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Why Do Science Lecturers Distinguish the Use of Mobile Technologies for Instruction?

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Abstrak

Dosen tidak sering menggunakan teknologi seluler untuk mendukung dan melengkapi instruksi dan pengalaman belajar mereka, karena teknologi ini membantu menyederhanakan konsep dan dapat meningkatkan kinerja akad-emik. Tujuannya adalah untuk menyelidiki dosen sains yang dianggap menggunakan teknologi seluler untuk pengajaran. Penelitian ini merupakan penelitian deskriptif dengan tipe survey dan teknik random sampling digunakan untuk memilih 172 responden. Analisis data menggunakan frekuensi hitung, persentase dan uji-t. Temuan menetapkan bahwa dosen sains memiliki persepsi yang cerah dalam penggunaan teknologi seluler untuk pengajaran. Studi ini menyimpulkan bahwa persepsi dosen IPA tentang penggunaan teknologi seluler meningkat-kan pembelajaran siswa mereka. Oleh karena itu, direkomendasikan agar pemerintah menyediakan platform yang terjangkau bagi dosen dan mahasiswa untuk memiliki perangkat teknologi pribadi (perangkat komputer) yang dapat mereka gunakan secara mandiri dan untuk pembelajaran kelompok.

Abstract

Lecturers are not engaging in the frequent use of mobile technologies to support and supplement instructions and their learning experiences, as these technologies assist in simplifying concepts and could lead to improved academics performance. The objectives was to investigate science lecturers perceived use of mobile technologies for instruction. The study was a descriptive research of survey type and random sampling technique was adopted to select 172 respondents. Data were analysed using frequency count, percentage and t-test. The findings established that science lecturers have bright perception in the use of mobile technologies for instruction. The study concluded that science lecturers' perception on the use of mobile technology boost their students' learning. It was thus recommended that government should provide an affordable platform for lecturers and students to have their personal technological devices (computer set) which they can use independently and for group learning.

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INTRODUCTION

Education is a process by which an individual becomes refined and fit in with their societal value to become an accepted member of the society. Roni (2011) opined that education can be defined to develop skills, habits and attitudes that are expected of one to become a good citizen. The intent is to develop or alter an individual cognitive, affective, and psychomotor domain. Every society, no matter how crude, will have way of educating the children, though the approach may be adjudged crude; the purpose of education is usually the same. Hence, the purpose of education is the same all over the world to train the individuals to be useful to him and the society to which he belongs. Educational scholar said that the old-style of curriculum is not sufficient, and the schools must offer learner with a broader set of 21st century skills to thrive in a fast-evolving technology-balanced world (Craig, 2009). This is mainly because of a new genre of students with learning needs massively different from their predecessors, and it is increasingly recognized that using technology effectively in high education is essential to provide high quality education and preparing students for the challenges of the 21st century (Thomas & Bannon, 2013).

Igwe and Ikatule (2012) described technology as the process by which humans modify nature to meet their needs and wants. A technology- based teaching and learning offers various interesting ways which includes educational videos, stimulation, storage of data, the usage of databases, mind-mapping, guided discovery, brainstorming and music that will make the learning process more fulfilling and meaningful. A more specific way in which technology is enhancing the teaching-learning process in our present-day educational system is through the introduction and utilization of mobile technologies. (Alzaza 2012). The term 'mobile technology' includes mobile computers (such as laptops), mobile devices and wireless communication tools. The term mobile technology encompasses the range of hardware (portable computers, projection technology, calculators, data logging and digital recording equipment, mobile phones), software application (generic software, multimedia resources) and information systems (intranet, internet) which are now available in universities (Hennessy et.al, 2015).

