# Utilisation of Remote Teaching Platforms by Science Lecturers in Some Selected Federal Universities in South-West, Nigeria

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## Abstract
*Remote teaching platforms have emerged as an essential tool for allowing effective teaching and learning in the face of changing conditions and rising demand for online education. The study investigated remote teaching platforms utilization by science lecturers in some selected federal universities in South- West, Nigeria. The study adopted an ex- post- facto research design.. Total enumeration technique was adopted to involve all the science lecturers. Structured questionnaire was used for collecting data for the study. Out of a total of four hundred and sixty seven (467) questionnaires administered, three hundred and thirty six (336) were returned. However, only three hundred and sixteen (316) were found useful for the study. The study revealed that science lecturers mainly use Skype 272 (86.1%), Chat rooms 229 (72.5%), and Zoom 253 (80.1%) as remote teaching platforms. The result of frequency also revealed that zoom 266 (84.2%) was used always. Poor internet connectivity ($\bar{x}$ =3.65), epileptic power supply ($\bar{x}$ = 3.78), inadequate/slow bandwidth ($\bar{x}$ = 3.64), were the main challenges encountered by the science lecturers while using the remote platforms. The study concluded that science lecturers may not be able to fully explore and adopt remote teaching platforms for their lectures due to the various challenges identified. The study thus recommended regular power supply, internet access, training and increased exposure to remote teaching platforms.*

***Keywords:*** Remote teaching, Remote Teaching Platforms, Science Lecturers, Federal Universities

## Introduction

The rapid advancement in technology has brought about global transformation in the way we perform our day to day activities including the teaching and learning processes in education. Consequently, the education landscape has undergone a profound transformation, catalysed by the rapid advancements in information and communication technology (ICTs) as well as the advent of the pre and post COVID-19 which made it impossible for people to move about freely.Covid-19 caused people to stay indoors, cut away from workplaces, social gatherings and most importantly learning environments including schools, colleges and universities. Among the most notable shifts introduced by the covid-19, is the widespread adoption of remote teaching platforms by educators across diverse disciplines including science subjects.

Science subjects encompass a broad range of disciplines that study the natural world and its phenomena through observation, experimentation, and analysis. Science subjects are practical oriented subjects that involve a series of activities and practical. Science lecturers are harnessing

the power of technology to transcend geographical boundaries and reimagining the possibilities of teaching and learning (Durkaya, 2023). With the advent of digital platforms, science lecturers have been tasked with navigating a complex terrain, balancing the imperative of fostering student engagement with the constraints imposed by virtual learning environments (Yu, 2024). Opportunities such as moving from virtual laboratories and interactive simulations to collaborative online tools are feasible. Moreover, concepts in the sciences could be converted to simulations, animations and can be uploaded as part of the teaching materials. Educators' instructions could also be broadcasted to students through remote teaching platforms.

Remote teaching also known as distance education or online instruction, refers to the practice of delivering educational content and facilitating learning experiences through digital technologies and communication tools. Instead of the traditional face-to-face interactions in a physical classroom setting, remote teaching allows instructors and students to engage in learning activities from different locations, often using the internet as the primary medium of communication. According to Lieberman (2020), remote teaching is an online instruction using videoconferencing platforms, such as Zoom or Google Meets, Microsoft Team and learning management system, such as Google Classroom, Canvas, or SeeSaw, to post assignments and video lectures.

Tsabedze and Ngoepe (2020), affirmed that remote teaching is an alternative to the real place transmission of instructional content, allowing individuals to access and participate in education regardless of their physical/ geographical location, provided they have the means (computer, smart phone, internet) to connect to the resources. Remote teaching is typically facilitated through technological tools that has features such as video conferencing tools for live lectures, discussions and virtual meetings; Learning management systems (LMS) for organizing course materials and use of multimedia resources; collaboration tools, such as discussion forums, group projects, and shared documents, to foster peer interaction and collaborative learning, assessment and feedback mechanisms, including quizzes, exams, assignments, and grading tools, to monitor student progress and provide personalised support.

Remote teaching usually takes the form of synchronous instruction where interaction is real time which tends to replicate the structure of a traditional classroom environment, with live lectures, discussions, and collaborative activities. In addition, it could take the form of asynchronous instruction where students may engage with course content, complete assignments, and participate in discussion forums asynchronously, without the need for simultaneous interaction with the instructor or peers. It can also be hybrid where we have a combination of both synchronous and asynchronous elements.

