitudes to learning. Contrary to this finding, Ojo (2000), Ojo and Olakulehin (2006) and John (2021) in their different studies found that students have positive attitudes to e – learning. In particular, Ojo and Olakulehin (2006) observed that students have positive attitudes toward Online Distance Learning (ODL) compared to traditional form of higher education. This implies the readiness of the students to continue to use online learning strategy against the conventional strategy. In the same vein. Ogunbodede and Ukpebor (2021) in their study on students' attitude towards online learning during the Covid - 19 pandemic observed that majority of the respondents who participated in the study have positive attitude towards online teaching. Further to this, Abaze and Odikpo (2024) also obtained a similar result among nursing students regarding their attitudes and perception towards online learning during covid - 19 lockdown. They also found a positive relationship between attitudes and perception among the sampled nursing students. The finding however negates those of Okolo (2022) and Jurakovic et al 2022 when they observed in their studies that university teachers and students have positive attitudes towards online teaching. The implication of these observations is for the management of universities and other tertiary institutions to provide necessary tools and gadgets to improve acquisition of digitalized knowledge and skills by teachers and students. The university authorities should as a matter of fact initiate and encourage in – service training as well as refresher courses on digitalization of education. These and other related actions by the university authorities can go a long way to improve the acquisition of basic digital skills with the consequential effects of improving the attitudes of both the university teachers and students alike.

The study also revealed an insignificant difference between the attitude of science education lecturers and students towards the use of online teaching strategy, this is highly related to finding earlier obtained in the study which indicated that substantial number of teachers and students possess negative attitude towards online teaching. The result is in line with the findings of Raimi (2022), when he observed similar results at certain level of educational attainment between university lecturers and science education undergraduates. It however negates the findings of Okolo (2022) who observed a significant difference in the attitude of university lecturers and undergraduates. The insignificant difference in the attitude of university lecturers and students has serious implication for science teaching and learning. This is because nowadays, there is an upsurge in students' enrolment, inadequate infrastructures, overloaded timetable, Ebola pandemic, the unpleasant experience of the COVID-19 pandemic, as well as other unforeseen natural disasters which impede physical classroom interaction. It has also become clearly evident that the conventional physical contact alone cannot suffice to promote effective teaching and learning in the face of desirous educational advancement. A blend of both physical and virtual teaching strategies could go a long way

in promoting science education (Raimi, 2002 and 2023, 2024). This is in line with Amuda and Muhammad (2022), who found that frequent use of ICT tools in teaching of Physics improved the competency and enhance students' achievement in the subject. As a result, it was recommended that there should be a paradigm shift in the attitudes of university teachers in terms of change of attitude towards the use of modern technology and other forms of digital tools to promote learning especially the sciences. This also has the potential effect of enhancing the attitude of Science Education students and hence, the overall achievement in the Sciences. The study further revealed that, there is insignificant difference between male and female science education lecturers in terms of their attitudes towards online teaching. This finding corroborates the results of studies carried out by (Raimi, 2002 and 2022) when he obtained similar findings at certain levels of educational attainment between male and female science teachers. However, it is desired that science education lecturers should develop the right type of attitude not only towards online teaching but towards digitalisation of education especially at the university level considering the advantage inherent in doing so. The implication of this to science teaching and learning is that being positive about digitalization on the part of university's teachers has the potential of infecting and influencing the students 'attitudes for the advancement of scientific knowledge.

That there exist no significant difference in the attitude of male and female undergraduates towards the use of online teaching strategy is not surprising after all. This is because of the conflicting nature of researches that are gender based. For instance, this finding is in line with the findings of Rhaman and Tiwan (2015); Raimi (2022) who in their various studies on attitude towards teaching profession obtained a similar result. In other studies, significant difference has been found between male and female at different levels of educational attainment. For instance, Hilary, Kabir and Obowu (2023) found a statistically significant difference between male and female students towards e – learning. Nwangwu (2020) also obtained a similar result in a related study. The implication of these conflicting findings on gender based studies is that at the undergraduate level, lecturers should as a matter of fact use strategies that would provide level plane ground and learning environment that would enable both male and female students continue on their educational attainment and in their chosen career. There shouldn't be any preferential treatment based on gender and both gender should be given equal opportunities to learn under the same condition and at individual's pace.

Conclusion

In this study, attitude of Science Education undergraduate students and lecturers towards online teaching strategies was investigated. Results of findings shows that sizeable number of Science Education lecturers and students have negative attitudes towards online teaching. It also revealed that gender has no significant influence on attitude towards online teaching, both for science education undergraduate students and their lecturers. These findings have implications for science teaching and learning in Nigeria, especially for educational institutions, policy makers, school administrators and science educators as well as their students.

Recommendations

Based on the findings of this study, it was recommended that, university lecturers should embrace digitalisation of teaching and learning and in particular,

the use of online teaching strategy due to the advantages inherent in doing so and at the same time develop positive attitude towards the use of online teaching and learning. It is also recommended that science education lecturers should employ strategies that will give both male and female undergraduates equal opportunities during science classroom instruction especially that which would enable them develop enhanced and positive disposition towards the use of ICT especially online teaching and learning strategies. Necessary digital tools and platforms should be provided by the relevant institutional authorities for the realisation of these objectives in the face of unpredictable global world and to key in to the contemporary and technologically driven world. This should be accompanied by regular training of staff on digitalisation of science teaching and learning. In – house as well as in – service training programmes that are focused on the use of modern technology in the teaching and learning of science should be put in place especially at the university level.

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