

Revealing the Impact: Online Teaching Effectiveness and Student Outcomes during The COVID-19 Pandemic at The University of Cape Coast

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Abstract

This study uses the Technology Acceptance Model (TAM) as a theoretical framework to investigate the significant effects of online instruction during the COVID-19 epidemic at the University of Cape Coast. The main objective is to look into how the effectiveness of online learning environments affects crucial student outcomes like behaviour, engagement, technology assistance, and overall performance. The study utilised a quantitative cross-sectional design, and data collection methods included simple random sampling procedures. The study's primary focus was the unique environment of Ghana's University of Cape Coast. The Technology Acceptance Model led the inquiry, and SPSS was used for statistical analysis. The study's findings show that the efficiency of online learning environments has a significant and favourable impact on students' performance, behaviour, and technological support. This highlights the critical role that effective online instruction plays in influencing favourable student outcomes and laying the groundwork for well-informed decisions about instructional strategies. The study's application highlights the strategic value of funding efficient virtual education systems. Educational institutions can use these insights to enhance online instruction, make the most of technology support services, and fine-tune curriculum design to improve student outcomes.

Keywords: Online Teaching; Students Performance; Covid-19; University of Cape Coast; Ghana.

1. Introduction

Severe acute respiratory syndrome coronavirus 2 caused the 2019–20 pandemic (WHO, 2020). The virus was discovered in Wuhan, China, in December 2019, prompting a global pandemic declaration on January 30, 2020. The WHO predicts 2020 to be the most populated year ever. Over 114,000 people in 210 countries and territories have perished from COVID-19. Reinfection is still possible despite 438,000 recoveries (Ni et al., 2020). All COVID-19 symptoms appear after diagnosis. After five days, infection symptoms appear. The virus causes a dry cough, fever, and illness. It is spreading fast. Other symptoms include body-wide fatigue and weakness. The Coronavirus has killed millions and still threatens many more. However, the infection remains. Many doctors feel that only immune system enhancement can cure this terrible disease (Baker et al., 2020).

Sintema (2020) recommends frequent hand washing, nasal mask use, social isolation, and avoiding public meetings as pandemic physical treatments. Absolute lockdown and stay-at-home restrictions were implemented to prevent these deadly diseases. At the end of February, several actions were taken to stop the spread of COVID-19. All Chinese schools were closed to prevent the virus from spreading. Foreign schools closed simultaneously (Huck et al., 2020). Szabo et al. (2021) claim that learning changed around mid-March 2020.

COVID-19 safety concerns increased as knowledge spread and cases rose. As a novel virus, COVID-19 was unknown to scientists and doctors. Thus, they could not prevent or treat it. Teachers, pupils, and staff were relocated online for safety. Due to these conditions, universities must teach online using social media and Microsoft Zoom (Abbasi, 2020). Schools and instructors should employ remote learning programmes and online learning platforms to reach students and

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avoid educational interruptions, according to UNESCO (UNESCO, 2020). According to COVID-19 recommendations, higher education institutions worldwide have started employing online platforms for emergency remote teaching and learning (Bozkurt & Sharma, 2020). Higher education institutions can provide assessment tools and pre-course concepts to increase student engagement in online courses (Joosten & Cusatis, 2020). Professors can also assess students' readiness, teach them online learning skills, and manage their expectations (Joosten & Cusatis, 2020). Lecturers can do this through instructional activities.

Ghana had its first COVID-19 case on March 12, 2020 (Ghana Health Service, 2020). The Ghana Health Service's Noguchi Memorial Institute for Medical Research detected COVID-19 in two recent Turkish and Norwegian returnees (Ghana Health Service, 2020). The next day saw two additional COVID-19 cases, four and six. Four more COVID-19 cases were confirmed on March 15, bringing the total to 10. On April 23, 2020, the Ghanaian government reported 1154 confirmed cases, 99 of which were recovered, and 9 deaths. To stop the spread of COVID-19, Ghana's president banned all public meetings, including conferences, seminars, funerals, festivals, political rallies, religious activities, and others.

State and private elementary, secondary, and post-secondary schools closed (Nyabor, 2020). The University of Ghana, University of Professional Studies Accra, University of Education, Ashesi University, and Kwame Nkrumah University of Science and Technology use e-learning platforms to engage students (Henaku, 2020). The rapid growth of technology has created complex issues that affect our daily lives. High-speed internet connections make many mobile apps and computerised platforms available, making technology valuable in many industries, including education (Ng et al., 2020). A developing corporation uses digital technologies and data to improve student learning (West, 2012). Lecturers must design and submit their models to an e-learning portal to ensure a successful instructional dissertation.

Academics, students, and parents are concerned about this fast shift from face-to-face to online education due to internet availability and electronic learning tools. The study seeks to investigate how the COVID-19 pandemic affects higher education's e-government services.

Mishra et al. (2020) examined how Mizoram University can use virtual classes and other online tools to transform formal education into online education during the COVID-19 pandemic. Muhammad (2021) examines how the COVID-19 pandemic has affected higher education, focusing on African colleges. Ghana was the case study for Agormedah et al.'s (2020) COVID-19 pandemic study of higher education online learning. Their research targets Cape Coast University students. They evaluate online learning tools. There are over fifty universities in Ghana, but we will focus on Cape Coast University in the central region. The scholars failed to study the effectiveness of the university platforms and lecturers during online education and their effects on student interaction, learning environment, technological support, and student behaviour during Ghanaian university lockdowns during the COVID-19 pandemic. There is a knowledge gap, so students from Ghana's oldest and largest university, the University of Ghana, will study these disciplines.