The aim of remote teaching is to give reliable alternate access of education to the students, where students watch lecturers deliver their lectures live, or asynchronously, where students watch lecture recordings at a later point in time. Remote teaching allows science lecturers to work or teach from anywhere and at any time so they can pass on information to students who may even be on the other side of the world. Science instructors can assign group posts through remote learning platforms, and students can set up group conversations to participate or share their ideas and information in discussions even when they are not physically there. Remote teaching platforms also improve teachers and students' communication skills, expand participation, strengthen peer support and enable collaborative learning (Wang, Lam, Chiu, Lung & Ho, 2020). There are various remote teaching platforms which science lecturers can use for teaching. Some of them include Google Classroom, Google Meet, and Learning Management System such as Edmodo, WhatsApp and YouTube.

Utilization is the action of making practical and effective use of something. Remote teaching platforms utilization enable both the science lecturers and their students to take the classroom everywhere they go. However, this does not imply that the opportunities of remote teaching adoption outweighs the numerous challenges embedded in integrating remote platforms into the teaching and learning environments. Challenges such as poor/low internet connectivity, technophobia, poor searching skills, inadequate online teaching infrastructure, inadequate training and technical support, inadequate power to charge the online teaching devices such as laptops, smartphones, etc. are still prevalent in a developing nation like Nigeria. . Although, the government of Nigeria through public and private partnership has invested resources and enacted policies to ensure that every Nigerian has access to technologies, these efforts are not 'felt' as Nigeria still ranked 143 out of 176 in global ICT development index in (Global ICT index, 2017).

This study was carried out in the oldest Federal Universities in South-West, Nigeria because according to the National Universities Commission, this zone has the highest distribution of universities in Nigeria hence the results obtained can be generalized for science lecturers in Nigeria. Additionally, these universities have graciously enjoyed Tertiary Education Trust fund (TETFUND) for the funding of higher education in Nigeria, hence they should be at the fore front of adopting remote teaching in the post covid era. This study therefore investigated the remote teaching platform utilisation by science lecturers in Federal Universities in South – West, Nigeria.

**Statement of the Problem**

Traditional classroom instructions sometimes seem to fall short of providing an immediate learning environment with faster evaluations, and more engagement opportunities. However, digital learning tools and technology fill this void .In recent years, the utilisation of remote teaching platforms has become increasingly prevalent, particularly in response to global events such as the COVID-19 pandemic. While these platforms offer promising avenues for delivering educational content, their effectiveness in facilitating science education which is a field traditionally reliant on hands-on experimentation and interactive learning, remains perhaps underexplored. Furthermore, despite the benefits embedded in the utilisation of remote teaching platforms observation revealed that science lecturers in Federal Universities in South-West Nigeria are yet to incorporate remote teaching platforms fully in the teaching process. This may be as a result of poor/low internet connectivity, technophobia, poor skills needed for performance of practical in an online platform , inadequate proper online teaching infrastructure, inadequate training and technical support; and inadequate power to charge the online teaching devices such as laptops, smartphones, etc. When these challenges are not properly addressed, they may alter the effective utilisation of the remote teaching platforms. Therefore, this research investigated the remote teaching platforms utilisation by science lecturers in federal universities in South- West, Nigeria.

**Research Questions**

The study answered the following research questions

1. What are the types of remote teaching platforms utilized by science lecturers in federal universities in South-West, Nigeria?

2. What are the purposes for which science lecturers use remote teaching platforms in federal universities in South-West, Nigeria?
3. What is the frequency of utilization of remote teaching platforms by science lecturers in fede ral universities in South – West, Nigeria?
4. What are the challenges associated with the utilization of remote teaching platforms by science lecturers in federal universities in South –West, Nigeria?

**Review of Related Literature**

Remote teaching is the process of teaching on virtual platforms, using technology and computer networking systems (or internet), without physical or face-to-face contact. Arkorful and Abaidoo (2014) refer to remote teaching as the use of information and communication technologies (ICTs) to allow access to online teaching resources. Stanley (2019) clarifies that remote teaching prevails the moment both teachers and students are joined together in a virtual classroom, utilizing video conferencing technology. Remote teaching provides students and teachers with new engagement methods that foster and develop competencies such as autonomy, critical thinking as well as collaboration among teachers and students, even outside the classroom. Effective remote teaching involves the use of online management systems such as Google classroom, Zoom, Telegram and Microsoft Team (Alqurshi, 2020).