Modern mobile technologies can be effectively used to support authentic learning activities. Activities that do not take place at a fixed predetermined location and the learner takes advantage of the technologies mentioned above, thus offering new learning opportunities, we can then refer to those activities as mobile learning activities (O'Malley et.al, 2016). Mobile technologies can facilitate learning outside the classroom to enhance the learning experience and learning materials are no longer limited to traditional materials like books (Hwang, 2016). The rapid and constant evolution of web and mobile technologies brings new opportunities to developers and researchers in the process of creating innovative mobile applications. Not only high-definition cameras but also positioning technologies and other sensors as well as ubiquitous Internet access became standard features of modern mobile devices. According to Nathaniel's (2020) study, there are a number of obstacles that university lecturers must overcome in order to make the most effective use of mobile technologies for research collaboration. These obstacles include the expense of using mobile network service providers, a lack of institutional support, power outages, unstable networks, a limited battery life, the need for additional training for lecturers, and a number of others. However, given that Nigerian lecturers are eager to collaborate and publish in peer-reviewed journals, it is necessary to look for easier, faster, and quicker methods through the use of digital mobile technologies. However, as this study's findings on university lecturers show, there are some challenges. This highlights how important it is to get teachers on board with using these tools and mobile devices if they are to be effectively included into their teaching methods. Language teachers should consider mobile devices as a helpful tool rather than a threat to their role in the classroom. The communicative approach claims that language is acquired via its use in interaction and communication (Almofadi,2022). Utilizing mobile devices to improve learning entails providing a tool and an unending supply of resources while the instructor acts as a facilitator and guide. Teachers may provide demonstrations on how to use mobile devices during class activities. Of course, educators should consider how students could utilize mobile devices in the classroom (Godwin-Jones, 2017).

Science lecturers play a central role in educating, inspiring, and guiding students to become responsible, scientifically literate citizens. Science is more than a body of knowledge and a way of accumulating and validating that

knowledge. Wendeson (2017) posits that science consists of the discovery and exploration into the world, which determines the questions that lead to compelling and consistent generalizations and explanations, using the process of investigating and producing evidence that can be reviewed by others. Science provides us with an important means for understanding how the world operates and how we exist and interact with our physical surroundings. Science can thus be observed as both a body of knowledge as well as a process. Science learning entails creating knowledge about complex concepts, which can be made more understandable if students are able to develop a relationship concerning their formal knowledge and their personal experiences (Vavoula, 2012). Through electronic access, processing, and dissemination of research findings, mobile technologies challenge face-to-face and formal education and encourage the creation of new forms of knowledge (Nathaniel, 2020). The effectiveness of higher education at universities across the world depends on students having access to information, especially electronic tools for instruction. Within a short period of time, mobile technologies have emerged as one of the fundamental pillars of contemporary civilization. Because of the vital role that information technology plays in the educational process today, many nations now see comprehending mobile technology and mastering the fundamental skills and concepts of ICT as being part of the core curriculum alongside reading, writing, and arithmetic (Hennessy, et al. 2015).

Science lecturers are educators, experts, who are likely to teach science as one of several courses in the higher education curriculum. Science lecturers make students believe that their knowledge of science can make a difference, make students aware of the relevance of science to their lives. Science educators help students to develop science process skills instead of focusing solely on the memorization of a body of facts (Rogers 2018). Science education is one of the most important subjects in school due to its relevance to students' lives and the universally applicable problem-solving and critical thinking skills it uses and develops. (Copeland, 2016). These are lifelong skills that allow students to generate ideas, weigh decisions intelligently and even understand the evidence behind public policymaking. Teaching technological literacy, critical thinking and problem-solving through science education gives students the skills and knowledge they need to succeed in school and beyond. The use of mobile technology is increasing the possibility for effective teaching and learning (Sanga et al.,2016). This is due to the benefits of mobile learning, which include its capacity to facilitate the development of critical thinking, participatory learning, problem-solving, and lifelong communication skills as well as the ability to communicate knowledge without regard to place or time limits (Abidin & Tho, 2018). Technologies have the potential to improve teaching, communication, and other instructional methods when properly integrated into the learning process. Educational institutions at the secondary and post-secondary levels must continue to investigate emerging technologies in order to increase student engagement and, as a result, improve retention and graduation rates. Mobile technologies' capabilities to support both individual and social aspects of learning must be improved (Campbell, 2022).