The main objective of the research is to examine the effects of online teaching during the COVID-19 pandemic lockdown at the University of Cape Coast in Ghana. This study is highly valuable for stakeholders and the University of Cape Coast, as it provides insights into the effects of online instruction during the COVID-19 lockdown. The acquired insights will guide strategic decision-making, improve the standard of distance education, and bolster the overall resilience and adaptability of the university in response to unexpected problems.

2. Literature Review

2.1. Theoretical background

This study is based on the Technology Acceptance Model (TAM). The TAM, introduced by Davis (1986), is a widely acknowledged conceptual framework for comprehending individuals' acceptance and utilisation of technology. According to the TAM, a person's perception of how simple and advantageous a technology is to use affects their attitude toward adopting it. This attitude then affects their actual behaviour when using the technology. The methodology has been widely used in many settings to evaluate the adoption and efficacy of technological advancements (Legris et al., 2003; Holden & Karsh, 2010), making it relevant for assessing the acceptance of online teaching platforms during the COVID-19 pandemic.

Within the study on online teaching at the University of Cape Coast in Ghana, the TAM might offer vital insights into the perceptions of learners and lecturers on the usability and utility of online teaching tools and platforms.

Comprehending this is essential for evaluating remote education tactics' overall effectiveness and influence throughout the epidemic.

2.2. Online Educational Platform Utilised and Assessing the Effectiveness of the Chosen Mode or Medium for Teaching

The COVID-19 pandemic pushed many schools to switch to online learning, surprising them. Many schools quickly switch to online education to ensure continuity of teaching and learning (Busuttill & Camilleri, 2020). Online education uses the following media: Google Classroom, Zoom, Cisco WebEx, Google Meet, Skype, webinars, YouTube videos, YouTube/Facebook streaming, WhatsApp/Telegram, telephonic conversations, email, and television. Moodle, Microsoft Teams, Zoom, Google Classroom, and YouTube channels were employed in online education because of the COVID-19 pandemic, according to Elfirdoussi et al. (2020). Colleges also use various strategies and media to guarantee that their educational programs meet their long-term goals. Several institutions have adopted Microsoft Teams, Google Classroom, Canvas, and Blackboard to help academics create and run student programs. In order to minimise the spread of the virus, China authorised live broadcasting on Facebook, YouTube, Zoom, and personal e-learning sites when education was moved online (Lim, 2020). Smartphones, desktop/laptop computers, tablets/iPads, and web-enabled computers like Facebook/Twitter, YouTube/Skype, and Zoom are needed for online education (Agormedah et al., 2020). Video conferencing, emailing presentations to students by teaching staff, internet access to pre-recorded lectures, forums and chat rooms for textual conversation, and online recordings of audio-only courses supplanted face-to-face instruction.

2.3. An assessment of the effectiveness of lecturers on the medium used by the university during online delivery, as well as the best online practices to be used by universities

Most nations said schooling would move online for the first time. Online education caught most institutions and teachers off guard. Most countries analyse professors' online education use to improve performance. Tobin et al. (2009) suggest that professors must keep pace while speaking and typing. Professors type and speak answers to students' written questions. Lecturers may type questions and have students type or speak answers (Johnson et al., 2000). Although enjoyable, online educators must help students reach learning objectives. Again, evaluate any learning tools that simplify learning and goal-setting (Kaplan & Haenlein, 2016). Tutors must read, understand the course framework, and organise their classes to teach effectively. Without this, lecturers will lose interest and do something else, harming course aims and ambitions (Stronge, 2018). When lecturers answer queries and clarify confusion, class learning is measured. Therefore, educators must always be present to answer student questions. For clarification, many students ask questions during lectures. Students need detailed input from tutors to identify each question. Again, educators should motivate students by rewarding specific responses (Grossman et al., 2009). Grover et al. (2011) define communication as receiving comprehension. In this case, teachers must use the primary language. Avoid using jargon when speaking. Avoid unclear grammar. Clear communication is required. Class delivery microphones must be in good condition to sound better. Learning usually occurs in secure settings.

Students should place their learning equipment in a quiet, conducive space to reduce noise. Secure internet access is essential for online education. Encourage students to reserve lesson seats (Manca & Ranieri, 2013). Learning's ultimate purpose is student growth. Teachers cannot ignore student improvement by hiding behind their computers. Teachers must evaluate students' progress. This will enable them to change their teaching method (Pérez-Vidal, 2022). Teaching and learning co-occur when students grasp course objectives or goals to identify what they must do after the course or issue. Not communicating the course goal will hinder their study (Sadler, 2016). According to Brookfield (2015), teachers are constantly in charge, so students must feel their presence. Random class name questions work. This was the first time most countries announced online schooling. Most colleges were unprepared because most academics started online schooling. Online education is here to stay in most countries; thus, lecturers must be evaluated for using technology to improve teaching (Crawford et al., 2020).

2.4. Students' digital competencies and skills required for online education

Unexpectedly, online education has emerged. Many students need online schooling. Students who want to benefit from online education must be skilled. According to Shamir-Inbal and Blau (2016), students learn how to process, save, and retrieve data on laptops, smartphones, desktops, iPads, and tablets. Regular use of these devices will make online studying easy for students. Online students should have these core competencies. These devices gave students an edge

(De Metz & Bezuidenhout, 2018). Students must also be able to collaborate using virtual learning environments, online tools, and apps via a linked network (Shopova, 2014). Ferrari and Punie (2013) say this is where students create and apply knowledge in a networked context. These abilities and competencies will allow them to use educational technology efficiently and proficiently. They can also download lesson materials, present them online, submit assignments, and take online quizzes and exams (Anderson et al., 2014). These help students preserve network data and enable virtual resiliency. Students can manage their online identity and appearance via virtual learning environments (VLEs) and social networks. Students produce, integrate, change, and distribute digital content.