**Types of Remote Teaching Utilized by Science Lecturers**

Various online platforms have been discovered to facilitate remote teaching. Platforms such as Microsoft teams, Google hangout, Skype, Bamboo learning, Google classroom, GoTo Meeting, YouTube, Blackboard, Edmodo, Schoology, Classdojo, Zoom, and WhatsApp exist to facilitate remote teaching (Ozili, 2020) by allowing educators to upload their coursework for students who are not physically present in the classroom. Nadezhda, (2020) and, Hasanah and Dewi (2019) revealed that the most utilised platform by lecturers are WhatsApp, Zoom, and Google classroom. Adeyeye, Ojih, Bello, Adesina, Yartey, Ben-Enukora and Adeyeye (2022) in their study on effectiveness of online learning platforms on practical related courses found out that Zoom and Moodle are very effective in teaching practical related courses for academic achievement of the students. In a related study, the findings revealed that the most utilised platform by science lecturers in the teaching of biology science education are WhatsApp, Zoom and Google Classroom (Tauhidah, Jayanti, Rahmasiwi, Pamungkas, & Saifulloh, 2021). A study by Mishra, Gupta & Shree (2021) found out that lecturers have adopted innovative pedagogical strategies, such as flipped classrooms and collaborative online activities, when using remote teaching platforms. In a study on the effectiveness of Google classroom as a tool to support online science learning use findings revealed that the teacher can use Google Calendar to remind students about meeting and test schedules for science subjects, assignments can be distributed and collected, lessons can be discussed anywhere without boundaries of time by using Google Docs and Google Mail ( Widiyatmoko, 2021). The study further found out that science teachers can share files with the students, such as PowerPoint presentations or science learning videos. Google Classroom can help science teachers manage classes, conducting laboratory activities, and making online tests (Widiyatmoko, 2021). In a related study on remote teaching of chemistry laboratory courses during covid-19 the findings revealed that use of a collaborate tool such as blackboard increased students level of engagement since videos was added to the teaching (Díez-Pascual & Jurado-Sánchez, 2022).

Remote teaching could take the form of synchronous or asynchronous mode. Asynchronous occurs when educators/lecturers record the lesson via platforms such as Zoom, and then share such video-recorded lesson with students. This allows flexibility of time in understanding and mastering the content by the student since they can listen at their own pace and time. Students are allowed to seek assistance if they encountered problems in understanding the video content. Synchronous remote teaching occurs through live video conferencing and chat, in which instructors and learners interact with each other; use natural language, and get immediate feedback (Blau; Weiser & Eshet-Alkalai, 2017).

**Purpose of use and frequency of Remote Teaching Platforms Utilisation by Science Lecturers**

Remote teaching platforms utilization by science lecturers serves various purposes for them as well as their students .The purpose of use of remote teaching platform by science lecturers are numerous. Remote teaching allows lecturers to include multimedia in lectures, simulate experiment, and improved interaction with students during lectures. One of the purposes of remote teaching platforms used by science lecturers according to Mukhtar, Javed, Arooh, and Sethi (2020) is that it encourages student-centred learning. Gupta and Pathamia (2021) also agreed that remote teaching platforms provide interactive and social learning environments, enable both synchronous and asynchronous communication, facilitate access to learning activities and offer flexibility by allowing learning to occur 'anytime and anywhere'. This was corroborated by Blonder, Feldman-Maggor, and Rap (2022) in their study, what can be learned from lecturers' knowledge and self-efficacy for online teaching during the Covid-19 pandemic to promote online teaching in higher education using the natural sciences. The study found out that experiments that would normally need a physical lab, allowed the science lecturers to use virtual lab simulations. This is essential for courses like chemistry and biology because these simulations offer practical experience in a virtual setting (Abuhassna, Al-Rahmi, Yahya, Zakari, Kosnin, & Darwish, 2020).Moreover, features like polls, quizzes, and interactive whiteboards are used in online teaching platforms to actively involve students. A good way to gauge students' comprehension and keep them interested in the material is by employing real-time polling during a lecture (Abuhassna, et al 2020). Educators use the sites for several purposes including personal and professional development. A related study by Bernard, Borokhovski, Schmid, Tanim and Abrami (2014) found out that remote teaching platforms can enhance student engagement and learning outcomes when used effectively by lecturers. Research by Bozkurt, Jung, Xiao, Vladimirschi, Schuwer, Egorov and Pasevicius (2020) suggested that the use of remote teaching platforms had led to changes in lecturers' teaching practices, including increased use of multimedia resources and asynchronous communication tools.

