



Investigating Computer Science Education Students' and Lecturers' Awareness and Self-efficacy for Mobile Learning in Tertiary Institutions in Bauchi State Nigeria

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ABSTRACT

This study investigates students' and lecturers' awareness and self-efficacy for mobile learning in public tertiary institutions in Bauchi State Nigeria. Four objectives were formulated and four research questions were raised. Survey design was used. The population of the study comprised of 1257 computer science education students and all computer science education lecturers in five public tertiary institutions offering computer science education in Bauchi state Nigeria. The sample size consisted of 297 students and the entire 35 computer science education lecturers. Two questionnaires were used to extract data on students and lecturers' mobile learning awareness and self-efficacy. The instruments were validated by two experts and were found to have reliability of 0.834 and 0.927 respectively. Data collected were analyzed using descriptive statistics. Findings from the results show that computer science education students and lecturers in public tertiary institutions were aware and had a good self-efficacy for mobile learning. It is therefore recommended that management of tertiary institutions offering computer science education should utilize mobile learning for its academic programs.

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INTRODUCTION

Mobile learning popularly known as m-learning has become a new educational paradigm that is popular in recent years especially for institutions of higher learning. The use of mobile learning devices has changed the way students learn as it reinforces communication amongst teachers and students, supports several multimedia tools and inspires individual learning (Crompton and Burke, 2020). Mobile learning places emphasis on the fact that the teaching and learning process take place without being constrained by time and location (Al-Hunaiyyan, Alhajri and Al-Sharhan, 2021). It increase students' motivations and achievement (Al-Emran, Mezhuyev and Kamaludin, 2020; Hwang & Fu, 2019). In addition, it allows learners to have access to learning materials and conduct

personalized curriculum sequencing according to their learning needs (Hwang and Fu, 2019).

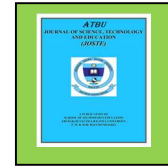
Mobile learning permits educators to generate online learning solutions for learners, which can be used anywhere and anytime to attain results that cannot be attained with other existing educational models (Tu and Hwang, 2020). The importance of mobile -learning cannot be over emphasized as it affords learners to share information amongst themselves and to complete tasks and activities towards accomplishing learning objectives (Durak and Cankaya 2021). Mobile-learning is now a critical educational component in higher education in some countries (Hamidi and Chavoshi, 2019). Mobile learning further extend the flexibility of e-learning regardless of learners' location using handheld mobile devices and wireless technologies (Chiu,

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Pu, Kao, Wu and Huang, 2021). Essentially, mobile learning plays an exceptionally central role in the field of education where it is making substantial contributions to learners' performance. Awareness of mobile learning is the state of being informed about the existence of an innovation is critical for both teachers and students. It is the state of consciousness and it determines whether an individual will accept or reject such thing (Falode et al., 2020). The concept is often synonymous to consciousness and is also understood as being consciousness itself (Chalmers, 2020). Lecturers and students' awareness of mobile learning influence their readiness to use it for learning (Tsai, Tsai, and Hwang, 2020).

Another variable for effective utilization of mobile learning is mobile learning self-efficacy. Mobile learning self-efficacy is learning effectiveness. Studies have shown that teachers mobile learning self-efficacy improve students' performance. Students who possess self-efficacy in mobile technology access greater benefits and develop stronger IT skills. Self-efficacy is defined as one's judgment of his or her ability to organize and execute a course of action required to attain a designated type of performance (Bandura, 1977). Self-efficacy in this study is related to the teachers and students belief that teachers and students integrate mobile learning with the conventional learning process. Lu and Viehland (2020) in their study to identify factors related to students' acceptance in a mobile learning environment indicated that, mobile self-efficacy had the highest ranking compared to other factors. Although many studies have been conducted on mobile learning, not much is said on students' and lecturers' awareness and self-efficacy for mobile learning technologies in tertiary institutions in Bauchi state Nigeria.

LITERATURE REVIEW

Conceptual Framework

The conceptual framework selected to guide the present study is Technology Acceptance Model (TAM) Davis (1989) developed TAM, which is a theory of information system that provides and models an explanation of how an individual

accepts and uses technology. TAM shed light on the technology determinant acceptance, which can explain the behavior of a user from a broad array of emerging end-user technologies of computing together with the user populace while simultaneously justifying the theoretical and Economic viewpoints (Davis, 1989).

