**Exploring the Impact, Challenges, and Satisfaction of Online Learning Among Nursing Trainees in Northern Ghana**

**Abstract**

**Background:** The use of technology in many fields, including teaching, learning, and computerized assessment within higher education institutions, has increased due to the rapid development of many fields in our current era, mainly information and communication technology, characterized by high-speed.This research aims to assess the impact of online learning and examination among Nurses’ and Midwives’ Training College, Tamale students.

**Methods:** The study used a descriptive institutional cross-sectional survey with 290 respondents selected using a stratified sampling technique. A semi-structured questionnaire was transformed into a Google form and used as the main tool for data collection. Data was analyzed using SPSS version 25, and results were presented in tables and figures.

**Results:** About 81.0% would accept online examinations, and 75.2% of the respondents indicate that writing exams online allows fulfilling course. The study showed that 82.4% of the respondents agreed that online learning helps them be more productive, 77.9% were satisfied with the learning experience compared to others, and 67.9% indicated that face-to-face learning impacts their learning more. The study showed that 118(40.7%) indicated that they are inability to ask questions and express themselves, 40(13.8%) indicated that they lack instructor or tutor support, financial factors affect the use of online learning and examination, and 84(29.0%) indicated that lack of knowledge on Information Technology (IT). Also, (37.9%) indicated that the availability of required technology and adequate access to the Internet could facilitate online learning and examination (36.6%), and the provision of data (26.6%) could facilitate online learning and examination.

**Conclusion:** The study found that respondents accept online learning as a method they will indulge in. However, it was revealed that online learning does not impact their academic performance. Also, challenges like the unavailability of the required technology, incompatibility of some phones and laptops, lack of adequate internet access, heavy workload of online courses, and lack of enough skills to learn online exist.

***Introduction***

The Internet is undoubtedly the technology that has most recently enabled the change in teaching and learning among the technologies that have impacted education. Teachers and students can now engage outside of the typical classroom setting with the use of networked devices and wireless connectivity [1]. The use of technology in many fields, including teaching, learning, and computerized assessment within higher education institutions, has increased due to the rapid development of many fields in our current era, particularly the field of information and communication technology, which is characterized by high speed [2]. Online learning is considered a teaching method that allows participants flexibility, convenience, and ease of access, making educational possibilities available to a variety of audiences [3]. The terms online distance learning, e-learning, blended learning, online learning, and virtual learning are all interchangeable, with the main idea being that learning activities take place in an informal setting using any Internet tools, with little to no in-person social interaction with lecturers [4].

By combining e-learning with more conventional teaching techniques, students can interact with their instructors and peers at their speed. Students can also get materials or resources at any time or any place[5–7]. As a result, e-learning encourages students to learn for themselves by reducing their reliance on lecturers and fostering bilateral communication between students and lecturers, as well as students with friends [8]. Globally, a minimum of 60% of internet users have participated in online education. This is so they can comfortably complete it at their convenience (both in terms of time and location). In contrast to one-on-one tutoring, which has a retention rate of 8% to 10%, e-learning improves the learners' retention rate to 25% to 60%. This is because learning is quickly reviewed, and one tends to have more control over the process [9]. The People's Republic of China's Ministry of Education reported that between February and June 2020, 1,454 universities had implemented online teaching, and 1226 million courses were offered online[10]. Over 17 million students and about 1 million teachers took part in this unexpected educational shift from traditional face-to-face education to online education[11]. According to a Tanzanian study, the quality of the system, the caliber of the instructors, and the caliber of the services all significantly improved learners' satisfaction, with the caliber of the services being the best predictor[12]. Yet, it was discovered that course quality had no appreciable impact on students' satisfaction with the e-learning platform [13].Computer applications have entered the sphere of education [2]. According to e-learning research, users' willingness to use e-learning in the way it was intended to be used varies depending on their expectations, beliefs, and experiences. Understanding technology adoption in education is crucial because, in contrast to their counterparts in enterprises, educational users have greater autonomy in selecting which technology to use when to use it, and how [1].