Similarly, a related study on use of Information and Communication Technologies in teaching of science study found out that more than half of the science teachers (53%) reported that ICT use in the sciences leads to better understanding of the concepts as it provides visualization of the different scientific concepts (Kazmi & Mohammad, 2023). Students acquire practical skills better when they are taught in a synchronous online setting (Ogbonna, Ibezim & Obi, 2019). For effective synchronous remote teaching, both the lecturers and students have to be online at the same time. This means that the lectures, students' presentations, assessments and discussions would take place at a specified time given by the lecturers. When students are online, they are allowed to participate and interact with other students at the time set by the lecturer (Libasin, Azudin, Idris, Rahman, & Umar, 2021). Science teachers can schedule lectures at

appropriate times, taking into account students' personal commitments and differences in time zones . By reducing commute times and providing a more comfortable workspace, teachers can teach in the comfort of their homes, this flexibility can greatly enhance work-life balance. (Blonder, Feldman-Maggor, & Rap, 2022; Mbongo, Hako & Munangatire, 2021).

Frequent use of remote teaching platforms by science lecturers, would encourage them to do online tasks and share resources with the students easily. According to Statista (2020) Facebook, Instagram, YouTube, Dailymotion, Flickr, Photo Bucket, and WordPress are the remote teaching platforms most frequently used by educators for effective remote teaching delivery. Yeboah and Horsu's (2015) survey on the familiarity and usage of social media among teachers revealed that the social media platforms which are most frequently used are, Facebook followed by YouTube. In a study, Examining how emergency remote teaching influenced mathematics teaching by Martin, Harbour and Polly (2022) , it was found out that during virtual teaching, the two most-used digital technologies, used either daily or a few times each week, were (a) digital technologies for teachers to assign work (95.59%) and (b) digital technologies used by students to turn in work.

**Challenges Associated with the Utilisation of Remote Teaching Platforms by Science Lecturers**

There are several challenges associated with the use of remote teaching platforms. According to Sahito and Vaisanen (2017) the challenges can be grouped into four categories such as individual based challenges, course based challenges, teaching based challenges and cultural based challenges that vary from country to country because of their different contexts and readiness. In a related study by Aung and Khaing (2016) on challenges of implementing e-Learning in developing countries, it was found out that connectivity issues, lack of ICT knowledge, and content delivery, were found to be the main challenges associated with the implementation of remote teaching in developing countries .The challenges of remote teaching according to Narh, Boateng, Afful-Dadzie and Owusu (2019); Zalat, Hamed and Bolbol (2021) also include unstable internet connectivity, inadequate computer laboratory, lack of computers/laptops, and technical problems, poor computer skills and self-efficacy, insufficient knowledge of internet handles, and inadequate time management skills.

In a similar study, Rapanta, Goodyear and Guardia (2020) found out that the challenges of remote teaching platforms utilisation are: lack of proper online teaching infrastructure, online teaching experiences of teachers, the information gap, the complex home and work balance, inadequate training and technical support needed for effective and efficient remote teaching for lecturers.Moreover,in deep rural areas where there is no electricity, students may encounter difficulties staying connected online due to inadequate power to charge the online learning devices such as laptops, smartphones (Atabhotor& Ojutalayo, 2020). A related study on academic staff's motivation for online teaching in a Nigerian university revealed that inadequate online teaching facilities, lack of system support, and lack of prior knowledge and experience of e-learning often made faculty members sceptical about online teaching (Itasanmi, Oni, Ekpenyong, Ajani & Omorinkoba, 2022). Generally, in Africa, the major impediment to online education, as documented in the literature, include lack of ICT skills, high cost of internet, inadequate infrastructure, rejection of e-learning by faculty members and irregular power supply (Adarkwah, 2020; Itasanmi, Oni, Ekpenyong, Ajani & Omorinkoba, 2022).