The TAM theory comprises of various parts which is representing the process of awareness and self-efficacy acceptance by the users. Five constructs establish an aspect of TAM: perceived ease of use (PEU), perceived usefulness (PU), attitude towards use (ATT), behavior intention (BI) and actual use (AU). These constructs are considered the primary determinants for users with regard to application and technology acceptance. According to Davis (1989), PEU is the level at which an individual assert that using a given technology will require less effort. PU is the level at which an individual believes that by using a given technology, his or her job performance will be increased (Davis, 1989). ATT is an individual's negative or positive viewpoint towards conducting the intended behavior in the application of a given system. BI is the level at which particular technology users have shaped a plan of intent to continue utilizing or not a particular technology with their future behavior (Davis, 1989).

AU is the degree of usage application of a specific technology in terms of frequency (how often) and the measured volume (how much) when using a given technology by users. According to TAM, PEU affects PU. If users perceive any given technology as easily usable, then there is a high chance for them to perceive such technology as useful. TAM claims that both PEU and PU affect the attitudes of individuals towards the use of technology. When users perceive a specific technology as easy to use and useful, they can formulate a positive attitude towards the use of this specific technology. Davis found that ATT and PU affect users' BI to use a technology: when individuals consider a technology useful, they can create a positive BI of users towards the use of technology. Eventually, this positive BI of users towards a given technology defines the real use of such

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technology known as AU. Therefore, if users have a positive intention towards a given technology, they are likely to use it in their daily lives. TAM theory is found suitable for this study because it explained the awareness and self-efficacy of mobile device. So,

using TAM theory has help the researcher to investigate the Students' and Lecturers' awareness and self-efficacy to mobile learning in public tertiary institution in Bauchi state Nigeria for research purposes.

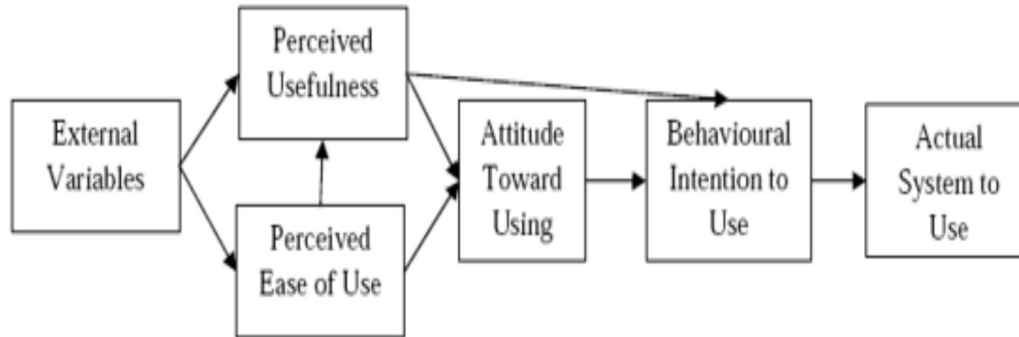


Figure 1: Davis Technology Acceptance Model (TAM)

METHODOLOGY

Survey design was used for the study. The population of the study comprised of 1257 computer science education students and all computer science education lecturers from the five public Tertiary Institution offering the course in Bauchi state. The sample size consisted of 297 students and the entire 35 computer science education lecturers. Mobile Learning Students' Questionnaire (MLSQ) and Mobile Learning Lecturers' Questionnaire (MLLQ) were the instruments used for data collection. The instruments were designed based on the literature review and research objectives. The instruments were validated by two experts and have reliability of 0.834 and 0.927 respectively.

