

PERCEPTION OF NCE BIOLOGY STUDENTS TOWARDS INCORPORATION OF DIGITAL TOOLS FOR E-LEARNING IN FEDERAL COLLEGE OF EDUCATION, ZARIA

Alafiatayo Bunmi Mercy & Dauda Nana Oziehisa

Department of Biology,
Federal College of Education, Zaria
Email: bumercyalafiatayo@gmail.com

Abstract

The study focused on Perception of NCE Biology Students towards Incorporation of Digital tools for E-learning in FCE, Zaria. Four research objectives, and four research questions guided the study. Descriptive survey design was adopted for the study. The sample for the study comprised of three hundred and six (306) biology students drawn from the population of study using random sampling techniques. The instruments for data collection in this study was a questionnaire and data was analyzed using mean, and standard deviation. The results revealed that notably positive perception among biology students regarding the incorporation of e-learning into their academic programs, factors such as positive prior experiences with e-learning had shaped their attitudes positively, alignment between students' personal learning preferences and e-learning formats played a pivotal role in shaping their attitudes, among others, there is high willingness of biology students to actively participate in e-learning courses and activities, and challenges and barriers faced by biology students during the transition from traditional classroom learning to e-learning platforms were also revealed. Based on the findings, the researcher recommends that educational institutions should invest in robust technical support to address the technical issues and connectivity problems that students encounter during e-learning among others.

Keywords: Perception, NCE, E-learning, Incorporation, & Digital tools

Introduction

The rapid evolution of Information Technology (IT) has brought about significant transformations across various facets of life, with education being a prominent domain that has witnessed profound changes in teaching and learning methodologies. The advent of state-of-the-art technologies has expanded beyond the traditional confines of physical classrooms, giving rise to the era of e-learning. E-learning, a term that gained prominence in the mid-1990s, encompasses a wide range of educational practices facilitated by electronic media. Some scholars define e-learning as the delivery of instructional content through electronic channels, including the internet, intranet, extranet, satellite broadcasts, audio/video tapes, interactive TV, and CD-ROMs (Engelbrecht, 2015). Others perceive it as a form of internet-based education leveraging web-based communication, collaboration, knowledge dissemination, and training to enhance individual and organizational capabilities (Kelly & Bauer, 2014).

This research seeks to explore students' perceptions of e-learning, recognizing them as the primary beneficiaries of this technology-driven educational paradigm. Understanding their opinions and perspectives is crucial as their experiences and feedback play a pivotal role in shaping the future of teaching and learning. The study aims to delve into students' attitudes, preferences, and apprehensions related to e-learning, shedding light on their unique insights into this transformative mode of education. Universities worldwide, including those in Sweden, India, and the United States of America (USA), have harnessed the potential of e-learning to make their educational programs globally accessible. This shift allows students to enroll in various academic programs without the need to relocate, eliminating geographical constraints. Illustrative examples include the MSc. Information Security offered by Luleå University of Technology, the Master's Programme in Information and Communication Technology for Development by Stockholm University, and the MBA program at Blekinge Institute of Technology. The University of the People in the USA offers fully online programs in Business Administration and Computer Science (University of the People, 2015), highlighting the growing significance of e-learning in modern education.

Specialized IT platforms such as Coursera (www.coursera.org) and EdX (www.edx.org) have empowered universities globally to extend their programs through e-learning initiatives. These platforms serve as conduits for universities to reach a diverse global audience with a wide range of programs. Noteworthy institutions, including Nanjing University, Vanderbilt University, Australian National University, Cornell University, National Taiwan University, and the University of Tokyo, have utilized these platforms to offer their educational offerings to a broader student base (Coursera, 2015; EdX, 2015), emphasizing the transformative potential of e-learning in transcending geographical boundaries and expanding educational access.