Chang, Liang and Tsai (2020) Stated that Various advanced digital devices such as smartphones, tablets, iPads, and iPods are highly accessible in science teaching and learning and have the potential to provide accommodations for various academic tasks (Ainsa, 2016 & Banister, 2015). Perception is a complex construct: Mounting evidence indicates that learners' perception is influenced by their user experience (Escobar-Rodriguez & Monge-Lozano, 2012). In the educational setting, user experience with technology is largely dependent on pedagogical roles that learners and teachers play in the classroom (Rodrigues, 2017). Mobile technology offers the ability to engage in learning activities such as communication and content material sharing between students and lecturers, students, and subject experts, and among students and their environments. In addition, mobile technologies can bridge pedagogically designed learning contexts, facilitate learners' generated contexts and content (both personal and collaborative) while providing personalization and ubiquitous social connectedness which makes it to be different from the traditional learning environment (Alexander 2019). Therefore, mobile technology can be referred to as social technology which provides social learning environment for learners.

Gender roles and expectations are learned. They can change over time, and they vary within and between cultures. Systems of social differentiation such as political status, class, ethnicity, physical and mental disability, age and more, modify gender roles. The concept of gen-

der is vital because, applied to social analysis, it reveals how women's subordination (or men's domination) is socially constructed. As such, the subordination can be changed or ended. It is not biologically predetermined nor is it fixed forever (UNESCO, 2018). Different studies have concluded that men and women have separate roles and that these roles are not equal. Accordingly, the concept 'Gender' was needed to describe the ways in which men and women are categories created by society so that what men and women are supposed to do, how they are supposed to behave, and what value is given to each can be separated according to one's gender (Callum, Jeffrey, & Kinshuk, 2015). University lecturers are expected to be open to embracing the development of technology in the sector. ICT in education has been used and recognized for decades in a variety of areas of our lives, including education. The use of computer-based communication that is included into the regular classroom instructional process is referred to as ICT integration in education (Ghavifekr & Rosdy, 2015). ICT tools come in a variety of forms that might help people with their job. For lecturers to fit in with the present, they must at least be familiar with some of them. It will assist professors not just in integrating new technologies but also in improving educational standards and making connections between classroom instruction and real-world situations (Lowther, et al., 2008; Weert and Tatnall, 2005).

Area of specialization is the course; subject or specific field a teacher studied or majored in while undergoing the teacher training programme. It is common knowledge that a teacher cannot give what he does not have. In the Nigeria school system, due to lack of teachers in some subject areas, any teacher could be assigned to teach any subject at any time and at the principals' discretion. Has this short cut to teaching any effect in the overall curriculum implantation process? Teacher area of specialization has a large body of scholarship spread across the years (Kollie 2018). Barker (2015) observed that lack of subject based-qualified teachers hampers curriculum implementation in most post-primary schools in Nigeria. The first step in educational reform is to improve the method of training teachers based on their various fields of specialization to produce well qualified teachers for efficient curriculum implementation. Green (2014) carried out a research work on the appraisal of the implementation of the National Policy on Education (NPF) in Cross River State: implication for physics teaching in the new millennium. The researcher developed a 15-point questionnaire which was a structured obtain information on qualification (s). Nine schools were used for the study. The findings revealed that most of the physics teachers in the (3) three Local Government Areas sampled were not trained in the subjects they were teaching. Their shallow knowledge in these areas made them to exhibit in effective teaching characteristics as follows: mystification of the subjects, disregard for the curriculum, and test and evaluation are done on familiar questions and marks are generously awarded to give the impression of good teaching. Green (2014) stated that a strong background in the subject for teachers is a necessary and important indicator of their ability to teach the subject.)