All the items have response of 4-point rating scale. The mobile learning instrument on awareness have a rating scale as: Not Aware (NA=1), partially Aware (PA = 2), Aware (A = 3) and Very Much Aware (VMA = 4). While the mobile learning instrument on self-efficacy have a rating scale as: Strongly Disagree (SD = 1),

Disagree (D =2), Agree (A =3) and Strongly Agree (SA = 4).The questionnaires were divided into two parts. Parts 1 consisted of 19 items on awareness of mobile learning. While parts 2 consisted of 12 items on mobile learning self-efficacy. Descriptive statistics were used to analyze the data collected using mean and standard deviation. A decision on a data obtained was made based on the following. For the awareness instrument 1-1.49 (Not Aware), 1.50- 2.49 (Partially Aware) 2.50-3.49 (Aware), and 3.50 -4.0 (Very Much Aware).While the self-efficacy instrument, a decision obtained was made based on Strongly Disagree (SD) = 1-1.49, Disagree (D) = 1.50- 2.49, Agree (A) = 2.50-3.49 and Strongly Agree (SA) = 3.50 -4.0

RESULTS

Out of the 297 questionnaires distributed, 284 (95.6 %) were fully filled and returned. Table 1Presents the distribution of students' respond based on the five public tertiary institutions offering computer science education in Bauchi state.

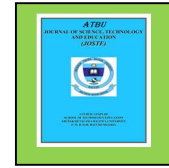


Table 1: Distribution of Students' Respond Based on Institutions

| S/N | Institution | Number of Questionnaires administered | Number of Questionnaires Retrieved | Percentage Retrieved |
|-----|--|---------------------------------------|------------------------------------|----------------------|
| 1 | Abubakar Tafawa Balewa University Bauchi | 97 | 93 | 95.8 % |
| 2 | Bauchi State University Gadau | 91 | 84 | 92.3 % |
| 3 | College of Education Azare | 29 | 28 | 96.5 % |
| 4 | Adamu Tafawa Balewa College of Education Kangere | 12 | 12 | 100 % |
| 5 | Abubakar Tatari Ali Polytechnic Bauchi | 68 | 67 | 98.5 % |
| | Total | 297 | 284 | 96.62 % |

As for the sample size of the lecturers, the entire population was used for the study because of the manageable size of the population.

Table 2: Mean Response and Standard Deviation of Students' Awareness for Mobile Learning

| S/N | Item | N | M | Std.Dev | Remark |
|-----|---|-----|-------------|-------------|-----------|
| 1. | Using mobile learning, one can learn without coming to the class physically | 297 | 2.98 | .943 | A |
| 2. | I learn anytime, anywhere using mobile devices | 297 | 3.09 | .834 | VMA |
| 3. | Lessons can be received from my lecturer using mobile devices | 297 | 2.29 | .992 | PA |
| 4. | Mobile learning caters for an individual learning need | 297 | 2.80 | .941 | A |
| 5. | Mobile devices offer interesting material for learning | 297 | 3.13 | .840 | A |
| 6. | I can use mobile devices for learning | 299 | 3.37 | .778 | A |
| 7. | I can find material for my study using mobile | 297 | 3.25 | .873 | A |
| 8. | I can quickly find information on my studies using mobile | 297 | 3.53 | .715 | VMA |
| 9. | Mobile devices provide me with resources online | 297 | 3.13 | .924 | A |
| 10. | I am not aware of mobile leaning | 297 | 1.89 | 1.149 | PA |
| 11. | I do not get information with mobile device | 297 | 1.54 | .918 | PA |
| 12. | I do not know how to find material for my study using mobile | 297 | 1.75 | 1.020 | PA |
| 13. | I do not know how to search for information using a mobile device | 297 | 1.72 | 1.046 | PA |
| 14. | I do not have the knowledge to use mobile device independently | 297 | 1.98 | 1.089 | PA |
| 15. | I do not know how to use mobile devices for learning | 297 | 1.79 | 1.028 | PA |
| 16. | I do not interact with other learners using mobile device | 297 | 2.04 | 1.053 | PA |
| 17. | I cannot use mobile device for normal phone calling, sms, mms | 297 | 1.77 | 1.102 | PA |
| 18. | I do not learn anytime, anywhere using mobile devices | 297 | 1.71 | 1.003 | PA |
| 19. | Mobile devices cannot provide me resources online | 297 | 1.72 | 1.089 | PA |
| | Grand mean | | 2.30 | .965 | PA |

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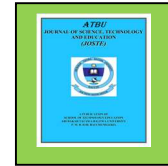


Table 2 shows the mean response and standard deviation of students' awareness for mobile learning in public tertiary institutions in Bauchi state. The findings from the table indicate that student's awareness to mobile learning is useful with an average mean value 2.30 and a

standard deviation 0.965. This is because none of the mean response was below 1.50. This indicates that computer science education students were partially aware of mobile learning.