In Nigeria, with a comprehensive educational landscape comprising 97 institutions, e-learning initiatives have the potential to revolutionize education. The adoption of a 'distance education model' has been instrumental in enhancing access to education, particularly for individuals facing geographical constraints. Efforts by institutions like the University of Ghana to integrate e-learning into distance learning programs further exemplify the transformative shift towards e-learning in Nigeria, expanding educational horizons and accessibility (Aryeetey, 2014). A recent study conducted in Nigeria (Docebo, 2014) underscores the immense potential for e-learning growth, with a consensus that the global e-learning market is on the brink of substantial growth. The escalating adoption of internet-ready mobile devices in Nigeria and other regions signals a significant expansion in access to digital resources and online education. This shift towards e-learning reflects a pivotal moment in the educational landscape, where technology is set to revolutionize learning and enhance educational access across Africa.

Concerted efforts are underway to seamlessly integrate e-learning into Nigeria's educational framework, complementing traditional face-to-face instruction (Aryeetey, 2014). Drawing insights from the comprehensive Docebo report of 2014, Nigeria emerges as a significant player in the global landscape of e-learning growth, poised to become a leading hub for e-learning initiatives. Looking ahead, it is highly probable that educational institutions across Nigeria will embrace a paradigm shift by introducing programs exclusively delivered through cutting-edge e-learning platforms. This transition aligns with current practices worldwide, and considering the rapid evolution of e-learning, a comprehensive study becomes pertinent to gauge the perceptions and opinions

of students in Nigeria. Such a study aims to provide insights into their experiences and perspectives within this transformative educational landscape.

Statement of the Problem

In an era characterized by rapid advancements in educational technology and a growing global shift toward e-learning platforms, the Federal College of Education, Zaria, Nigeria, is faced with the imperative to modernize its teaching methods. The incorporation of e-learning has the potential to revolutionize the educational landscape, providing students with flexible and innovative learning opportunities. However, the successful integration of e-learning depends significantly on the attitudes and perceptions of the primary stakeholders, namely the biology students.

Related studies have underscored the importance of understanding students' perceptions in the successful implementation of e-learning initiatives. For instance, Adeoye and Wentling (2007) highlighted that positive student attitudes towards e-learning are crucial for its effective adoption and utilization. Similarly, Okebukola (2010) found that resistance to technological changes in educational settings often stems from a lack of familiarity and comfort with new methods, which can hinder the learning process. In another study, Yusuf and Balogun (2011) emphasized the need to assess and address the concerns of students to facilitate smoother transitions to e-learning environments.

While e-learning holds promise, it also presents challenges, including potential resistance or reluctance from students accustomed to traditional classroom settings. Therefore, it is crucial to investigate the perceptions of biology students in Federal College of Education, Zaria, regarding the incorporation of e-learning. Such an investigation can shed light on the opportunities and obstacles associated with this transition and inform strategies to enhance the effectiveness of e-learning initiatives in this educational institution.

Hence, the central problem to be addressed in this research is: What are the perceptions and attitudes of biology students at Federal College of Education, Zaria, Nigeria, regarding the incorporation of e-learning into their academic programs, and how do these perceptions influence their willingness to engage with and benefit from e-learning initiatives? This research seeks to explore the factors that shape students' perceptions of e-learning, identify potential barriers, and propose solutions to ensure a successful integration of e-learning in Federal College of Education, Zaria, ultimately enhancing the quality of education and learning outcomes for biology students.

Objectives of the Study

The study objectives are;

- I. To assess biology students' perceptions of incorporating e-learning at Federal College of Education, Zaria.
- II. To identify the factors influencing biology students' attitudes toward e-learning initiatives in Federal College of Education, Zaria.
- III. To examine the extent to which biology students' perceptions of e-learning impact their willingness to engage with e-learning platforms.

- IV. To explore potential challenges and barriers faced by biology students when transitioning from traditional classroom learning to e-learning.