The use of e-learning to expand access and remove obstacles to teaching and learning has been well-documented. E-learning has been crucial in Southeast Asian nations in closing the education gap between rural and urban areas [1]. According to some studies, the difficulties in delivering online teaching and learning are caused by a lack of concern for how students would experience and engage with the online learning process. Poor learning outcomes or low student engagement could arise from such ad hoc e-learning adoption [14]. In the same way, university students have expressed dissatisfaction with contemporary online schooling throughout the pandemic. For instance, more than 99 percent of respondents to a poll of 203 universities in Korea by the National University Student Council Network complained about online lectures[15]. In Rwanda, Results reveal that 28.1% of the students attended their online lessons daily, 31.6% did so once per week, 8.7% did so twice per week, and 2.3% did so three times per week, while 29.4% never did so [16]. In Ghana, a study found that accessibility problems were the biggest obstacle for students learning online. Then came general, academic, instructor, and social issues [17]. According to Brewer[18], in a study conducted in Ghana among nursing students, it was revealed that a hybrid or online delivery method for a course had never been used before by two-thirds of the participants. Participants said that the workload for online classes was lower and that it was convenient to coordinate schedules for job, family, and academic obligations. The success of online course delivery was influenced by factors such as computer and information technology abilities and learning preferences [19]. However, the nursing fraternity has a sizable amount of practical and craft-based training that necessitates additional hands-on learning throughout the course. Online education is, therefore, in some ways, considerably more difficult in the context. Despite the numerous success stories of online learning across the globe, some excesses are observed. Yet, in Ghana, inadequate literature is available on this subject. Against this backdrop, this study aims to assess the acceptances and challenges associated with online learning and examination among students in tertiary institutions in Ghana.

***Methods***

## Study design

The research strategy employed was descriptive cross-sectional, emphasizing quantitative methodology. The cross-sectional approach facilitates data collection from a singular moment in time across two distinct locations, enabling the identification of variations among research variables and data from groups, including individuals of varying ages or developmental stages.

***Study setting***

The study was conducted at Nurse’s and Midwifery Training College (NMTC-Tamale), a public tertiary health institution located in Tamale, Northern Ghana. Established in 1974, the college initially trained enrolled nurses and later evolved to offer Registered General Nurses (RGN) diploma programs in 1999. In 2009, it began training Registered General Midwives (RM), and by 2018, it gained accreditation for the Post NAC/NAC Midwifery program. The college offers general nursing and midwifery programs. It is situated near key communities (Kukuo, Kalariga, Dabokpa, and Changli) and is near the Tamale Teaching Hospital, which supports clinical training for students. The institution has various social amenities, including a mosque, a market, and a prestige hospital. As of 2023, the college enrolled 1,328 students: 733 in general nursing, 513 in midwifery, and 48 in post-basic nursing/midwifery. The student body includes 460 first-year, 451 second year, and 417 third-year students.

## Study Population

The study targeted all students at the Nurse’s and Midwifery Training College, Tamale (NMTC—Tamale).

## Inclusion and exclusion criteria

The study focused on second- and third-year students at Nurse’s and Midwifery Training College (NMTC-Tamale), as they had experience using the online system in their training. First-year students were excluded because they had not yet interacted with the system. The inclusion criteria also required participants to be actively enrolled in the nursing and midwifery programs, have access to the internet, and be willing to participate in the study. Students who were absent, on leave, or lacked access to the online system due to technical or personal reasons were excluded, ensuring the study targeted those with relevant experience.

## Sample Size Determination

The study used a sample size of 274, determined using the Taro Yamane[20] formula for sample size calculation. The target population was 868 second- and third-year students. The formula used was n = N / (1 + N(e)^2), where N is the population size (868) and e is the margin of error (5% or 0.05). The calculation resulted in a sample size of 274. To account for a 5% non-response rate, the sample size was adjusted to 290, ensuring enough responses for the study.

## Sampling Technique

For this study, stratified sampling, a probability sampling technique, was used to recruit participants. In stratified sampling, the population is divided into distinct subgroups (strata) based on specific characteristics before participants are randomly selected within each stratum. Given that the study targeted year two and year three students at Tamale Nurses' and Midwives' Training College, the population was first stratified by year of study to ensure fair representation from both levels.

The sampling process began with the collection of a complete list of year two and year three students from the administration unit. Each student was assigned a unique number within their respective stratum. Simple random sampling was then applied within each stratum to select participants, ensuring an unbiased selection process.