2.5. The benefits of online education

Despite its drawbacks, online education has many advantages. Instead of predetermined hours and days, most online education is done in real time, according to Throne (2000). Asynchronous courses do not require students or instructors to be present. Participation and attendance criteria may specify the number of days. Online learning lets students and teachers work independently, enabling work-life balance (Berry & Major, 2020). One of our most valuable assets is time. Everyone maximises their daily time, as it is equal. They are gone permanently. Busy people are often seeking ways to save time. Internet use instead of traffic can save students and instructors time and money (Brabazon, 2016). Online learning can save students and instructors money, according to Wolla (2017). For online students who wish to save money, some courses may be cheaper than in-person courses.

Online education can save students and professors money on transportation, parking, housing, meals, and more (Schejbal, 2012). Online learning allows virtual classrooms using an Internet connection, PC, or mobile device, according to Ekici (2017). Traditional schoolchildren have to adjust their routines to meet the physical school programme. Online education requires and benefits from a viewpoint change because students can work around their schedules. The recent COVID-19 pandemic illustrates this. Several schools closed due to the pandemic. Since they transferred their studies online, they finished their education without the coronavirus (Hodges et al., 2020). Online learning can aid physically disabled students since they can study in a virtual environment with limited mobility (Basilaia & Kvavadze, 2020).

2.6. The impacts of covid-19 on online education

COVID-19 affects students and universities. Effects can be good or bad. COVID-19 has huge effects on online education.

2.7. Positive Impact of COVID-19 Higher Education on Students

Ali and Dmour (2021) contend that online education has changed students' behaviour. Students improved their hardware, software, and website skills. Many students quickly master most online education tools and technologies. When introduced, Zoom, YouTube Live Stream, WhatsApp, and others were new to most students (Langford & Damşa, 2020). Because of this, they could immediately use their new skills. Knowing how to utilize these devices made it easier for pupils to ask for academic help (Barkley & Major, 2020). COVID-19 has also altered student-professor contact (Molea & Năstasă, 2020). Students who contact or call lecturers with topic-specific queries should receive straightforward and appropriate guidance. Instructors monitor course progress and performance to address student complaints. Instructors adjust communication to meet students' needs. Al-Ataby (2020) advanced that COVID-19 has boosted student technology use. The teacher assists pupils with technology issues like website access and communication. Teachers are polite, helpful, and direct when pupils need technology aid. Pre-planned exercises can help teachers build online learning. Teachers use due dates to keep students on target, alert them, and resolve technology concerns. The instructor encourages student collaboration to attain goals (Oyazun et al., 2018).

2.8. Negative Impact of covid-19 higher education on students

Matijević and Šćukanec (2021) concluded that online education burdens students. Assignments replace quizzes and exams. Online tests allow pupils to replicate or hire someone to do their job. Most professors give students additional daily or weekly assignments instead of exams to keep them engaged without making them bored or lazy. The COVID-19 pandemic impacted students' mental and emotional health, causing boredom, anxiety, impatience, and rage. Brown et al. (2020) suggest that online education may increase student unemployment. Most firms dislike online education, and many nations do not offer it. Since kids can copy from the internet and do not have to engage in class or take

examinations, they think online education is not the best. Thus, students are discouraged from academically participating. Employers like online students. Sintema (2020) claims that online education lowers student achievement. In year-end and internal exam courses, fewer instructional hours and a lack of teacher-student communication during learning and comprehension issues may lower students' grades.

2.9. Impact of covid-19 on higher education institutions

COVID-19 disrupted long-term strategies and daily operations, forcing all institutions to close (Darwish et al., 2021). Some schools and universities in affected areas may cancel classes for the semester or longer. The COVID-19 pandemic has closed every industry, including education. The participants had several problems when the institutions closed due to a lack of teaching (Almendingen et al., 2021). This caused many educational institutions to postpone events, including entry and competitive tests. Higher education students suffered when multiple entrance exams were cancelled. Due to COVID-19, most institutions lost students and had to change their academic programmes. When schools could not accept new students, it affected their student bodies and raised tuition. Since the number of employees remained unchanged, they were entitled to full wages. Without access during the lockdown, the same number of employees with the same salaries would have spent the same amount. This hurts most universities.

3. Research Methods

3.1. Research design

This investigation employed a quantitative research design. The researcher opted for this strategy to address inquiries about the mechanisms, rationales, and temporal aspects. For this study, participants were only solicited for their opinions via closed-ended questionnaires instead of interviews.

3.2. Population of the study

The effectiveness of any research depends on the population of the study. Research cannot be conducted without a population. A population is defined as a group that is chosen to be studied (Bougie & Sekaran, 2016). The study's population comprises students from the University of Cape Coast archaeology department. The students are diploma, first-degree, master's, and PhD students. The total number of students in the Department of Archaeology was 347.

3.3. Sampling and sampling techniques

Sampling collects representative data from a smaller group or subset of the general population. This subset is the sample (Cohen et al., 2018). Sampling is justified since individuals cannot survey the entire population due to funds, time, and other constraints. 2016 (Saunders, Lewis, Thornhill). Probability and non-probability sampling methods exist. Probability sampling gives each participant an equal chance of being included in the research, whereas non-probability sampling does not. This study used a simple random sample. A random sample is a set of units from a population with a known and non-zero probability, ensuring each unit has an equal chance of selection. Selection is well-defined, measurable, and reproducible.