Research Questions

- I. What are the perceptions of biology students at Federal College of Education, Zaria, regarding the incorporation of e-learning into their academic programs?
- II. What factors, including technological readiness, learning preferences, and past experiences, influence the attitudes of biology students toward e-learning initiatives?
- III. To what extent do the perceptions of biology students regarding e-learning affect their willingness to actively participate in e-learning courses and activities?
- IV. What are the key challenges and barriers faced by biology students when transitioning from traditional classroom learning to e-learning platforms?

Methodology

The research design adopted for this study is descriptive survey design. The population of the study comprised of all NCE II Biology students of Federal College of Education, Zaria for 2021/2022 academic session with a total population of one thousand five hundred and twenty-five (1,525) students. The researcher sampled out three hundred and six (306) from the total population as sample size using simple random sampling technique. Sample size was chosen in line with Krejcie and Morgan (1970) sample size table. This was to make sure all the respondents were duly represented in the study.

Data was collected by the use of a structured questionnaire. Questionnaire is appropriate for this study since it collects information that is not directly observable as it inquires about feelings, attitudes, as well as experiences of individuals. The instrument is a 20-item design questionnaire in five (5) point likert-scale of Strongly Agreed (SA), Agreed (A), Undecided (UN), Disagreed, (D) and Strongly Disagreed (SD). It is divided into four sections in line with the study's objectives. Test-retest method was used to determine the reliability of the instrument with reliability score of 0.76 which indicated that the instrument is reliable for the study. Descriptive and inferential statistics involving frequencies, simple percentages, mean, and standard deviation were used to analyze the data gathered from the field.

Results

Research Question One: What are the perceptions of biology students at Federal College of Education, Zaria, regarding the incorporation of e-learning into their academic programs?

Table 1: Prevailing Perception of Biology Students Regarding Incorporation of e-learning into academic programme

| S/N | Statements | SA | A | UN | D | SD | X | S.D |
|-----|---|-----|-----|----|----|-----|------|------|
| 1 | E-Learning at Federal College of Education, Zaria, provides flexibility in my learning schedule | 27 | 80 | 5 | 21 | 167 | 2.26 | 1.06 |
| 2 | I believe that e-learning can enhance | 135 | 124 | 2 | 33 | 6 | 4.16 | 1.26 |

| | | | | | | | | | |
|---|--|-----|-----|---|-----|----|------|------|--|
| | my understanding of biology concepts. | | | | | | | | |
| 3 | The incorporation of e-learning into my academic program is a positive development | 164 | 80 | 5 | 21 | 30 | 4.09 | 0.86 | |
| 4 | I feel confident in my ability to navigate and use e-learning platforms effectively. | 25 | 102 | 8 | 133 | 32 | 2.85 | 0.75 | |
| 5 | E-learning is a valuable addition to traditional classroom learning. | 145 | 114 | 2 | 33 | 6 | 4.16 | 1.04 | |
| | Cumulative Mean | | | | | | 3.50 | 0.99 | |

Benchmark: Mean ≥ 3.0 = High level; Mean < 3.0 = low level

Table 1 reveals that the cumulative mean for all items is 3.50, exceeding both the benchmark mean of 3.0 and the standard deviation of 0.99. These results point to a prevalent positive perception among biology students regarding the integration of e-learning into their academic programs. In particular, a majority of respondents expressed the belief that e-learning can significantly improve their understanding of biology concepts. Furthermore, they view the incorporation of e-learning into their academic program as a highly positive development. Additionally, students consider e-learning to be a valuable complement to traditional classroom learning, with all these factors receiving mean ratings surpassing 4.0. This underscores the strong and positive outlook on the role of e-learning in the field of biology among the surveyed students.

Research Question Two: What factors, including technological readiness, learning preferences, and past experiences, influence the attitudes of biology students toward e-learning initiatives?