## Methodology

The study is a descriptive survey. Survey research uses a list to collect data about a group of people. You can conduct surveys online, by mail or in person (McCombs,2019) . The reason for this design is to describe the opinions of the respondents on the utilization of the remote teaching platforms in federal universities in South- West, Nigeria. The population of the study comprised of 467 science lecturers in federal universities in South-West, Nigeria. Purposive sampling technique was used to select departments in the faculty/colleges of sciences in six federal universities in South-West, Nigeria. Three (3) departments; Physics, Chemistry and Mathematics were selected for the study while Biology was excluded because it was not offered in all the selected universities. Total enumeration technique was adopted for the study which involved all the science lecturers. A questionnaire was used as instrument for data collection. The data collection instrument was divided into sections which addressed the objectives of the study which are types, purpose, frequency and challenges of remote teaching platforms utilization. In all 55 items were raised and rated on a four points scale of Strongly Agree (4), Agree (3) Disagree (2) Strongly Disagree (1). Out of a total of four hundred and sixty seven (467) copies of questionnaires administered, three hundred and thirty six (336) were returned. However, only three hundred and sixteen (316) were found useable for the study. The data collected were analysed using descriptive statistics of mean and standard deviation.

## Results

**Research Question 1:** What are the types of remote teaching platforms utilised by science lecturers in some selected federal universities in South –West, Nigeria?

**Table 1:** Types of Remote Teaching Platforms Utilization

| Item | Types of Remote Teaching | USED | NOT USED |
|---|---|---|---|
| 1. | Skype | 272(86.1%) | 44(13.9%) |
| 2. | Chat rooms | 229(72.5%) | 87(27.6%) |
| 3. | Zoom | 253(80.1%) | 63(19.9%) |
| 4. | YouTube | 63(19.9%) | 253(80%) |
| 5. | WhatsApp | 190(60.1%) | 126(39.9) |
| 6. | Moodle | 19(6.0%) | 297(94.0%) |
| 7. | Class dojo | 63(19.9%) | 253(80.1%) |
| 8. | Edmodo | 41(13.0%) | 275(87%) |
| 9 | Google Classroom | 88(27.8%) | 228(72.1) |
| 10 | Google hangout | 40(12.6%) | 276(87.3%) |
| 11. | Instagram | 42(13.3%) | 230(86.7%) |
| 12. | Facebook | 64(20.2%) | 252(79.7%) |
| 13. | Telegram | 63(20.1%) | 253(80%) |
| 14. | Google Meet | 85(57%) | 231(73.1%) |
| 15. | Microsoft teams | - | 316(100%) |

Result in Table 1 revealed that majority of the respondent use Skype 272 (86.1%), chat rooms 229 (72.5%) and Zoom 253(80.1%) for remote teaching while none of the respondents used Microsoft Teams. Hence, it could be deduced that Skype,

Zoom, Chat rooms and WhatsApp are the types of remote teaching platforms utilised by science lecturers in Federal Universities in South- West, Nigeria.

**Research Question 2:** For What Purposes do Science Lecturers Use Remote Teaching Platforms in Some Selected Federal Universities in Nigeria?