3.4. Sample size

Yamane's (1967: 886) formulas were used to determine the sample size for the investigation. This formula was chosen because the study only works with a limited sample size. Below are the formulas.

$$n = N / (1 + N(e)^2)$$

Where

n : is the sample size

N : is the population under study

e : is the confident interval or margin of error. The margin of error is estimated to be 5% at 95 confident intervals.

$$N = \frac{347}{1 + 347(0.05)^2} = \frac{347}{1.8675} = 186$$

In all a simple size of 186 is needed for the study.

3.5. Research instrument

A research instrument is a technique a researcher employs to gather data for their study. Typically, it is employed for gathering original data (Yin, 2018). The research instruments encompass surveys, observation, interviews, and focus group discussions. The research instruments employed in this study were questionnaires. The questionnaire on student behaviour, student interaction, and technological support was developed from the study by Lehman and Conceição (2013). The questionnaire on student performance was extracted from Fraser et al. (2010). A Likert scale of five-point rating was given to the students as their rating of the questionnaire was administered.

3.6. Data analysis

The data collected was analyzed using SPSS version 23. All the questionnaires were coded into SPSS. A reliability test was conducted to determine the intentional consistency of the model. The simple ordinary least squares regression method was used to estimate the impact of behaviour, student interaction, and technological support on their performance.

4. Results and Discussion

4.1. Results

4.1.1. Reliability test

The reliability test results are displayed in Table 1. All the instruments have a Cronbach's alpha value greater than 0.70. Consequently, the research instrument employed in the study is deemed reliable.

Table 1. Reliability tests result.

Scale	Number of items	N	Cronbach's Alpha
The impact on student behavior	10	186	.832
The impact on student interaction	12	186	.949
The impact on technological support	10	186	.927
The impact on student performance	5	186	.860

4.1.2. Demographic results of respondents

Table 2 illustrates the demographic information of the respondents. The total number of respondents is 186. 101 are males, 54.3%, and 85 are females, 45.7%. 78 of the respondents are 30 and below, representing 47.3%. 16 are between the ages of 41 and 50, representing 8.6%, and four are between the ages of 51 and 60, representing 2.2%. With the respondents' education level, 43 are diploma holders, representing 23.1%; 62 are degree holders, representing 33.3%; 56 are masters' holders, representing 30.1%; and 25 are PhD holders, representing 13.4%. In addition, 102 respondents are single, accounting for 54.8%; 80 are married, accounting for 43%; and four are divorced, accounting for 2.2%.

The results show that more males responded to the questionnaires than females. Most of the respondents are first-degree, and more respondents have not married than those who are married.

4.1.3. Hypothesis testing

A simple linear regression was performed to test hypothesis 1 (H1), which determined whether the effectiveness of the platforms used in online education influences student behaviour. H1 was confirmed, and the results are presented in Table 3. The results revealed a significant and positive influence on the effectiveness of the platforms used for online education on students' behaviour ($\beta = .741$, $SE = .051$, $t = 14.613$, $P < .05$) with a large effect size of .762. Thus, H1 was accepted.

Table 2. Demography of the respondents

		N	Marginal Percentage	
1.	Gender	Males	101	54.3%
		Female	85	45.7%
2.	Age	30years and below	78	41.9%
		31-40years	88	47.3%
		41-50years	16	8.6%
		51-60years	4	2.2%
		Diploma	43	23.1%
3.	Educational Level	Degree	62	33.3%
		Masters	56	30.1%
		PhD	25	13.4%
4.	Marital status	Single	102	54.8%
		Married	80	43.0%
		Divorced	4	2.2%
Valid		186	100.0%	
Missing		0		
Total		186		

Table 3. The impact of the effectiveness of the platforms used for online education on student behaviour.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.183	.361		3.278	.001
1 Effectiveness of the platforms	.741	.051	.762	14.613	.000

a. Dependent Variable: Student behavior

Hypothesis 2 (H2) examined whether the effectiveness of the platforms used for online education influences student interaction. This hypothesis was validated. The results of H2 are presented in Table 4. The results showed a significant and positive influence of the online education platforms' effectiveness on student interaction ($\beta = .690$, $SE = .054$, $t = 12.887$, $P < .05$) with a large effect size of .762. Hence, H3 was accepted

Table 4. The impact of the platforms used for online education and the effectiveness of the platforms on student interaction.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.521	.381		3.992	.000
1 Effectiveness of the platforms	.690	.055	.673	12.887	.000

a. Dependent Variable: Student interaction

Hypothesis three (H3) ascertained whether the effectiveness of the platforms used for online education influences student technological support. H3 was supported. The results are presented in Table 5. The results revealed a significant and positive influence of the effectiveness of the platforms used for online education on student technological support ($\beta = .649$, $SE = .055$, $t = 11.800$, $P < .05$) with a large effect size of .673. Therefore, H3 was accepted.