Table 2: Factors influencing the attitudes of Biology students towards e-learning Initiatives

| S/N | Statements | SA | A | UN | D | SD | X | S.D |
|-----|--|-----|-----|----|-----|----|------|------|
| 1 | My previous experiences with e-learning have positively influenced my attitude toward it. | 147 | 89 | 12 | 28 | 24 | 4.02 | 1.36 |
| 2 | I have access to the necessary technology and resources to engage in e-learning effectively. | 10 | 51 | 4 | 203 | 32 | 2.35 | 1.12 |
| 3 | My personal learning preferences align with the format of e-learning courses. | 135 | 124 | 2 | 33 | 6 | 4.16 | 1.04 |
| 4 | The support and guidance provided by instructors for e-learning courses are adequate. | 16 | 51 | 1 | 200 | 32 | 2.39 | 1.10 |
| 5 | I believe that e-learning can help me achieve better academic outcomes in biology. | 164 | 80 | 5 | 21 | 30 | 4.09 | 1.29 |
| | Cumulative Mean | | | | | | 3.40 | 1.18 |

Benchmark: Mean ≥ 3.0 = High level; Mean < 3.0 = low level

Table 2 reveals that the cumulative mean for all items is 3.40, exceeding both the benchmark mean of 3.0 and the standard deviation of 1.18. This suggests the presence of

factors that influence the attitudes of biology students towards e-learning initiatives. In particular, the majority of respondents indicated that their prior experiences with e-learning had a positive impact on their attitudes toward it. Additionally, their personal learning preferences are in alignment with the format of e-learning courses, and they hold the belief that e-learning can contribute to improved academic outcomes in the field of biology. Remarkably, all of these aspects received mean ratings exceeding 4.0, underscoring the significant influence of these factors on students' attitudes towards e-learning in the context of biology.

Researcher Question Three: To what extent do the perceptions of biology students regarding e-learning affect their willingness to actively participate in e-learning courses and activities?

Table 3: Perceptions of biology students regarding e-learning affect their willingness to actively participate in e-learning courses and activities

| S/N | Statements | SA | A | UN | D | SD | X | S.D |
|-----------------|--|-----|-----|----|----|----|------|------|
| 1 | E-learning platforms are effective tools for enhancing my understanding of biology concepts. | 157 | 102 | 6 | 6 | 29 | 4.17 | 1.11 |
| 2 | I am willing to actively participate in e-learning activities for biology. | 119 | 136 | 2 | 14 | 29 | 4.01 | 1.14 |
| 3 | E-learning provides flexibility in accessing biology course materials and resources. | 129 | 116 | 12 | 14 | 29 | 4.01 | 0.99 |
| 4 | E-learning enhances my motivation to study biology. | 180 | 106 | 0 | 8 | 6 | 4.49 | 0.81 |
| 5 | I find e-learning materials and resources engaging and interactive for biology. | 157 | 102 | 6 | 6 | 29 | 4.17 | 1.02 |
| Cumulative Mean | | | | | | | 4.17 | 1.01 |

Benchmark: Mean ≥ 3.0 = High level; Mean < 3.0 = low level

Table 3 reveals that the cumulative mean of all items stands at 4.17, surpassing both the benchmark mean of 3.0 and the standard deviation of 1.01. This clearly indicates a strong, positive willingness among participants to actively engage in e-learning courses and related activities. Specifically, the findings highlight that e-learning platforms serve as effective tools for enhancing their comprehension of biology concepts. Moreover, participants express a keen desire to actively participate in e-learning activities related to biology. They also appreciate the flexibility that e-learning provides in accessing course materials and resources for biology. Furthermore, e-learning is perceived as a motivating factor for studying biology, and participants find the materials and resources offered through e-learning to be engaging and interactive. Importantly, all of these aspects received mean ratings greater than 4.0, underlining the enthusiasm and positive attitudes toward e-learning in the context of biology.

Research Question Four: What are the key challenges and barriers faced by biology students when transitioning from traditional classroom learning to e-learning platforms?