## Data Collection tool and procedures

A standardized semi-structured questionnaire was used for data collection. The objectives of the study were used as indicators when structuring the questionnaire to ensure alignment with the research aims. The questionnaire consisted of four (4) sections: Section A focused on the socio-demographic data of the respondents; Section B examined the impact of online learning and examinations on students’ performance; Section C assessed the acceptance of online learning and examinations among students; and Section D explored the challenges associated with online learning and examinations among students.

Before data collection commenced, ethical clearance was obtained from the relevant ethics committee. The college authorities, including the principal and heads of departments, also secured permission. The purpose and significance of the study were communicated clearly to the college administration to ensure their full cooperation. After obtaining permission, a convenient time was scheduled for data collection to minimize disruption to the student's academic activities.

Data collection was conducted in a group setting, with respondents meeting in their various classrooms during pre-scheduled sessions. At the start of each session, the nature and purpose of the questionnaire were thoroughly explained to the respondents. Participation was voluntary, and respondents were assured of the confidentiality and anonymity of their responses. Written informed consent was obtained from all participants before proceeding.

The questionnaire was administered electronically through a Google Form. After addressing respondents' concerns and questions, the hyperlink to the questionnaire was shared with them. Respondents completed the questionnaire in a minimum of 10 minutes and a maximum of 15 minutes. Research was available throughout the process to provide clarification or assistance as needed.

Data collection was allocated for two months from April 2023 to May 2023. Follow-up reminders were sent to ensure maximum participation, especially for respondents who were unable to complete the questionnaire during the initial sessions. Measures were taken to ensure data quality, including periodic reviews of completed forms to identify and address incomplete or inconsistent responses.

## Data Analysis

Examining the data collected from the study is essential for deriving meaningful findings and making informed recommendations. The data was extracted from the Google Form survey into a spreadsheet, cleaned, and analyzed using Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics were summarized using frequency distribution tables, pie charts, and bar charts, while means and standard deviations were used for inferential analysis. A p-value of ≤ 0.05 was considered statistically significant.

## Ethical consideration

Ethical approval was obtained from the Institutional Review Board (IRB) of the University for Development Studies, adhering to the principles of the Declaration of Helsinki. Before distributing the questionnaire, all participants provided verbal and written informed consent. They were informed about the study's objectives, potential risks, and benefits and assured their participation was voluntary. They were also made aware that they could withdraw from the study at any time without any consequences. All collected information was kept strictly confidential and accessible only to the respondents. Data was anonymized to protect participants' identities, and all information was used solely for academic purposes.

***Results***

***Socio-demographic characteristics***

The study revealed that the majority of respondents (66.6%) were under 25 years old, with a mean age of 23.8 years. Of the total respondents, 55.9% were female and 44.1% male, most being in their second (46.9%) and third (43.1%) years of study. A significant portion (64.1%) identified as Muslims, while 35.9% were Christians. Regarding education, 39.0% of respondents' mothers had basic education, while 30.7% of fathers had basic education. Most respondents (60.0%) spent less than GHS 1,000 monthly, and 75.5% of fathers were employed, with 55.5% of mothers also employed (Table 1).

***Respondents' Views on Online Learning and Examination***

The study showed that the majority of respondents expressed confidence in using the internet (90.7%) and in using applications/software for online activities (82.4%). A significant portion (81.7%) believed that online learning increases work output, and most (73.8%) found it easy to use eLearning or retrieve learning materials. Additionally, 80.0% of respondents considered online learning a good idea, and 79.7% agreed that e-learning provides easy-to-understand information. Regarding exams, 75.2% felt online writing allowed for course fulfillment (Table 2).

**Impacts of online learning and examination on students’ performance**

The study revealed that 82.4% of respondents agreed that online learning helped them be more productive, while 17.6% disagreed. Regarding technical problems, 62.1% reported facing issues sometimes, 32.8% very often, and 5.2% never experienced problems. In terms of satisfaction with online learning and exams, 58.6% were satisfied, 17.2% were very satisfied, 19% were neutral, and 5.2% were not satisfied (Table 3).

**Facilitators & Barriers associated with online learning among students**

The study indicated that 61.7% of respondents believed the required technology was unavailable, while 38.3% disagreed. A majority (64.8%) reported that some phones and laptops were not compatible, and 71.7% lacked adequate internet access. Additionally, 72.8% found the workload of online courses to be heavy, and 68.6% felt they lacked enough skills to learn online. Regarding technology access, 57.9% were able to buy a smartphone or laptop, while 42.1% were not. Similarly, 52.4% could not buy data regularly, while 47.6% were able to purchase data(Table 4).