Hypothesis 4 (H4) analysed whether the effectiveness of the platforms used for online education influences student performance. H4 confirmed. Results are shown in Table 6. The results demonstrated a significant and positive influence of the online education platforms' effectiveness on student performance ($\beta = .281$, $SE = .016$, $t = 17.563$, $P < .05$) with a large effect size of .781. Consequently, H4 was accepted

Table 5. The impact of the effectiveness of the platforms used for online education on student technological support.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.823	.391		4.660	.000
1 Effectiveness of the platforms	.649	.055	.673	11.800	.000

a. Dependent Variable: Technological support

Table 6. The impact of the platforms used for online education and the effectiveness of the platforms on student performance.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.626	1.159		5.715	.000
1 Effectiveness of the platforms	.281	.016	.781	17.563	.000

a. Dependent Variable: Student performance

4.2. Discussion

The main objective of the research was to examine the effects of online teaching during the COVID-19 pandemic lockdown at the University of Cape Coast in Ghana. Hypothesis 1 posits that the effectiveness of the platforms used for online education influences student behaviour. H1 was accepted. The results demonstrated a significant and positive influence on student behaviour and the effectiveness of the platforms used in online education. The confirmation of Hypothesis 1 indicates a noticeable influence of the usefulness of online education platforms on behaviour among learners. The subsequent findings demonstrate a statistically significant and positive association, confirming that the effectiveness and practicality of the employed online education platforms substantially impact students' behaviour in the learning environment. The study's results confirm that when online education platforms are successful, they positively impact shaping and influencing student behaviour (Al-Marroof et al., 2021). The results of this study confirm the outcome of Singh et al. (2021), who discovered that interactivity, cost-effectiveness, and the fundamental characteristics of the TAM, namely perceived utility, contribute to a positive attitude towards the usage of digital content platforms (DCP) and the intention to adopt them shortly among students at Indian higher education institutions (HEI). Their research aimed to offer potential explanations for the significant connections between the constructs and explored the utilisation of information, which could be used to improve the adoption of DCP among students in both urban and rural India.

Hypothesis 2 assumes that the effectiveness of the platforms used for online education influences student interaction. The results show a positive and statistically significant association, confirming that the effectiveness and features of online learning platforms substantially influence how students engage with each other in virtual lecture halls. The study's findings corroborate that effective online education platforms positively promote heightened student engagement (Chakraborty & Muyia Nafukho, 2014). H2 was, therefore, accepted. Wut et al. (2022) discovered that information quality, social influence, and facilitating conditions impact students' inclination to interact with one another. The results of this study align with Wut et al.'s (2022) findings.

Hypothesis 3 suggests that the effectiveness of the platforms used for online education influences student technological support. H3 was validated. The results indicate a strong and positive association, suggesting that effective online education platforms have a notable impact on increasing and positively affecting the technological support provided to students. The study's results affirm the notion that efficient online education platforms enhance technological support for students, indicating a direct correlation between the platform's quality (Abuhassna et al., 2020) and the level of assistance students receive in managing the technological aspects of their online learning experience (Coman et al., 2020). The findings of Moreno et al. (2017) suggest that students' evaluations of the usefulness and simplicity of the use of e-learning systems have a beneficial impact on their intention to effectively use these systems. Furthermore, how students feel about the Learning Management System (LMS) significantly impacts these effects. The results of this study align with Moreno et al.'s (2017) findings.

Finally, H4 predicts that the effectiveness of the platforms used for online education influences student performance. H4 was confirmed. The findings demonstrate a statistically significant and positive association, indicating that successful online education platforms significantly improve student performance. Consequently, investing in and employing efficient online education platforms can favour student performance, leading to improvement. The findings of this study are congruent with the study conducted by Edeh et al. (2020), which revealed a statistically significant disparity in academic achievements between the experimental and control groups. The experimental group performed better than the control group following the treatment. The average score of the experimental group (EG) was significantly greater than that of the control group (CG), indicating that the EG did better following the therapy. Additionally, the study revealed that the utilisation of e-learning platforms had a statistically significant impact on the learning interests of the experimental group following the intervention.

5. Conclusion

This study aimed to examine the impact of online instruction at the University of Cape Coast in Ghana during the COVID-19 pandemic lockdown, employing the Technology Acceptance Model as its theoretical framework. The study's findings have presented convincing evidence that the efficacy of online education platforms has a substantial and favourable impact on student involvement and performance. The findings emphasise the need for allocating resources towards enhancing and maximising the efficiency of online education platforms. Significantly, the demonstrated beneficial impact extends to various aspects, such as student conduct, engagement, technological assistance, and overall scholastic achievement. These results highlight technology's crucial influence on the educational experience, especially in difficult situations like the pandemic lockdown. The findings of this study can provide helpful information for legislators, administrators, and educators as educational institutions adapt to the changing landscape of online teaching. The proven influence of efficient online education platforms on student involvement and achievement highlights the necessity for continuous endeavours to improve and customise digital learning environments to maximise educational outcomes for students in comparable situations.

a. Theoretical Implications

Using the TAM as the theoretical basis for this investigation has resulted in noteworthy theoretical ramifications. The results confirm the significance of the TAM in comprehending and forecasting the adoption and influence of online teaching platforms during the COVID-19 pandemic lockdown at the University of Cape Coast in Ghana. The study offers empirical evidence to support the applicability of TAM in the educational field, particularly in the context of online teaching platforms. The observed acceptance and positive impact are due to the fundamental concepts of TAM, highlighting the model's strength in elucidating user behaviour and outcomes in an academic context. The findings broaden our comprehension of TAM constructs beyond the conventional emphasis on technology adoption. The study expands the application of TAM by illustrating how platform effectiveness impacts student behaviour, interaction, technological assistance, and performance. This highlights the usefulness of TAM in capturing various aspects of the educational experience. This study adds to the ongoing discussion in educational technology research by emphasising the crucial importance of platform effectiveness. Future studies in this field might use these insights to investigate further the exact characteristics and features of online teaching platforms that have the greatest impact on student results. The study's findings reveal strong and meaningful connections, providing valuable insight for educational institutions as they integrate online teaching platforms. Decision-makers can use these theoretical implications to guide policies, investments, and strategies to maximise the educational experience for students, especially during times of crisis. To summarise, the study's theoretical implications highlight the importance and usefulness of the TAM in comprehending the workings of online education platforms during a pandemic-induced lockdown. These implications create opportunities for more theoretical advancements and practical uses in the constantly changing field of educational technology.