Mobile technologies are used by the lecturers in playing pre-recorded lectures, recording lectures, accessing class news bulletins, students listening to podcasts and digital audio books as well as watching educational videos. If used, these technologies enable both education and science lecturers to provide the educational materials (in text, audio, and video formats) to their students on a mobile technology (Yuen, 2018). More attention is to be paid to the more obvious reality that the usefulness of this emerging technology can remain in the deep shadows if the lecturers who are supposedly meant to make use of it to facilitate their students are not either aware of its effectiveness, refrain for the use of it due to cultural beliefs or orientations or do not see it as a tool for learning rather a tool for just entertainment. Hence, the research fills the gap by investigating the science lecturers' perceived use of Mobile technologies for instruction in university of Ilorin. The use of technology in the educational system has changed traditional teaching methods to more contemporary ones. It aids teachers in particular in communicating to pupils what they will demonstrate. The use of technology in the educational process in the classroom supports learning at almost every level. University education is one of the educational levels that uses technology to help the learning process (Animatun, 2022).

The main objective of the study is to investigate the science lecturers' perceived use of Mobile technologies for instruction in university of Ilorin. Specifically, the study investigated the science lecturers perceived usefulness of mobile technologies for instruction and also investigated the effect of gender on science lecturers per-

ceived use of mobile technologies for instruction. The following research questions were raised to guide this study. i) What is the perceived use of mobile technologies for instruction by science lecturers? ii) What is the effect of gender on lecturer's perceived use of mobile technologies for instruction? The hypothesis tested in the study is that there is no significant difference between male and female science' lecturers perceived use of mobile technology for instruction.

METHOD

The study is a descriptive research of the survey type. Survey is chosen for this study because it enabled the researcher to collect information about science lecturers perceived use of mobile technologies for instruction. A researcher designed Questionnaires were used to collect information. The populations for the study were lecturers in the University of Ilorin, Ilorin, Nigeria. The target populations for this study were based on Science' lecturers in university of Ilorin, Kwara state, Nigeria. The sample were purposely drawn from university of Ilorin lecturers on the premise that they make use of mobile technologies for teaching and learning. Faculty of Science is two hundred and five (205). 100% of entire population in the entire lecturer in the faculty was purposely sampled. A researcher designed questionnaires titled "Science lecturers perceived use of mobile technologies for instruction in university of Ilorin, Nigeria. The questionnaire was divided into two (2) sections. Section A consisted of demographic data of the respondents and Mobile technology tools availability; section B sought information on the variables selected from the study. The questionnaire consisted of twenty (20) questions using four likert scale of SA=Strongly Agree, A=Agree, SD= Strongly Disagree, D=Disagree. Response to each statement was identified by ticking the appropriate column assigned to the statement.

The research instruments were validated by three (3) professors in the d department of Educational Technology and 3 professors from the department of Science Education for face and content validity. The question of whether a test looks to assess what it is intended to measure is known as face validity. This kind of validity is concerned with whether a measure initially appears to be pertinent and appropriate for the thing it is evaluating. Examining a test's content validity determines whether it is representative of the construct in its whole. A test, survey, or measuring method's content must include all pertinent aspects of the thing it seeks to measure in order to yield reliable findings. All necessary corrections, amendments, modification, and suggestions were made before and administration of the instrument. Ethical considerations were also considered in this study. These are some of the core ethical principles (informed consent, confidentiality/anonymity, voluntary participation, deception, risk of harm, accuracy in analysis and reporting) that must be considered and planned for when designing and carrying out studies.

Ethical considerations in research are a set of principles that guide your research designs and practices. These principles include voluntary participation, informed consent, anonymity, confidentiality, potential for harm, and results communication. No harm of any kind was ever done to research participants. Priority was also given to treating research subjects with respect. Before the trial began, the subjects gave their full consent. The confidentiality of research participants was protected. The research data's confidentiality was adequately protected. Participating persons and organizations' anonymity has been guaranteed. It was avoided to lie or exaggerate the research's goals and objectives. Any and all affiliations, funding sources, and potential conflicts of interest have been disclosed. Any form of communication on the research was carried out in an honest and open manner. We avoided providing any incorrect information and representing the results of our primary research in a biased manner. The questionnaires were distributed to the respondents in the selected faculty and be administered by the respondents. It was collected immediately after they have been adequately completed. The data obtained through the questionnaires were subjected to descriptive and inferential statistics. Frequency count and percentage were used to answer the research question while t-test was employed to test hypothesis one.