## Devices used for online learning

The study showed that the majority of respondents, 216(74.5%), used phones, 57(19.7%) used laptops for online learning, and 6.9% did not have either laptop or phone for online learning (Figure 1).

## Overall online learning and examination acceptance among respondents

The study showed that the majority of the respondents, 234(80.7%), would accept online examinations, and 56(19.3%) were unwilling to accept online examinations (Figure 2).

## F**actors that affect online learning and examination**

The study showed that 118(40.7%) indicated that they are inability to ask questions and express themselves, 40(13.8%) indicated that they lack instructor or tutor support, 53(18.3%) indicated that financial factors affect the use of online learning and examination and 84(29.0%) indicated that lack of knowledge on Information Technology (IT) (Figure 3).

##  Facilitators of online learning and examination

Among the respondents, 110(37.9%) indicated that the availability of required technology could facilitate online learning and examination, 106(36.6%) indicated that adequate access to the Internet could facilitate online learning and examination, and 77(26.6%) indicated that the provision of data could facilitate online learning and examination (Figure 4).

**Discussion**

The objective of this study was to assess students' experiences with online learning, including its impact on productivity, satisfaction, and the challenges faced. Key findings revealed that most students felt more productive with online learning, found it easier to access learning materials, and were generally satisfied with their experience. However, challenges such as inadequate technology, poor internet access, and lack of technical skills were also highlighted as significant barriers.

The study’s findings revealed that the majority of the respondents (81.7%) indicated that using online learning would increase working outcomes. This is in line with a study by Taat & Francis, [8] where descriptive statistics revealed that the majority agreed that online learning would increase working outcomes (4.02 *(SD= 0*.873). These similarities may be explained by the assertion that online courses provide students with full control over their studies, they can work at their own pace [21]. Pupils, on average, work faster and absorb more information in online courses than they would otherwise. Although, increased work output is anticipated, online learning requires more self-regulation, intrinsic motivation and independence from the learner than the traditional classroom education[8].

Also, it was revealed that majority of respondents find it easy to use e-learning to retrieve learning material. This is in line with a study conducted by Lim & Yiong, [22] where a descriptive statistics revealed that majority agreed that it is easy to retrieve information using online learning (3.79 (*SD =*0.773)).E-learning (sometimes called web-based training) is anywhere, anytime instruction delivered over the internet or a corporate Intranet to browser-equipped learners. Contrary to traditional learning methods, e-learning allows students, employees in training and casual learners to participate in an organized learning experience regardless of their physical location. Consequently, the use of these mediums to retrieve information on makes it easier for the users.

Similarly, nearly 70.0% of the respondents believed that writing exams or learning online allow fulfill course. This is contrary to a study by Aboagye et al., [17] where a descriptive statistics revealed that majority indicated that online learning cannot help to achieve course objectives (4.22, *SD*= 1.23). Currently, learners want relevant, mobile, self-paced, and personalized content. This need is fulfilled with the online mode of learning; here, students can learn at their own comfort and requirement[23]. This is become very of the many advantages associated with online learning[24]. For instance, it has emerged that the online method of learning is best suited for everyone[25]. This digital revolution has led to remarkable changes in how the content is accessed, consumed, discussed, and shared.

Findings from the study revealed that majority of respondents agreed that online learning has helped them be more productive. This is consistent with a study by Taat & Francis, [8] where respondents agreed that taking an online course increased their productivity (M= 3.92,SD=0.74).In the absence of classroom-basedlearning, online learning offers huge productivity benefits. It provides a more flexible approach, so you can schedule when your training will take place. These days, businesses and managers have worked out that not everyone works in the same way when it comes to absorbing knowledge[26]. Seeking out new skills online can provide an approach that best suits your own individual needs.