b. Managerial/Practical Implications

The results of this study provide practical knowledge that has direct relevance for educational institutions, administrators, and policymakers. It offers direction for efficient administration and informed decision-making in online education during pandemic circumstances. Educational institutions should strategically allocate resources to optimise the efficacy of online instructional platforms. This entails emphasising technical infrastructure, user interface design, and features that benefit student behaviour, interaction, technological assistance, and performance. Investing in such endeavours can result in concrete advantages through enhanced educational achievements. Institutions should prioritise faculty training and support programmes as they acknowledge the significant influence of platform efficacy on student outcomes. Educators must possess the expertise and tools to proficiently navigate and exploit online teaching platforms,

guaranteeing a smooth and influential learning encounter for students. Institutions should optimise and customise their technical support services in response to the beneficial impact of platform efficacy. This may require tailored support systems and resources to help students overcome technological obstacles, thus creating a favourable online learning environment. The study highlights the importance of a deliberate approach to designing and implementing curriculum in an online teaching setting. Educational administrators should prioritise the synchronisation of course structures with the capabilities of efficient online platforms, fostering student involvement and achievement through meticulously crafted curricula that include technology. Institutions must establish complete contingency plans for emergency scenarios in light of the beneficial impact of efficient online teaching platforms during the pandemic lockdown. This encompasses the tasks of assuring the preparedness of the digital infrastructure, offering sufficient assistance to both teachers and students and setting procedures for a smooth transition to online learning in the event of unexpected setbacks.

c. *Social Implications*

This study shows how effective online instruction transforms society beyond academia. Successful online teaching gives pupils excellent education regardless of location or socioeconomic status. Reducing educational gaps makes society more inclusive. The study emphasises technology proficiency for educators and students. Today's technology-driven society requires digital literacy, so emphasising this promotes it. This research can help educational institutions worldwide develop crisis management methods. Smoothly switching to online instruction promotes continual learning in challenging situations. The favourable link between online teaching effectiveness and student results implies that digital education investments can boost student achievement. This affects society since educated people help their communities develop socioeconomically. Understanding online teaching prepares society for changing educational settings. It requires constant innovation and adaptation to keep education relevant and effective in a continuously changing environment. This study shows that good online teaching promotes diversity, adaptation, and individual achievement, advancing society.

d. *Limitations and directions for future studies*

The current study provides valuable insights into the impact of online instruction at the University of Cape Coast during the COVID-19 pandemic. However, it is important to recognise certain limitations and identify potential areas for future investigation. The study's utilisation of a quantitative cross-sectional design, combined with data gathering by simple random approaches, imposes constraints on capturing the temporal dynamics of online education. Further investigation could focus on conducting longitudinal studies to thoroughly analyse the long-term impact of online education platforms on student results. Such an analysis would yield a more comprehensive comprehension of the enduring consequences of platform efficacy. Although SPSS is a reliable tool for analysis, it may not fully capture the intricate interactions between variables. Integrating supplementary qualitative methodologies or employing sophisticated statistical tools could provide a more intricate examination of the aspects that impact online education outcomes. Given the complex nature of online education, future research could utilise a mixed-methods approach, integrating quantitative analyses with qualitative insights. This would provide a more thorough investigation into the variables that impact student behaviour, interaction, technological assistance, and academic achievement. The study's concentration on a particular university in Ghana may restrict the applicability of the results to other educational settings. To broaden the focus beyond one university, future studies could entail a comparative examination of online instruction across other colleges, encompassing African and non-African contexts. Employing this comparison methodology would enhance our comprehension of the contextual variables that impact the efficacy of online educational platforms.

References

- Abbasi, J. (2020). Anthony Fauci, MD, on COVID-19 vaccines, schools, and Larry Kramer. *JAMA*, 324(3), 220-222.
- Abuhassna, H., Al-Rahmi, W. M., Yahya, N., Zakaria, M. A. Z. M., Kosnin, A. B. M., & Darwish, M. (2020). Development of a new model on utilizing online learning platforms to improve students' academic achievements and satisfaction. *International Journal of Educational Technology in Higher Education*, 17, 1-23.
- Agormedah, E. K., Henaku, E. A., Ayite, D. M. K., & Ansah, E. A. (2020). Online learning in higher education during COVID-19 pandemic: A case of Ghana. *Journal of Educational Technology and Online Learning*, 3(3), 183-210.