Table 3: Mean Response and Standard Deviation of Student's Self-efficacy for Mobile Learning

| S/N | Items | N | Mean | Std.Dev | Remark |
|-------------------|--|-----|--------------|--------------|----------|
| 1. | I know how to use mobile technology for learning | 297 | 3.04 | .942 | A |
| 2. | I have the necessary skills in using mobile technology for my study | 297 | 3.06 | .874 | A |
| 3. | I can use my mobile device to get website that are useful for my studies | 297 | 3.34 | .760 | A |
| 4. | I know how to attach files in an e-mail with mobile device | 297 | 3.12 | .847 | A |
| 5. | I know how to get journals articles with mobile device. | 297 | 3.02 | .816 | A |
| 6. | I know how to use mobile device to connect to other students | 297 | 3.12 | .847 | A |
| 7. | I know how to use mobile device to connect to other devices like laptop, flash drive to download or upload files | 297 | 3.27 | .878 | A |
| 8. | I know how to connect with other online to aid my studies using mobile device. | 297 | 3.05 | .947 | A |
| 9. | I know how to use mobile devices to get current information on my study. | 297 | 3.26 | .865 | A |
| 10. | Mobile devices increase my contact with my lecturers | 297 | 2.83 | .911 | A |
| 11. | I know how to use mobile device to share learning materials | 297 | 3.22 | .854 | A |
| 12. | I know how to use the mobile device to enhance my learning | 297 | 3.22 | .832 | A |
| Grand Mean | | | 3.129 | 0.942 | A |

Table 3 presents the mean response and standard deviation of student's self-efficacy for mobile learning. From the table it reveals that the grand mean score of respondents in all the items measuring the student's self-efficacy for mobile learning is 3.129 all the items are having the mean score of above 2.50 with a grand mean

of 3.129. The result indicates that students have good mobile learning self-efficacy. This was because none of the mean response was below 2.50 which was on the 4-point scale response options.

Table 4: Mean Response and Standard Deviation of Lecturers Awareness for Mobile Learning

| To what extent are you aware of: | N | Mean | Std. Dev | Remark |
|---|----|------|----------|--------|
| 1 Using mobile learning, I can teach without coming to the class physically | 35 | 2.76 | .723 | A |

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| | | | | | |
|-------------------|--|----|-------------|-------------|-----------|
| 2 | I can use mobile devices for research | 35 | 2.53 | .716 | A |
| 3 | Deliver lessons to my students using mobile devices | 35 | 3.03 | .986 | A |
| 4 | Key in a website address to enter the site using mobile | 35 | 3.35 | .824 | A |
| 5 | Mobile devices offer interesting material for my teaching | 35 | 3.41 | .725 | A |
| 6 | Mobile devices provide me resources online | 35 | 3.74 | .732 | VMA |
| 7 | I can find material on my teaching using mobile | 35 | 3.51 | .731 | VMA |
| 8 | I can quickly find information on my research using mobile | 35 | 3.62 | .644 | VMA |
| 9 | Mobile devices provide me with resources online | 35 | 1.95 | 1.177 | PA |
| 10 | I am not aware of mobile teaching | 35 | 2.11 | 1.197 | PA |
| 11 | I do not get information with mobile device | 35 | 1.97 | 1.142 | PA |
| 12 | I do not know how to find material for my teaching using mobile | 35 | 1.97 | 1.142 | PA |
| 13 | I do not know how to enter words into a document using a mobile device | 35 | 1.97 | 1.213 | PA |
| 14 | I do not have the knowledge to use mobile device independently | 35 | 1.81 | 1.198 | PA |
| 15 | I do not know how to use mobile devices for teaching | 35 | 1.95 | 1.053 | PA |
| 16 | I do not interact with other lecturers using mobile device | 35 | 2.00 | 1.269 | PA |
| 17 | I cannot use mobile device for normal phone calling, sms, mms | 35 | 2.05 | 1.104 | PA |
| 18 | I do not teach anytime, anywhere using mobile devices | 35 | 1.73 | 1.071 | PA |
| 19 | You teach anytime, anywhere using mobile devices | 35 | 3.19 | .908 | A |
| Grand Mean | | | 2.19 | .972 | PA |

Table 4 revealed the result of lecturer's awareness on mobile learning. From Table 4, it can be seen that the (grand mean = 2.19 and standard deviation = .972). It can be said that the lecturers were partially aware of mobile learning for teaching and learning purposes. It is expected

that lecturers should be more aware of some of the state of the earth emerging technologies.