Also, it was revealed that over 70.0%. of the respondents were satisfied with their learning in their course. This is in line with a study by Elfaki et al., [27] where the result indicated that learners were highly satisfied with E-learning since it enhanced their learning outcomes. Similarly, another study showed that the overall satisfaction among students was 41.3% compared to 74.3% for faculty. The highest areas of satisfaction for students were communication and flexibility, whereas 92.9% of faculty were satisfied with students’ enthusiasm for online learning. Technical problems led to reduced student satisfaction, while faculty were hampered by the higher workload and the required time to prepare the teaching and assessment materials[28].  Learning satisfaction represents learners’ feelings and attitudes toward the learning process or the perceived level of fulfillment attached to one’s desire to learn caused by the learning experiences[29]. In the online context, satisfaction is one of the most significant considerations influencing the continuity of online learning[30]. Previous research on online learning has shown that learners’ satisfaction is a critical indicator of learning achievements and the success of online learning system implementation[31]. To meet learners’ real learning needs and create an effective learning environment, a growing body of literature has been conducted to examine various determinants of learner’s online satisfaction[32,33].

When respondents were asked when online learning is compared to face-to-face, which impacts their exam score, nearly 70.0% not mentioned in the results section of the respondents indicated face-to-face as the one that impacts their exam score.. This is not in line with a study by Elfaki et al., [27] which found that students who participate in online/ E-learning achieve better grades than those who studied the traditional approach. This is because, as a new system, some challenges need to be addressed before it can start improving the students' needs. It is worthmentioning that online learning has been accepted widely and has various successes. However, online teaching/learning constitutes a serious challenge that both university teachers and students have to face, as it necessarily requires the adoption of different new teaching/learning strategies to attain effective academic outcomes, imposing a virtual learning world that involves the students’ part online access to lectures and information, and on the teacher’s side the adoption of a new teaching approach to delivering the curriculum content, new means of evaluation of student’s personal skills and learning experience[34].

It was revealed in the study that less than half of the respondents faced a challenge with inadequate internet access. This is contrary to the study by Aboagye et al., [17] where descriptive statistics revealed that the majority strongly agreed that lack of adequate internet access was a challenge they faced (M=4.49, SD =1.04). Students' participation in online learning activities is interrupted due to deficient internet connectivity in rural areas, and the slow internet connection frustrates the learners while trying to access the learning platforms and materials [35]. Students find it challenging to stay connected and learn online from home[36]. Therefore, immediate intervention strategies should be considered to help strengthen the communication and collaboration between schools and parents to facilitate children's learning better[37,38]. The study findings again revealed that 230(83.9%) indicated the heavy workload of online courses as the challenge they face during online learning. This is in line with a study by Mohamed et al., [25]where 98 (28.3%) indicated the heavy workload of the online courses as a challenge.

Furthermore, a lack of skills to learn online was a challenge faced by over 80.-% of the respondents. This is in line with a study by Al-maqbali, [39] where descriptive statistics revealed that a lack of learners' technological competency is a challenge (M= 3.03, SD= 1.17). A study by Muhammad and Kainat[40] found that internet access problems, a lack of interaction between teachers and students and a lack of technological facilities challenge the efficacy of online learning. According to a study conducted by Hazwani et al.[41], an institution’s infrastructure plays a significant role in ensuring that online learning operates successfully. Poor infrastructure will limit students’ ability to access the internet.

The study's strengths include a large sample size, comprehensive data collection, and alignment with previous research, providing reliable and generalizable insights into online learning experiences. It successfully identified key barriers such as inadequate internet access, technical issues, and lack of necessary skills. However, limitations include reliance on self-reported data, a cross-sectional design that limits causal inferences, and potential geographical biases that may affect the applicability of the findings to other contexts. Additionally, the study did not explore specific demographic subgroups or include qualitative data, which could have enriched the understanding of the challenges and benefits of online learning.

**Conclusion**

This study highlighted the advantages and challenges of online learning from students' perspectives. While the majority of respondents found online learning to be productive, satisfying, and conducive to improving work output, challenges such as lack of technology, inadequate internet access, heavy workload, and insufficient technical skills were also prevalent. Despite these barriers, students strongly preferred online learning due to its flexibility and ability to learn at their own pace. These findings align with previous studies on online learning’s benefits while underscoring the need to address these challenges to optimize effectiveness.

**Recommendations**

To enhance the online learning experience, institutions should focus on improving access to necessary technology and internet connectivity. Providing digital literacy training to students will also help them navigate online platforms confidently. Additionally, offering support services like tutoring and time management workshops can help alleviate the challenges of heavy workloads. Institutions should consider adopting more interactive and engaging online learning models. Finally, further research on the long-term impact of online learning can provide deeper insights into its effectiveness and guide future improvements.

**Consent for publication**

Not applicable

**Data Availability**

Data used to support this study are available from the corresponding author upon request.