- Al-Ataby, A. (2020). Technology-enhanced learning and teaching in COVID-19 era: Challenges and recommendations. *International Journal for Innovation Education and Research*, 8(10), 317-331.
- Ali, L., & Dmour, N. A. H. H. A. (2021). The shift to online assessment due to COVID-19: An empirical study of university students, behaviour and performance, in the region of UAE. *International Journal of Information and Education Technology*, 11(5), 220-228.
- Al-Marroof, R. S., Alnazzawi, N., Akour, I. A., Ayoubi, K., Alhumaid, K., AlAhbabi, N. M., ... & Salloum, S. (2021, November). The effectiveness of online platforms after the pandemic: Will face-to-face classes affect students' perception of their behavioural intention (BIU) to Use online platforms?. In *Informatics* (Vol. 8, No. 4, p. 83). MDPI.
- Almendingen, K., Morseth, M. S., Gjølstad, E., Brevik, A., & Tørris, C. (2021). Student's experiences with online teaching following COVID-19 lockdown: A mixed methods explorative study. *PLoS one*, 16(8), e0250378.
- Anaam, E. A., Abu Bakar, K. A., Mohd Satar, N. S., & Ma'arif, M. Y. (2020). Investigating the electronic customer relationship management success key factors in the telecommunication companies: A pilot study. *Journal of Computational and Theoretical Nanoscience*, 17(2-3), 1460-1463.
- Anderson, A., Huttenlocher, D., Kleinberg, J., & Leskovec, J. (2014, April). Engaging with massive online courses. In *Proceedings of the 23rd international conference on World wide web* (pp. 687-698).
- Baker, S. R., Bloom, N., Davis, S. J., & Terry, S. J. (2020). Covid-induced economic uncertainty (No. w26983). National Bureau of Economic Research.
- Barkley, E. F., & Major, C. H. (2020). *Student engagement techniques: A handbook for college faculty*. John Wiley & Sons.
- Basilaia, G., & Kvavadze, D. (2020). Transition to online education in schools during a SARS-CoV-2 coronavirus (COVID-19) pandemic in Georgia. *Pedagogical Research*, 5(4).
- Bozkurt, A., & Sharma, R. C. (2020). Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian journal of distance education*, 15(1), i-vi.
- Brabazon, T. (2016). *The University of Google: Education in the (post) information age*. Routledge.
- Brookfield, S. D. (2015). *The skillful teacher: On technique, trust, and responsiveness in the classroom*. John Wiley & Sons.
- Brown, P., Lauder, H., & Ashton, D. (2010). *The global auction: The broken promises of education, jobs, and incomes*. Oxford University Press.
- Busuttil, L., & Camilleri, R. (2020). Teachers' response to the sudden shift to online learning during COVID-19 pandemic: Implications for policy and practice.
- Chakraborty, M., & Muyia Nafukho, F. (2014). Strengthening student engagement: what do students want in online courses?. *European Journal of Training and Development*, 38(9), 782-802.
- Coman, C., Țîru, L. G., Meseşan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective. *Sustainability*, 12(24), 10367.
- Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., ... & Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching*, 3(1), 1-20.
- Darwish, S., Gomes, A. M., & Ahmed, U. (2021). Risk management strategies and impact on sustainability: the disruptive effect of Covid 19. *Academy of Strategic Management Journal*, 20, 1-19.
- Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *International journal of man-machine studies*, 38(3), 475-487.
- De Metz, N., & Bezuidenhout, A. (2018). An importance–competence analysis of the roles and competencies of e-tutors at an open distance learning institution. *Australasian Journal of Educational Technology*, 34(5).

- Edeh, M. O., Nwafor, C. E., Ezeanya, C. U., Eziokwu, P. N., & Ani, U. E. (2020). Impact of e-learning platforms on students' interest and academic achievement in data structure course. *Coal City University Journal of Science*, 1(1), 1-16.
- Ekici, D. I. (2017). The Use of Edmodo in Creating an Online Learning Community of Practice for Learning to Teach Science. *Malaysian Online Journal of Educational Sciences*, 5(2), 91-106.
- Elfirdoussi, S., Hrimech, H., Fontane, F., & Kabaili, H. (2020). Industry 4.0: Impact of new technologies on logistics management. *ICT for an Inclusive World: Industry 4.0–Towards the Smart Enterprise*, 493-507.
- Ferrari, A., & Punie, Y. (2013). DIGCOMP: A framework for developing and understanding digital competence in Europe.
- Fraser, B. J., Aldridge, J. M., & Soerjaningsih, W. (2010). Instructor-student interpersonal interaction and student outcomes at the university level in Indonesia. *The Open Education Journal*, 3(1).
- Ghana Health Service (2020). Updates of coronavirus disease 2019 (covid-19) in Ghana, 17 March 2020,
- Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, re-imagining teacher education. *Teachers and Teaching: theory and practice*, 15(2), 273-289.
- Grover, P., Woyach, K., & Sahai, A. (2011). Towards a communication-theoretic understanding of system-level power consumption. *IEEE Journal on Selected Areas in Communications*, 29(8), 1744-1755.
- Henaku, E. A. (2020). COVID-19 online learning experience of college students: The case of Ghana. *International Journal of Multidisciplinary Sciences and Advanced Technology*, 1(2), 54-62.
- Hodges, C. B., Moore, S., Lockee, B. B., Trust, T., & Bond, M. A. (2020). The difference between emergency remote teaching and online learning.
- Holden, R. J., & Karsh, B. T. (2010). The technology acceptance model: its past and its future in health care. *Journal of biomedical informatics*, 43(1), 159-172.
- Johnson, W. L., Rickel, J. W., & Lester, J. C. (2000). Animated pedagogical agents: Face-to-face interaction in interactive learning environments. *International Journal of Artificial intelligence in education*, 11(1), 47-78.
- Joosten, T., & Cusatis, R. (2020). Online learning readiness. *American Journal of Distance Education*, 34(3), 180-193.
- Kaplan, A. M., & Haenlein, M. (2016). Higher education and the digital revolution: About MOOCs, SPOCs, social media, and the Cookie Monster. *Business horizons*, 59(4), 441-450.
- Langford, M., & Damsa, C. (2020). Online Teaching in the Time of COVID-19. Centre for Experiential Legal Learning (CELL), University of Oslo. Available online: <https://khrono.no/files/2020/04/16/report-university-teachers-16-april-2020>
- Legris, P., Ingham, J., & Colletette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information & management*, 40(3), 191-204.
- Lehman, R. M., & Conceição, S. C. (2013). *Motivating and retaining online students: Research-based strategies that work*. John Wiley & Sons.
- Lim, F. P. (2017). An analysis of synchronous and asynchronous communication tools in e-learning. *Advanced Science and Technology Letters*, 143(46), 230-234.
- Manca, S., & Ranieri, M. (2013). Is it a tool suitable for learning? A critical review of the literature on Facebook as a technology-enhanced learning environment. *Journal of Computer Assisted Learning*, 29(6), 487-504.
- Matijević, A. S., & Šćukanec, N. (2021). The impact of COVID-19 on higher education: a review of emerging evidence.
- Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International journal of educational research open*, 1, 100012.
- Molea, R., & Năstasă, A. (2020). How Romanian higher education institutions have adapted to online learning process in the COVID-19 context through a student's eye. *Revista Romaneasca pentru Educatie Multidimensionala*, 12(2Sup1), 175-181.