**Table 2:** Purposes of Utilization of Remote Teaching Platforms by Science Lecturers

| S/n | Purpose | Strongly Agree | Agree | Disagree | Strongly Disagree | Mean $\bar{x}$ | Std Dev |
|---|---|---|---|---|---|---|---|
| 1. | develop more teaching skills | 221 (69.9%) | 42 (13.3%) | 37 (11.7%) | 16 (5.1%) | 3.48 | 0.89 |
| 2. | make lectures more interesting | 226 (71.5%) | 49 (15.5%) | 26 (8.2%) | 15 (4.7%) | 3.53 | 0.84 |
| 3 | give assignment/homework to students using appropriate technology tools | 199 (63.0%) | 80 (25.3%) | 20 (6.3%) | 17 (5.4%) | 3.46 | 0.84 |
| 4 | increase students' achievement on the scientific concepts | 215 (68.0%) | 52 (16.5%) | 27 (8.6%) | 22 (7.0%) | 3.46 | 0.92 |
| 5 | improve presentation of materials | 197 (62.3%) | 65 (20.6%) | 29 (9.2%) | 24 (7.6%) | 3.51 | 2.47 |
| 6 | Make me feel like a novice lecturer again rather than an experienced professional | 182 (57.6%) | 72 (22.8%) | 28 (8.9%) | 34 (10.8%) | 3.27` | 1.01 |
| 7 | Enable students to catch up and revisit a topic with ease | 186 (59.9%) | 86 (27.2%) | 22 (7.0%) | 22 (7.0%) | 3.38 | 0.89 |
| 8 | Enhance knowledge of technology | 168 53.2%) | 11.2 (35.4%) | 21 (6.6%) | 15 (4.7%) | 3.37 | 0,81 |
| 9 | Incorporate and integrate multimedia resources into teaching process | 143 (45.3%) | 114 (36.1%) | 25 (7.9%) | 31 (9.8%) | 3.46 | 3.05 |
| 10. | Allow peer to peer work remotely | 154 (48.7%) | 114 (36.1%) | 23 (7.3%) | 25 (7.9%) | 3.26 | 0.90 |
| 11. | Make teaching more interactive and meet the different needs of the learners in different locations. | 148 (46.8%) | 122 (38.6%) | 22 7.0%) | 24 (7.6%) | 3.25 | 0.89 |
| 12. | Receive constant feedback from students | 121 (38.5%) | 165 (52.2%) | 16 (5.1%) | 14 (4.4%) | 3.24 | 0.74 |
| 13. | Encourage learning through group interaction | 106 (33.5%) | 168 (53.2%) | 18 (5.7%) | 24 (7.6%) | 3.13 | 0.83 |
| 14. | Enhance creative skills for both students and educators | 109 (34.5%) | 165 (52.2%) | 27 (8.5%) | 15 (4.7%) | 3.16 | 0.77 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 15. | Increase storage of information | 107 (33.9%) | 156 (49.4%) | 28 (8.9%) | 25 (7.9%) | 3.09 | 0.86 |
| ***Weighted Average = 3.34 Decision rule: Means ≥ 2.50 is acceptable*** | | | | | | | |

Result in Table 2 revealed that all the items 1-15 had the mean scores above the accepted midpoint of 2.50. This implies that remote teaching platform utilization by the lecturers serves various purposes such as making lectures more interesting ($\bar{x}$ = 3.53), improved presentation of materials ($\bar{x}$=3.51) and developing more teaching skills ($\bar{x}$ = 3.48).

**Research Question 3:** What is the frequency of utilisation of Remote Teaching Platforms by Science Lecturers in Some Selected Federal Universities in South-West, Nigeria?

**Table 3:** Frequency of Use of Remote Teaching Platforms

| S/n | Remote Teaching Platforms | Always | Sometimes | Rarely | Never | Mean $\bar{x}$ | Std Dev |
|---|---|---|---|---|---|---|---|
| **1** | Zoom | 266 (84.2%) | 44 (13.9%) | 4 (1.2%) | 2 (0.6%) | 3.82 | 0.46 |
| 2. | Skype | 118 (37.3%) | 96 (30.4%) | 36 (11.4%) | 66 (20.9%) | 2.84 | 1.14 |
| 3. | Facebook | 11 (3.5%) | 100 (31.6%) | 102 (32.3%) | 103 (32.6%) | 2.06 | 0.88 |
| 4. | YouTube | 40 (12.7%) | 59 (18.7%) | 96 (30.4%) | 121 (38.3%) | 2.05 | 1.04 |
| 5. | WhatsApp | 156 (49.4%) | 64 (20.3%) | 48 (15.2%) | 47 (14.9%) | 3.11 | 1.62 |
| 6. | Google Classroom | 64 (20.3%) | 75 (23.7%) | 60 (19.0%) | 117 (37.0%) | 2.27 | 1.16 |
| 7. | Class dojo | 8 (2.5%) | 28 (8.9%) | 74 (23.4%) | 206 (65.2%) | 1.49 | 0.76 |
| 8. | Instagram | 16 (5.1%) | 44 (13.9%) | 69 (21.8%) | 187 (59.2%) | 1.65 | 0.90 |
| 9. | Microsoft teams | 18 (5.7%) | 29 (9.2%) | 91 (28.8%) | 178 (56.3%) | 1.64 | 0.87 |
| 10 | Telegram | 24 (7.6%) | 51 (16.1%) | 76 (24.1%) | 165 (52.2%) | 1.79 | 0.97 |
| 11. | Google meet | 43 (13.6%) | 53 (16.8%) | 58 (18.4%) | 162 (51.3%) | 1.93 | 1.11 |
| 12. | Edmodo | 7 (2.2%) | 24 (7.6%) | 63 (19.9%) | 222 (70.3%) | 1.42 | 0.73 |
| 13. | Google hangout | 8 (2.5%) | 21 (6.6%) | 67 (21.2%) | 220 (69.6%) | 1.42 | 0.73 |
| 14. | Chart rooms | 27 (8.5%) | 33 (10.4%) | 51 (16.1%) | 205 (64.9%) | 1.63 | 0.99 |
| | | 8 | 19 | 58 | 231 | 1.38 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 15. | Moodle | (2.5%) | (6.0%) | (18.4%) | (73.1%) | | 0.71 |