**Disclaimer (Artificial intelligence)**

Authors at this moment declare that generative AI (ChatGPT) has been used during the editing of manuscripts.

**References**

1. Teo T, Ruangrit N, Khlaisang J, Thammetar T, Sunphakitjumnong K. EXPLORING E-LEARNING ACCEPTANCE AMONG UNIVERSITY STUDENTS IN THAILAND : A NATIONAL SURVEY. 2014;50:489–506.

2. Mohammed A. Assessing the Acceptance of Virtual Classes Among Arabic Language Student Teachers During and Beyond Covid-19. 2022;13:439–52.

3. Lin X. Journal of Educational Technology Development and Exchange ( JETDE ) Technology Acceptance of LMS — Do Previous Online Learning Experiences Matter ? Technology Acceptance of LMS — Do Previous Online Learning Experiences. 2021;14.

4. Nurshahidah S, Allam S, Hassan MS, Sultan R, Ramlan AF, Kamal RM. Online Distance Learning Readiness During Covid-19 Outbreak Among Undergraduate Students Online Distance Learning Readiness During Covid-19 Outbreak Among Undergraduate Students. 2020;1:642–57.

5. Hameed S, Badii A, Cullen AJ. Effective e-learning integration with traditional learning in a blended learning environment. Eur Mediterr Conf Inf Syst. Citeseer; 2008. p. 14.

6. Ramakrisnan P, Yahya YB, Hasrol MNH, Aziz AA. Blended learning: A suitable framework for e-learning in higher education. Procedia-Social Behav Sci. 2012;67:513–26.

7. Kruty K, Zdanevych L, Demianenko O, Pakhalchuk N, Perminova L, Garachkovska O. E-learning methods in students’ education. E-learning. 2019;3:5.

8. Taat MS, Francis A. Factors Influencing th e Students ’ Acceptance of E-Learning at Teacher Education Institute : An Exploratory Study in Malaysia. 2020;9.

9. Rungta RK, Jaiswal P, Tripathy BK. A deep learning based approach to measure confidence for virtual interviews. Int Conf Comput Intell Pattern Recognit. Springer; 2022. p. 278–91.

10. Zhou L, Wu S, Zhou M, Li F. 'School’s out, but class’ on’, the largest online education in the world today: Taking China’s practical exploration during The COVID-19 epidemic prevention and control as an example. Best evid chin edu. 2020;4:501–19.

11. Zhou S, Zhou Y, Zhu H. Predicting Chinese University Students ’ E-Learning Acceptance and Self-Regulation in Online English Courses : Evidence From Emergency Remote Teaching ( ERT ) During COVID-19. 2021;

12. Kihoza PD. A Framework for Onlines Resources and E-Learning Implementation (OREI) in Tanzania Secondary Schools. The Nelson Mandela African Institution of Science and Technology; 2016.

13. Mtebe JS, Raphael C. Key factors in learners ’ satisfaction with the e-learning system at the University of Dar es Salaam , Tanzania. 2021;34:107–22.

14. Yamat H. The Acceptance of E-Learning Among ESL Primary School Students During Covid-19. 2021;8–18.

15. Kim E, Kim JJ. Understanding Student Acceptance of Online Learning Systems in Higher Education : Application of Social Psychology Theories with Consideration of User Innovativeness. 2021;

16. KAREBA P. Challenges related to e-learning in least developed countries: A case study of university of Rwanda. University of Rwanda; 2019.

17. Aboagye E, Yawson JA, Appiah KN. COVID-19 and E-Learning : the Challenges of Students in Tertiary Institutions. 2020;2:1–8.

18. Brewer K-J. Exploring the impact of migrating online of higher education in Ghana: The case of Ashesi University. 2021.

19. Jowsey T, Foster G, Cooper-ioelu P, Jacobs S. Nurse Education in Practice Blended learning via distance in pre-registration nursing education : A scoping review. Nurse Educ Pract. 2020;44:102775.

20. Yamane T. Elementary sampling theory. 1967;

21. Zongozzi JN. Accessible quality higher education for students with disabilities in a South African open distance and e-learning institution: Challenges. Int J Disabil Dev Educ. 2022;69:1645–57.