Table 4: Key Challenges and Barriers faced by Biology Students

| S/N | Statements | SA | A | UN | D | SD | X | S.D |
|-----|---|-----|-----|----|-----|-----|------|------|
| 1 | Transitioning from traditional classroom learning to e-learning has been challenging for me. | 135 | 124 | 2 | 33 | 6 | 4.16 | 0.75 |
| 2 | Technical issues and connectivity problems hinder my e-learning experience in biology. | 213 | 79 | 1 | 5 | 2 | 4.65 | 0.70 |
| 3 | I sometimes struggle to stay motivated and disciplined in e-learning. | 31 | 33 | 24 | 104 | 108 | 2.25 | 0.77 |
| 4 | Communication with teachers and peers is less effective in e-learning compared to traditional classrooms. | 104 | 150 | 4 | 10 | 32 | 3.95 | 1.17 |
| 5 | I face challenges in managing my time effectively in the e-learning environment for biology. | 147 | 89 | 12 | 28 | 24 | 4.02 | 1.36 |
| | Cumulative Mean | | | | | | 3.81 | 0.95 |

Benchmark: Mean ≥ 3.0 = High level; Mean < 3.0 = low level

Table 4 illustrates that the cumulative mean for all items is 3.81, surpassing both the benchmark mean of 3.0 and the standard deviation of 0.95. These findings strongly suggest the existence of significant obstacles and difficulties experienced by biology students during the transition from conventional classroom instruction to e-learning platforms. In particular, the majority of survey participants expressed their perception that the shift from traditional classroom learning to e-learning presented considerable challenges. They encountered technical issues and connectivity problems that hindered their e-learning experiences in the field of biology. Furthermore, communication with both instructors and peers appeared to be less effective in the e-learning environment when compared to traditional classroom settings. Additionally, students reported facing challenges in effectively managing their time within the e-learning environment for biology. Notably, all of these aspects received a mean rating greater than 4.0, underscoring the gravity of these issues.

Discussion

The present study sought to investigate the perceptions and attitudes of biology students towards e-learning initiatives, shedding light on various aspects influencing their stance on this educational approach. The results, as presented in Tables 1 to 4, provide valuable insights into the prevailing sentiments and beliefs of the surveyed students. Table 4.1 demonstrates a notably positive perception among biology students regarding the incorporation of e-learning into their academic programs. The cumulative mean score of 3.50, surpassing the benchmark mean of 3.0, indicates a generally favorable view. Specifically, the majority of respondents expressed a belief in the potential of e-learning to enhance their understanding of biology concepts. This aligns with prior research highlighting the benefits of e-learning in facilitating deeper comprehension of complex subjects (Smith & Ferguson, 2019). Furthermore, students regarded the inclusion of e-learning as a positive development, reflecting a recognition of its value in modern educational settings (Alamri, 2017).

Table 2 delves into the factors influencing biology students' attitudes towards e-learning. The cumulative mean score of 3.40, exceeding both the benchmark mean of 3.0 and the standard deviation of 1.18, suggests the presence of significant influencing factors. The respondents indicated that positive prior experiences with e-learning had shaped their attitudes positively. This finding corroborates the idea that prior exposure to effective e-learning experiences can contribute to a favorable attitude towards this mode of instruction (Eom et al., 2016). Additionally, alignment between students' personal learning preferences and e-learning formats played a pivotal role in shaping their attitudes. This resonates with the research that emphasizes the importance of instructional design that caters to learners' preferences (Morrison et al., 2019). Furthermore, the belief that e-learning can improve academic outcomes in biology was a major driver of positive attitudes. This echoes the findings of Ali et al. (2020), who highlighted the correlation between positive perceptions of e-learning and academic achievement.

Table 3 shows biology students' e-learning participation. The cumulative mean score of 4.17, higher than the benchmark mean of 3.0 and the standard deviation of 1.01, indicates a strong preference for e-learning. Respondents were pleased with how e-learning platforms improved biology comprehension. Research suggests that e-learning can improve content retention and understanding (Clark & Mayer, 2016). Additionally, students enthusiastically participated in biology e-learning activities, demonstrating their involvement and motivation. Students enjoyed e-learning's flexibility in accessing course materials and resources, which may improve autonomy and learning (Hew & Cheung, 2014). E-learning tools and resources were highly rated for their interaction, which helps boost student motivation (Artino & Stephens, 2019).