- Moreno, V., Cavazotte, F., & Alves, I. (2017). Explaining university students' effective use of e-learning platforms. *British Journal of Educational Technology*, 48(4), 995-1009.
- Moreno, V., Cavazotte, F., & Alves, I. (2017). Explaining university students' effective use of e-learning platforms. *British Journal of Educational Technology*, 48(4), 995-1009.
- Muhammad, M. (2021). Higher Education and Covid-19 Pandemic: Matters Arising and the Challenges of Sustaining Academic Programs in Developing African Universities. *Kaduna Journal of Business and Management Sciences (KJBMS)*, 1(1), 8.
- Ni, L., Ye, F., Cheng, M. L., Feng, Y., Deng, Y. Q., Zhao, H., ... & Dong, C. (2020). Detection of SARS-CoV-2-specific humoral and cellular immunity in COVID-19 convalescent individuals. *Immunity*, 52(6), 971-977.
- Nyabor, J. (2020). Coronavirus: Government bans religious activities, funerals, all other public gatherings. *Citi Newsroom*.
- Oyarzun, B., Stefaniak, J., Bol, L., & Morrison, G. R. (2018). Effects of learner-to-learner interactions on social presence, achievement and satisfaction. *Journal of Computing in Higher Education*, 30, 154-175.
- Pérez-Vidal, C. (2022). The Case of the SALA Project: Constructs and Methods Revisited. In *Designing Second Language Study Abroad Research: Critical Reflections on Methods and Data* (pp. 43-64). Cham: Springer International Publishing.
- Sadler, D. R. (2016). Three in-course assessment reforms to improve higher education learning outcomes. *Assessment & Evaluation in Higher Education*, 41(7), 1081-1099.
- Schejbal, D. (2012). In search of a new paradigm for higher education. *Innovative Higher Education*, 37, 373-386.
- Shamir-Inbal, T., & Blau, I. (2016). Developing digital wisdom by students and teachers: The impact of integrating tablet computers on learning and pedagogy in an elementary school. *Journal of Educational Computing Research*, 54(7), 967-996.
- Shopova, T. (2014). Digital literacy of students and its improvement at the university. *Journal on Efficiency and Responsibility in Education and Science*, 7(2), 26-32.
- Singh, A., Sharma, S., & Paliwal, M. (2021). Adoption intention and effectiveness of digital collaboration platforms for online learning: the Indian students' perspective. *Interactive Technology and Smart Education*, 18(4), 493-514.
- Sintema, E. J. (2020). Effect of COVID-19 on the performance of grade 12 students: Implications for STEM education. *EURASIA Journal of mathematics, science and technology education*, 16(7), em1851.
- Sintema, E. J. (2020). Effect of COVID-19 on the performance of grade 12 students: Implications for STEM education. *EURASIA Journal of mathematics, science and technology education*, 16(7), em1851.
- Stronge, J. H. (2018). *Qualities of effective teachers*. Ascd.
- Szabo, P. A., Dogra, P., Gray, J. I., Wells, S. B., Connors, T. J., Weisberg, S. P., ... & Farber, D. L. (2021). Longitudinal profiling of respiratory and systemic immune responses reveals myeloid cell-driven lung inflammation in severe COVID-19. *Immunity*, 54(4), 797-814.
- Throne, R. L. (2000). *Distance learning: A spatiotemporal leap into the potentiality of higher education online*. The Union Institute.
- UNESCO (2020). *COVID-19: Educational disruption and response*. Paris, France: UNESCO University of Twente
- VanderStaay, S. L., Faxon, B. A., Meischen, J. E., Kolesnikov, K. T., & Ruppel, A. D. (2009). Close to the heart: Teacher authority in a classroom community. *College Composition and Communication*, 61(2), W262.
- West, D. M. (2012). *Digital schools: How technology can transform education*. Brookings Institution Press.
- WHO. (2020). Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-ncov). URL. [https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-healthregulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-healthregulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)) accessed on January 02, 2024.

- Wolla, S. (2017). Evaluating the effectiveness of an online module for increasing financial literacy. *Social Studies Research and Practice*, 12(2), 154-167.
- Wut, T. M., Lee, S. W., & Xu, J. (2022). How do Facilitating Conditions Influence Student-to-Student Interaction within an Online Learning Platform? A New Typology of the Serial Mediation Model. *Education sciences*, 12(5), 337.