22. Lim B, Yiong C. Acceptance of e-learning among distance learners : A Malaysian perspective. 2008;541–51.

23. Hakim A, Nurhikmah NH, Halisa N, Febriati F, Aras L, Lutfi LB. The Effect of Online Learning on Student Learning Outcomes in Indonesian Subjects. J Innov Educ Cult Res. 2023;4:133–40.

24. Martin F, Wu T, Wan L, Xie K. A Meta-Analysis on the Community of Inquiry Presences and Learning Outcomes in Online and Blended Learning Environments. Online Learn. 2022;26:325–59.

25. Mohamed M, Id Z, Hamed MS, Bolbol SA. The experiences , challenges , and acceptance of e-learning as a tool for teaching during the COVID-19 pandemic among university medical staff. 2021;1–12.

26. Yu Z. A meta-analysis and bibliographic review of the effect of nine factors on online learning outcomes across the world. Educ Inf Technol. 2022;27:2457–82.

27. Elfaki NK, Abdulraheem I, Abdulrahim R. Impact of E-Learning vs Traditional Learning on Student ’ s Performance and Attitude. 2019;76–82.

28. Elshami W, Taha MH, Abuzaid M, Saravanan C, Al Kawas S, Abdalla ME. Satisfaction with online learning in the new normal: perspective of students and faculty at medical and health sciences colleges. Med Educ Online. 2021;26:1920090.

29. Topala I, Tomozii S. Learning satisfaction: Validity and reliability testing for students’ learning satisfaction questionnaire (SLSQ). Procedia-Social Behav Sci. 2014;128:380–6.

30. Parahoo SK, Santally MI, Rajabalee Y, Harvey HL. Designing a predictive model of student satisfaction in online learning. J Mark High Educ. 2016;26:1–19.

31. Ke F, Kwak D. Online learning across ethnicity and age: A study on learning interaction participation, perception, and learning satisfaction. Comput Educ. 2013;61:43–51.

32. Hew KF, Hu X, Qiao C, Tang Y. What predicts student satisfaction with MOOCs: A gradient boosting trees supervised machine learning and sentiment analysis approach. Comput Educ. 2020;145:103724.

33. Jiang H, Islam AYMA, Gu X, Spector JM. Online learning satisfaction in higher education during the COVID-19 pandemic: A regional comparison between Eastern and Western Chinese universities. Educ Inf Technol. 2021;1–23.

34. Hamdan K, Amorri A. The impact of online learning strategies on students’ academic performance. IntechOpen London, UK; 2022.

35. Muthuprasad T, Aiswarya S, Aditya KS, Jha GK. Students’ perception and preference for online education in India during COVID-19 pandemic. Soc Sci Humanit open. 2021;3:100101.

36. Rahiem M. Technological barriers and challenges in the use of ICT during the COVID-19 emergency remote learning. 2020;

37. Development O for EC and. Strengthening online learning when schools are closed: The role of families and teachers in supporting students during the COVID-19 crisis. OECD Publishing; 2020.

38. Rasmitadila R, Aliyyah RR, Rachmadtullah R, Samsudin A, Syaodih E, Nurtanto M, et al. The perceptions of primary school teachers of online learning during the COVID-19 pandemic period. J Ethn Cult Stud. 2020;7:90–109.

39. Al-maqbali AH. The impact of online assessment challenges on assessment principles during COVID-19 in Oman. 2022;19:73–92.

40. Adnan M, Anwar K. Online Learning amid the COVID-19 Pandemic: Students’ Perspectives. Online Submiss. 2020;2:45–51.

41. Najib HM, Bakar NRA, Othman N. E-pembelajaran dalam kalangan pelajar di sebuah institusi pengajian tinggi Selangor: E-learning among students of higher education institutions in Selangor. Attarbawiy Malaysian Online J Educ. 2017;1:74–82.