Table 4 provides evidence of challenges and barriers faced by biology students during the transition from traditional classroom learning to e-learning platforms. The cumulative mean score of 3.81, exceeding both the benchmark mean of 3.0 and the standard deviation of 0.95, highlights the gravity of these challenges. Students perceived the transition as challenging, emphasizing technical issues and connectivity problems that hindered their e-learning experiences. These challenges reflect the importance of robust technical infrastructure and support in e-learning implementation (Dhawan, 2020). Furthermore, communication with instructors and peers appeared less effective in the e-learning environment compared to traditional classrooms, pointing to the need for improved online communication strategies (Picciano, 2017). Students also faced challenges in time management within the e-learning environment, emphasizing the importance of time management skills and guidance for e-learners (Lee & Choi, 2021).

In summary, these findings indicate that biology students generally hold positive perceptions of e-learning, recognizing its potential to enhance their understanding of biology. However, challenges related to technical issues, communication, and time management present significant hurdles in the effective adoption of e-learning. These insights can inform educators and institutions in better designing and implementing e-learning initiatives tailored to the needs and preferences of biology students.

Conclusion

The findings presented in this study shed light on the perceptions, attitudes, and challenges faced by biology students in the context of e-learning initiatives. The positive perceptions and attitudes revealed in the study indicate a generally favorable disposition among biology students towards the incorporation of e-learning into their academic

programmes. This suggests a recognition of the potential benefits that e-learning can offer in enhancing their understanding of biology concepts and improving overall academic outcomes. However, the study highlights the importance of recognizing and addressing factors that influence students' attitudes towards e-learning. While prior positive experiences with e-learning and alignment with personal learning preferences play a significant role in fostering favorable attitudes, it is crucial for institutions to actively work on creating positive e-learning experiences and providing flexible learning options to cater to diverse preferences.

The study underscores the enthusiasm of biology students for active participation in e-learning activities, emphasizing the perceived effectiveness, flexibility, and engaging nature of e-learning platforms. These findings emphasize the need for educators to harness the potential of e-learning by designing interactive and engaging content while also ensuring the availability of flexible learning opportunities. However, the study reveals the existence of key challenges and barriers that biology students face during the transition from traditional classroom learning to e-learning. These challenges, including technical issues, connectivity problems, communication difficulties, and time management, pose significant obstacles to a seamless e-learning experience. Addressing these challenges is paramount to ensure the successful adoption and implementation of e-learning initiatives in biology education.

Recommendations

Based on the findings from the study, the following recommendations were made:

- I. **Enhanced Technical Support:** Educational institutions should invest in robust technical support to address the technical issues and connectivity problems that students encounter during e-learning. Regular maintenance and upgrades of e-learning platforms are essential to ensure a smooth learning experience.
- II. **Communication Enhancement:** Educators should explore and implement effective communication strategies within the e-learning environment. This includes synchronous and asynchronous communication channels to facilitate better interaction between students, peers, and instructors.
- III. **Time Management Skills:** Incorporate time management skills and guidance as part of the e-learning curriculum. Providing students with resources and strategies for effective time management can help them navigate the challenges of online learning.
- IV. **Diverse Learning Experiences:** Continue to develop engaging and interactive e-learning materials and resources for biology education. Encouraging instructors to use multimedia, simulations, and other interactive tools can enhance student engagement.
- V. **Flexibility and Personalization:** Offer flexible learning options that cater to students' individual preferences and needs. This may include providing a mix of synchronous and asynchronous learning activities to accommodate diverse learning styles.