RESULT AND DISCUSSION

In this section we divide the explanation of our research into three sub-sections. First, the science lecturer's perception toward the use of mobile technology for instruction. Second, its effect on gender differences. Third, the discussion.

Table 1 Respondents Information based on Gender

Gender	Frequency	Percent	Cumulative Percent
Male	93	54.1	54.1
Female	79	45.9	100.0
Total	172	100.0	

Table 2 Science Lecturers' Perceived Usefulness of Mobile Technologies

S/N	Perceived Usefulness	Mean	Std. Dev.
1.	Mobile technologies enhance easier access to information anywhere and anytime	3.69	0.467
2.	I feel more connected with my students by using mobile technology	3.28	0.626
3.	Mobile technologies increase communication between the lecturer and the student	3.27	0.726
4.	I use mobile technology to create an easy communication with my colleagues.	3.45	0.567
5.	Mobile technologies help lecturers be more prepared for class by easily accessing information before class.	3.35	0.589
6.	I utilize mobile technology for the purpose of teaching and learning	3.37	0.595
7.	I feel safe or secure using mobile technology	3.12	0.86
8.	I can research at my own pace using mobile technology	3.41	0.658
9.	Mobile technologies allow students to get access to up-to date information through the Web.	3.36	0.631
10.	I can send emails to my science or education students to discuss subject content and attach course outline and other important information using mobile technology	3.23	0.567
11.	I access and download textual materials, audio and video clips for my class directly using mobile technology	3.19	0.695
12.	I use my mobile technology to contact my students for important information.	3.34	0.662
13.	I can send notifications (class cancellations, change of lecture venue, change in time of lectures and other administrative duties) with the help of mobile technology	3.30	0.575
14.	I encourage students submit their assignments online using their mobile technology devises	3.24	0.552
15.	I have course materials such as slides, lecture notes and practice quizzes available on my mobile technology.	3.38	0.577
16.	I read news, books and articles online directly from my mobile technology in order to gather more information on topics treated in class	3.35	0.589
17.	I use online science dictionaries on my mobile technology to get definitions for my class.	3.33	0.541
18.	Mobile technologies fostered interaction and teamwork between me and my colleague.	3.30	0.533
19	Mobile technologies make it easier for me to communicate with my colleague and science lecturers.	3.28	0.587
20.	Mobile technologies with scientific, educational software have increased my research in the university.	3.44	0.523
	Science Lecturers Perceived Use of Mobile Technologies	3.33	

A. Perception of Science Lecturers on the Utilization of Mobile Technologies

Research question one aims to reveal the science lecturers' perception toward the usefulness of mobile technologies. After give the research instrument to our respondents and collect the data, we analyse finding and present it in table 2 as follows. The mean and standard deviation was used to establish the perceived use of mobile technologies for instruction by science lecturers as shown in table 2.

The perceived use of mobile technologies for instruction by sciences lecturers were investigated and the result displayed in table 2.

Table 3 t-test on Significant Difference Between Male and Female Lecturers Perceived Use of Mobile Technology

Gender	N	Mean	Std. Deviation	Mean Gain	Df	T	Sig.(2-tailed)
Female	79	3.4267	.34692				
				0.07	158	1.402	0.163
Male	93	3.3569	.28307				

The results indicated that Mobile technologies enhance easier access to information anywhere and anytime with mean score of 3.69. A mean score of 3.28 also established that most science lecturers feel more connected with their students by using mobile technology. Furthermore, most lecturers agreed that Mobile technologies increase communication between the lecturer and the student with a mean score of 3.27 and the mean score of 3.45 deduced that science lecturers use mobile technology to create an easy communication with my colleagues. In addition, science lecturers believed that mobile technologies help lecturers be more prepared for class by easily accessing information before class and lecturers utilize mobile technology for the purpose of teaching and learning with mean scores of 3.35 and 3.37 respectively.