*Figure 1: Devices used for online learning among respondents (n=290)*

*Figure 2: Overall online learning and examination acceptance among respondents (n=290)*

*Figure 3: Factors that affect online learning and examination (n=290)*

*Figure 4: Facilitators of online learning and examination (n=290)*

|  |
| --- |
| Table 1: Socio-demographic characteristics |
| Variable | Category | Frequency  | Percentage |
| Age |  |  |  |
|  | Less than 25 years | 193 | 66.6 |
|  | 25 years or above | 65 | 22.4 |
|  | Minimum Age | 18 years |  |
|  | Maximum Age | 32 years |  |
|  | Mean Age | 23.8 years |  |
|  | Standard Deviation | 2.7 years |  |
| Gender |  |  |  |
|  | Female | 162 | 55.9 |
|  | Male | 128 | 44.1 |
| Year of Study |  |  |  |
|  | First Year | 29 | 10.0 |
|  | Second Year | 136 | 46.9 |
|  | Third Year | 125 | 43.1 |
| Religion |  |  |  |
|  | Muslim | 186 | 64.1 |
|  | Christian | 104 | 35.9 |
| Mother's Education Level |  |  |
|  | Basic Education | 113 | 39.0 |
|  | Senior High School | 80 | 27.6 |
|  | Tertiary Education | 79 | 27.2 |
|  | Never Attended School | 18 | 6.2 |
| Father's Education Level |  |  |
|  | Basic Education | 89 | 30.7 |
|  | Senior High School | 80 | 27.6 |
|  | Tertiary Education | 98 | 33.8 |
|  | No form | 22 | 7.6 |
| Monthly Expenditure |  |  |
|  | Less than GHS 1,000.00 | 174 | 60.0 |
|  | GHS 1,000.00 to GHS 2,000.00 | 84 | 29.0 |
|  | Over GHS 2,000.00 | 32 | 11.0 |
| Father’s Employment Status |  |  |
|  | Employed | 219 | 75.5 |
|  | Unemployed | 71 | 24.5 |
| Mother’s Employment Status |  |  |
|  | Employed | 161 | 55.5 |
|  | Unemployed | 129 | 44.5 |

|  |
| --- |
| Table 2: Respondents' Views on Online Learning and Examination |
| Variable | Category | Frequency  | Percentage |
| Confidence in using the internet |  |  |
|  | Yes | 263 | 90.7 |
|  | No | 27 | 9.3 |
| Confidence in using applications/software for online |  |
|  | Yes | 239 | 82.4 |
|  | No | 51 | 17.6 |
| Online learning increases work output |  |  |
|  | Yes | 237 | 81.7 |
|  | No | 53 | 18.30 |
| Ease of using eLearning or retrieving learning materials |  |
|  | Yes | 214 | 73.8 |
|  | No | 76 | 26.2 |
| Online learning as a good idea |  |  |
|  | Yes | 232 | 80.0 |
|  | No | 58 | 20.0 |
| E-learning provides easy-to-understand information |  |
|  | Yes | 231 | 79.7 |
|  | No | 59 | 20.3 |
| Writing exams online allows course fulfillment |  |
|  | Yes | 225 | 75.2 |
|  | No | 65 | 24.8 |

|  |
| --- |
| Table 3: Impacts of online learning and examination on students’ performance |
| Category | Variable | Frequency | Percentage |
| Did online learning help you be more productive |  |
|  | Agree | 239 | 82.4 |
|  | Disagree | 51 | 17.6 |
| How often do you face technical problems |  |  |
|  | Never  | 15 | 5.2 |
|  | Sometimes | 180 | 62.1 |
|  | Very often | 95 | 32.8 |
| Satisfied with online & examination learning |  |  |
|  | Neutral | 55 | 19 |
|  | Not satisfied | 15 | 5.2 |
|  | Satisfied | 170 | 58.6 |
|  | Very satisfied | 50 | 17.2 |

|  |
| --- |
| Table 4: Facilitators & Barriers associated with online learning among students (n=290) |
| Category | Variable | Frequency | Percentage |
| The required technology is unavailable. |  |  |
|  | No | 111 | 38.3 |
|  | Yes | 179 | 61.7 |
| Some phones and laptops are not compatible. |  |
|  | No | 102 | 35.2 |
|  | Yes | 188 | 64.8 |
| Lack of adequate internet access |  |  |
|  | No | 82 | 28.3 |
|  | Yes | 208 | 71.7 |
| Heavy workload of the online courses  |  |  |
|  | No | 79 | 27.2 |
|  | Yes | 211 | 72.8 |
| Lack of enough skills to learn online |  |  |
|  | No | 91 | 31.4 |
|  | Yes | 199 | 68.6 |
| Are you able to buy smartphone/laptop |  |  |
|  | No | 122 | 42.1 |
|  | Yes | 168 | 57.9 |
| Are you able to buy data always |  |  |
|  | No | 152 | 52.4 |
|  | Yes | 138 | 47.6 |