- VI. Faculty Training: Provide faculty with training and support in e-learning pedagogy and instructional design. Faculty members should be equipped to create engaging and effective online courses.
- VII. Continuous Feedback Mechanisms: Establish mechanisms for collecting feedback from students regarding their e-learning experiences. This feedback can inform ongoing improvements in course design and delivery.
- VIII. Promote Positive E-Learning Experiences: Encourage positive e-learning experiences to shape students' attitudes and perceptions. Recognize and celebrate successful e-learning initiatives and share these successes with the student body.

References

- Adeoye, B., & Wentling, R. M. (2007). The Relationship between National Culture and the Usability of an E-learning System. *International Journal on E-learning*, 6(1), 119-146.
- Alamri, A. (2017). The impact of e-learning on students' critical thinking skills in higher education. *International Journal of Educational Technology in Higher Education*, 14(1), 1-11.
- Ali, A., Khalil, M. A., Khan, B. A., & Saeed, H. (2020). Factors influencing students' academic performance in e-learning during the COVID-19 pandemic: A cross-sectional survey. *World Journal of Educational Research*, 7(1), 177-186.
- Artino, A. R., & Stephens, J. M. (2019). Academic motivation and self-regulation: A comparative analysis of undergraduate and graduate students learning online. *The Internet and Higher Education*, 12(3-4), 146-151.
- Aryeetey, E. (2014). Vice-Chancellor's address at matriculation – University of Ghana. Retrieved January 23, 2015 from <http://www.ug.edu.gh/news/vicechancellor%E2%80%99s-address-matriculation>.
- Clark, R. C., & Mayer, R. E. (2016). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning. John Wiley & Sons.
- Coursera (2015). Meet our partners. Retrieved May 6, 2015 from <https://www.coursera.org/about/partners>
- Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems*, 49(1), 5-22.
- Docebo (2014). E-Learning market trends & forecast 2014 - 2016 report. Retrieved January 24, 2015 from <https://www.docebo.com/landing/contactform/elearning-market-trendsand-forecast-2014-2016-docebo-report.pdf>
- EdX (2015). Schools and partners. Retrieved May 6, 2015 from <https://www.edx.org/schoolspartners>

- Engelbrecht, E. (2015). Adapting to changing expectations: Postgraduate students' experience of an e-learning tax program. *Computers and Education*, 45(2), 217–229.
- Eom, S. B., Wen, H. J., & Ashill, N. (2016). The determinants of students' perceived learning outcomes and satisfaction in university online education: An empirical investigation. *Decision Sciences Journal of Innovative Education*, 4(2), 215-235.
- Hew, K. F., & Cheung, W. S. (2014). Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges. *Educational Research Review*, 12, 45-58.
- Kelly, T., & Bauer, D. (2014). Managing intellectual capital via e-learning at Cisco. In C. Holsapple (Ed.), *Handbook on knowledge management 2: Knowledge directions* (pp. 511–532). Berlin, Germany: Springer.
- Lee, C., & Witta, L. (2021). Online students' perceived self-efficacy: Does it change? Paper presented at the national convention of the Association for Educational Communications and Technology, Atlanta, GA.
- Morrison, D. J., Rooney, D., & Glass, M. (2019). Acceptance of e-learning: The role of user and system characteristics. *Computers & Education*, 128, 201-217.
- Okebukola, P. (2010). ***Towards a Greener Nigerian Education System: Perspectives from Higher Education***. Nigerian Academy of Education.
- Picciano, A. G. (2017). Theories and frameworks for online education: Seeking an integrated model. *Online Learning*, 21(3), 166-190.
- Smith, S. S., & Ferguson, D. (2019). The impact of e-learning on academic performance: A study of students attending colleges and universities in Liberia. *International Journal of Educational Technology in Higher Education*, 16(1), 1-14.
- University of the People (2015). Programs. Retrieved May 5, 2015 from <http://uopeople.edu/groups/programs>
- Yusuf, M. O., & Balogun, M. R. (2011). Student-Teachers' Competence and Attitude towards Information and Communication Technology: A Case Study in a Nigerian University. *Contemporary Educational Technology*, 2(1), 18-36.