Table 5: Mean Response and Standard Deviation of Lecturers' Self-efficacy for mobile Learning.

| S/N | Statements | N | Mean | Std. Dev | Remark |
|-----|---|----|------|----------|--------|
| 1 | I know how to use mobile technology to teach | 35 | 3.76 | .435 | SA |
| 2 | I have the skills necessary to use mobile technology for teaching | 35 | 3.51 | .507 | SA |
| 3 | I can use my mobile device to get website that are useful for my teaching | 35 | 3.38 | .594 | A |
| 4 | I know how to attach files in an e-mail with mobile device. | 35 | 3.30 | .571 | A |
| 5 | I know how to get journals article with mobile device. | 35 | 3.14 | .751 | A |
| 6 | I know how to use mobile device to connect to other lecturers | 35 | 3.22 | .787 | A |

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| | | | | | |
|-------------------|--|----|-------------|-------------|----------|
| 7 | I know how to use mobile device to connect to other devices like laptop, flash drive to download or upload files | 35 | 3.16 | .727 | A |
| 8 | I know how to connect with others online to aid my research using mobile device | 35 | 3.46 | .605 | A |
| 9 | I know how to use mobile devices to get current information on my teaching | 35 | 3.30 | .702 | A |
| 10 | Mobile devices increases my contact with my students | 35 | 3.51 | .507 | SA |
| 11 | I know how to use mobile device to share learning materials to my students | 35 | 3.46 | .605 | A |
| 12 | I know how to use mobile devices to enhance my teaching | 35 | 3.46 | .605 | A |
| Grand Mean | | | 3.38 | .676 | A |

Table 5 presents the lecturers' self-efficacy for mobile learning. The results indicate that the lecturers' agree to all items. As none of the mean response was below 2.50 while the grand mean is 3.38, with a standard deviation of 0.676. This signifies that the lecturers have a good mobile learning self-efficacy.

DISCUSSION OF FINDINGS

Results from table 2 shows that the students' awareness for mobile learning had a grand mean of 2.30, which means that computer science education students were partially aware of the mobile learning. This is because, in addition to using mobile devices for interaction, they are also been using them to do assignment and other school related issues. The findings agree with that of Wendeson, Ahmad and Nazleeni (2023) who found that students' were aware of mobile learning in tertiary institutions. This is not in line with findings of Chang Liu & Huang (2022) who found that students were not aware of mobile learning in primary schools. Interestingly students in public tertiary institutions in Bauchi state were found to be aware of the mobile devices for learning purposes.

Results from Table 3 presents the grand mean respond of student's mobile learning self-efficacy with grand mean of 3.129, which means that computer science education students have good mobile learning self-efficacy. This result agree with the result of Yorganci (2020) who found that a number of primary school students have good self-efficacy of mobile learning. It is

surprisingly the findings agree with the findings of Al-Emran et al., (2022) that said mobile self – efficacy increase students' motivations and achievement.

Table 4 was on the lecturers' awareness for mobile learning. Results from table 4 shows that the grand mean of respondent on lecturers' awareness for mobile learning is 2.19. This means that computer science education lecturers were partially aware of the mobile learning. The result is in line with the findings from the study conducted by Aremu, Kola and Sunday (2019). The result is contrary to the findings of Zakaria, Mistima Maat and Khalid (2019).

Results from table 5 shows that the average mean of lecturers on self-efficacy for mobile learning have mean of 3.36. This means that computer science education lecturers in public tertiary institutions in Bauchi state have a good mobile learning self-efficacy. The findings from this study is in line with the finding of Wendeson, Fatimah, Ahmad, and Nazleeni (2020) who found that self-efficacy measure the technology integration using the technology proficiency self-Assessment (TPSA). Based on the results obtained, it is therefore recommended that management of tertiary institutions offering computer science education should utilize mobile learning for it academic programs.

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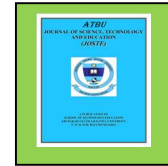
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