Moreover, lecturers in the field of science as well feel safe or secure using mobile technology for instructional activities in science courses with mean score of 3.12. A mean score of 3.41 and 3.36 further established that most lecturers agreed that they can research at their own pace using mobile technology and Mobile technologies allow students to get access to up-to date information through the Web accordingly. science lecturers perceived mobile technologies to enhances easier access to information anywhere and anytime and use mobile technology to create an easy communication with their colleagues with mean scores of 3.69 and 3.45 consequently. In addition, mobile technologies are perceived with scientific, educational software have increased my research in the university and can research at their own pace using mobile technology with mean scores of 3.44 and 3.41 individually. The grand mean of 3.33 which was more than the benchmark of 2.50 established that science lecturers have positive perception on the use of mobile technologies for instruction.

Based on research questions 2, research hypotheses 1 was developed. The results related to hypotheses one to three formulated for the study in chapter one was as shown in subsequent tables. All hypotheses were tested at 0.05 level of significance.

B. The Different Perceptions Between Male and Female Science Lecturers on the Utilization of Mobile Technologies

In order to answer the research question two regarding the effect of gender on lecturer's perceived use of mobile technologies for instruction we have hypothesis one that there is no significant difference between male and female lecturers perceived use of mobile technology for instruction. In other to ascertain the significant difference between male and female lecturers perceived use of mobile technology for instruction, independent t-test was employed.

Results in table 3 shows that the calculated t-value was 1.41 with significant value of 0.16 was not significant at 0.05 alpha levels because p-value was greater than 0.05. This implies that the null hypothesis one was not rejected: hence, there was no significant difference between male and female lecturers perceived use of mobile technology for instruction.

C. Discussion

The findings in this study established that science lecturers have positive perception on the use of mobile technologies for instruction. Although, Crompton (2018) stated that science learning can be quite difficult to understand and a demanding area, since it entails creating knowledge about abstract and complex concepts; consequently, there is a need to involve collaboration and co-construction of knowledge and ideas, which stresses on change in educational practice. Thus, mobile technologies application for instructional activities could boost the academic performance of students in science and other fields. Science educationists especially in the Western world have become more informed of the vast possibilities that smartphones are having in teaching and learning science. Therefore, these technologies could supplement a new dimension to science education which include content and scientific processes that are presently considered as difficult (Twum, 2017).

Furthermore, this support the findings of Bennett, Maton, & Kervin, (2018) who established that mobile technology has proofing to be

a convenient and concrete way of teaching and learning, as it complements the works of the teacher and allow learners to construct knowledge on their own. The study of Yalcin et. al. (2021) also established that mobile technologies when adequately used for learning will influence students academic performance irrespective of their status and demographics

There was no significant difference between male and female lecturers perceived use of mobile technology for instruction. This corroborates with the findings of Tinio (2018) who deduced that all lecturers irrespective of their gender have good perception towards the use of mobile technologies for instruction across all tertiary institutions. Alani et al. (2022) found that men and women use the computer for different purposes at work. Similarly, Li, Records, & Fougère (2014) found that female students are less likely to choose an information system minor than male students. Williams (2019) conducted research on the influence of gender on how teachers perceived mobile technologies and concluded that most lecturers both male and female agree to apply the mobile technologies for their instructional delivery if given the opportunity to.

CONCLUSION

From the result of this research, it was concluded that sciences lecturers perceived the use of mobile technologies as a useful tool in teaching and learning with great potential in both classrooms and outdoor learning. Since it has been found that both sciences lecturers perceived the use of mobile technology as a useful tool it was therefore recommended that he government should provide an affordable platform for lecturers and students to have their personal technological devices (computer set) which they can use independently and for group learning (virtual learning). Also, lecturers should be encouraged to explore different ways in which mobile technologies can be used in teaching and learning. To make the students more aware of the possibilities of these technologies and therefore will try to exploit their full potential.

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