***Weighted Average = 2.03 Decision rule: Decision rule: Means ≥ 2.50 is acceptable***

Result in table 3 showed that Zoom ($\bar{x}$ = 3.82), WhatsApp ($\bar{x}$ = 3.11) and Skype ($\bar{x}$ = 2.84) are the most frequently used remote teaching platforms by science lecturers in South-West, Nigeria. This implies that Moodle, Edmodo, Google hangout, Class dojo, Chart rooms, Microsoft teams, Instagram, Telegram, Google meet, YouTube, Face book and Google Classroom are not frequently used by science lecturers in some selected federal universities in South – West, Nigeria.

**Research Question 4:** What are the Challenges Associated with Utilization of Remote Teaching Platforms by Science Lecturers in Some Selected Federal Universities in South-West, Nigeria?

**Table 4:** Challenges of Remote Teaching Platforms

| S/n | Challenges | Strongly Agree | Agree | Disagree | Strongly Disagree | Mean $\bar{x}$ | Std Dev |
|---|---|---|---|---|---|---|---|
| 1. | Poor internet connectivity | 244 (77.2%) | 35 (11.1%) | 34 (10.8%) | 3 (0.9%) | 3.65 | 0.71 |
| 2 | Epileptic power supply | 269 (85.1%) | 32 (10.1%) | 7 (2.2%) | 8 (2.5%) | 3.78 | 0.61 |
| 3. | Inadequate/slow bandwidth | 216 (68.4%) | 89 (28.2%) | 7 (2.2%) | 4 (1.3%) | 3.64 | 0.59 |
| 4. | Lack of information and communication technology skills | 128 (40.5%) | 60 (19.0%) | 111 (35.1%) | 17 (5.4%) | 2.95 | 0.99 |
| 5. | Non-payment of subscriptions | 82 (25.9%) | 143 (45.3%) | 75 (23.7%) | 16 (5.1%) | 2.92 | 0.83 |
| 6. | Limited access to computer terminals | 87 (27.5%) | 111 (35.1%) | 74 (23.4%) | 44 (13.9%) | 2.76 | 1.01 |
| 7. | Lack of pedagogical content to teach remotely | 47 (14.9%) | 107 (33.9%) | 131 (41.5%) | 31 (9.8%) | 2.53 | 0.86 |
| 8. | Lecturers apathetic attitude toward remote teaching | 36 (11.4%) | 56 (17.7%) | 183 (57.9%) | 41 (13.0%) | 2.27 | 0.83 |
| 9. | Lack of experience in remote teaching | 25 (7.9%) | 82 25.9%) | 162 (51.3%) | 47 (14.9%) | 2.27 | 0.81 |
| 10. | Inadequate training and technical support for effective and efficient remote teaching | 103 (32.6%) | 113 (35.8%) | 58 (18.4%) | 42 (13.3%) | 2.88 | 1.01 |

***Weighted Average = 2.97 Decision rule: Means ≥ 2.50 is acceptable***

Result of Table 4 revealed that one of the major challenges inhibiting the utilization of remote teaching platforms are Epileptic power supply ($\bar{x}$ = 3.78), poor internet connectivity ($\bar{x}$ = 3.65) inadequate/slow bandwidth ($\bar{x}$ = 3.64), lack of information and communication technology

skills ($\overline{x}$ = 2.95), non-payment of subscription ($\overline{x}$= 2.92), limited access to computer terminals ($\overline{x}$ = 2.76), inadequate pedagogical content to teach remotely ($\overline{x}$= 2.53).

## Discussions of Findings

Findings revealed that remote teaching platforms used by science lecturers in some selected federal universities in South-West, Nigeria are: Skype, Chat rooms, Zoom and WhatsApp. These platforms are effective for remote teaching delivery. This finding is in line with the findings of Tauhidah, Jayanti, Rahmasiwi, Pamungkas, and Saifulloh (2021) who reported that the most utilised platforms by science lecturers in the teaching of biology science education are WhatsApp, Zoom and Google Classroom.

On the purposes of remote teaching platforms, findings indicated that science lecturers used remote teaching for various purposes. Some of the purposes of remote teaching platforms used by science lecturers as revealed by the study are: developing teaching skills, making lectures more interesting, giving assignment/homework to students using appropriate technology tools, improving presentation of materials, making teaching more interactive and meeting the different needs of the learners in different locations as well as increasing storage of information. This is in tandem with the findings of Gupta and Pathamia (2021) which remarked that the use of remote teaching platforms foster and facilitate access to learning activities and offer flexibility by allowing learning to occur 'anytime and anywhere.

With regards to the frequency of use of remote teaching platforms, it was indicated that majority of the science lecturers always used Zoom and Skype as remote teaching platforms. The findings were in agreement with Nadezhda (2020) and Hasanah and Dewi (2019) who observed that the most frequently utilised remote teaching platforms by science lecturers were What Sapp, Zoom App, Google classroom and WhatsApp. These findings align with expectations probably because of the popularity and flexibility of these platforms to accommodate a large number of participants at a time.

The findings further revealed that science lecturers encountered some challenges when teaching their students using remote teaching platforms. Some of the challenges encountered by science lecturers according to the study are poor internet connectivity, epileptic power supply, inadequate/slow bandwidth, non-payment of subscription, limited access to computer terminals amongst others. The findings corroborates the findings of Rapanta, Goodyear and Guardia (2020), which identified the challenges of remote teaching platforms utilization to include: lack of proper online teaching infrastructure, online teaching experiences of teachers, the information gap, the complex home and work balance, inadequate training and technical support for effective and efficient remote teaching for lecturers. Moreover, Aung and Khaing( 2015) agreed with the findings when they noted that connectivity issues, lack of ICT knowledge, content delivery, and students' IT skills were found to be the main challenges during the implementation of remote teaching in developing countries.

## Conclusion

Integrating and incorporating remote teaching platforms are essential for meeting the educational needs of both the lecturers and students. The findings of this research work, concluded that the major remote teaching platforms frequently utilized by science lecturers in some selected federal universities in South- West, Nigeria are Skype, Chat rooms, Zoom and

WhatsApp. Science lecturers in federal universities in South- West, Nigeria utilized remote teaching platforms for various purposes such as: developing teaching skills, making lectures more interesting, improving presentation of materials and enhancing knowledge of technology. The science lecturers use Zoom and Skype always as remote teaching platforms. Moreover, the major challenges of remote teaching platforms utilization by science lecturers in federal universities in South- West, Nigeria are poor internet connectivity, epileptic power supply, inadequate/slow bandwidth, non-payment of subscription and limited access to computer terminals, inadequate information and communication technology skills, inadequate pedagogical content to teach remotely, inadequate remote teaching experiences and lecturers apathetic attitude toward remote teaching. The study concludes that science lecturers may not be able to fully explore and adopt remote teaching platforms for their lectures fully due to the various challenges identified.

## Recommendations

In line with the findings, the study therefore recommended that management in federal universities in Nigeria should encourage the use and adoption of more remote teaching platforms apart from zoom in the teaching and learning process. There should also be mapped out strategies such as training and retraining programmes for the science lecturers that will further create greater awareness that will improve the adoption of remote teaching platforms by lectures. The study further recommended that stakeholders in education in Nigeria, should integrate and implement realistic ICT polices into the curriculum beyond the availability of these policies on 'paper'. This will go a long way in ensuring that the digital divide is reduced to the barest minimum especially among the science lecturers. Moreover, the provision of stable/alternative power supply and good internet connectivity will go a long way in easing the problem of science lecturers not adopting remote teaching platforms .This will reposition them to the reality of the economic situation of the country as well as the unpredictable natural happenstances like the covod-19 which has made the use of remote learning platforms indispensable

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