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Final Year Mathematics Students Perception of e-Learning and Instruction During the Covid-19 Era

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Abstract: The current trend of most tertiary teaching to reach out students in different modes such as distance, weekends and sandwich resorts largely to online system. The Covid-19 pandemic brought up various lock-down strategies in most countries. This allowed most universities such as Valley View University (a Premier Private University in Ghana, West Africa) to start with online lesson delivery modes to help maintain their academic calendar. The aim of this study was to investigate into the perception final year students and lecturers in the Mathematics Education department had on the Online Learning System during the Covid-19 pandemic lockdown era. The study adopted an explanatory investigation design through a sample size of 378 respondents comprising 36 lecturers and 342 students. Students' and lecturers' response to questionnaires put in a Likert Scale were investigated in

numerous descriptive and inferential statistics. The results revealed that lecturers registered a higher positive perception of online learning than students. This variation was however not significant. Specifically, lecturers perceived an increased flexibility in online learning, with learners utilizing a wide range of learning sources. Student interest however decreased in terms of the absence of in person meetings, promotion of students learning, ensuring autonomous learning environment, the absentness of cooperative learning strategies and among others. It was recommended that universities who resort to online means of teaching and learning should resource teachers and learners with the necessary accoutrements to help sustain their interest and minimize stress of teaching and learning. Researchers are however encouraged to further investigate into other factors necessary to sustain learners' and teachers' interest in coping with online (e-learning) modes.

Keywords: educational technology, e-learning, ICT, information technology, lecturers' perception, online learning, online teaching, students' perception, technology in the classroom.

Introduction

Online Teaching strategy has been one of the key modes some educational institutions resort to facilitate students learning beyond face-to-face interaction. Such choice of mode of teaching could be influenced by several factors. Among such need for this strategy was the Covid-19 pandemic which hit the world hard to hide people to their most closet shields. Most institutions resorted to distant teaching in order to enhance and continue teaching and learning. The Covid-19 (coronavirus case), which first appeared in 2019, has since spread globally (Li et al., 2021). Since the coronavirus has spread so far, policies requiring social or physical segregation have been put in place to reduce Covid-19's footprint. The beginning of the pandemic has a significant effect on many spheres of life, particularly schooling. Most institutions switched to online-learning pedagogies as a result of the epidemic. Academic institutions face a difficulty, according to Eromafuru (2020), in adapting to current needs of instructional mode while retaining the effectiveness of session delivery. According to Sharma (2020), the pandemic is enabling an instructional transitional teaching using technologies.

Higher education institutions in Ghana were abruptly shut down by the government as a result of the coronavirus epidemic, and students were instructed to leave campuses as one of the precautions against additional infections (Li et al., 2021). Universities embraced the online educational system as a way to make up for time gaps and maintain ongoing education. The continuous face-to-face class programs at the various educational institutions were severely warped by this influence. According to Coman et al. (2020), academic institutions across the continent are establishing institution-wide task committees to lessen the pandemic's effects and maintain the provision of education. In an effort to maintain students' interest in their specific courses and programs of study, many institutions in wealthy countries have quickly transitioned to online-learning (Olayemi et al., 2021).

Rahayu and Wirza (2020) asserted that using technology to access learning experiences is known as "online learning". According to Marfo and Okine (2016), a type of remote education called online learning constantly concentrated on providing opportunities to a learning environment, as it is effective in terms of time and location than campus-based education. Online learning is described in the media as studying and teaching using technology from home rather than attending a traditional classroom. On gadgets like tablets, computers, cell phones, and iPads, the technology can be used. There are numerous online learning platforms available that can be connected to technology, including Whatsapp, Google Classroom, Ruang Guru, Quipper, Zoom meetings, Moodle, and many others.

Online learning is inexpensive and easy for students to access anywhere, anytime, according to Me

and Fu (2020). Students have the possibility to learn individually through online activities (Anwar & Wahid, 2021). Additionally, it offers current information and can be used with other components to strengthen students' understanding, including audio and video explanation, group chats, forums, discussion boards, and quizzes. Giving Baticulon et al. (2020), distance learning exposes students to cultural diversity and globalization in education by removing time and space restrictions and provides a novel learning experience for students through its variety of contacts with the education community.

Online instruction has some drawbacks. According to Landrum et al. (2020), these drawbacks may include the learners' increased reflection, remoteness, and lack of engagement. Additionally, it is hard to check-out abnormal behaviors involving plagiarism and piracy, being misled into these behaviors, devaluing the role of the instructor, and the inability of purely scientific fields to be properly studied through e-learning. Additionally, using some websites excessively results in unanticipated time and financial costs. The pandemic hasn't yet subsided, therefore the system is here to stay. Additionally, it is unlikely that schools would completely return to the traditional system, which is why it is important to look into and comprehend the perspectives and worries of the teachers and students. This is significant because lecturers and students are used to traditional in person instruction, so the fast shift to remote instruction brought on by the pandemic is probably going to have an effect on both instruction and knowledge. Therefore, the aim of this investigation was to ascertain in what way lecturers and apprentices at Valley View University in Ghana felt about online learning with respect to their perceptions of it.

Online Learning

Online form of instruction is considered as providing instructional strategies in contexts using technological devices (such as mobile phones, laptops, etc.) with an Internet connection (Dhawan, 2020, p. 18). Over the past ten years, there has been a notable increase in the use of e-learning in education, which provides a lot of benefits (Allen & Seaman, 2017, p. 23). Education professionals were forced to design online courses that would improve both teaching (lecturing for higher institutions) and learning efficacy because a large number of students are taking their courses online (Evans, 2014). Numerous studies have demonstrated that distant education increases student engagement, improves the quality of conversations, and fosters online relationships. The debate board can help scholars and advance learning by finding solutions to challenging problems. It may be straightforward to access an online learning platform with mobile technologies like applications and PCs, which could improve the effectiveness of mobile learning (Panigrahi et al., 2018).

In the framework of e-learning (on-line instruction), collaboration and virtual communities could be developed. Online learning has been increasingly adopted and employed in higher educational institutions with the help of information technology including computers, tablets, iPads, and mobile phones (Yu, 2021). Online learning could benefit students in a variety of ways, such as by directing their focus toward crucial information and allowing them to participate in collective educational doings (Alwi et al., 2015). Peer discussions and engagement levels were highly and favorably connected with collaborative learning. The development of virtual communities may enhance the effectiveness of distant education (Panigrahi et al., 2018).

Perceptions of Lectures on Online Learning

Giovannella et al. (2020) study comprehended how teachers view and interact with elearning two months after the Covid-19 outbreak began. It was found that teachers valued the use of technology. This is agreed upon and supported by Klapproth et al. (2020), who suggests that teachers improve their digital literacy. Schools should therefore equip them with the technology and software they require in order for them to be willing to use online teaching tools. A scientific works examination by Frazer et al.

(2017) institute that resultative distance learning techniques recognized a number of periodic themes on collective educational doings. However, the authors suggested that there can be a discrepancy between the use of these tactics and teacher perceptions of what matters most for student achievement. According to Frazer et al. (2017), lecturers believed that modifications based on feedback from students to the instructor were a crucial component of successful distance learning to improve student results.

According to a study from 2021 by Butnaru et al. (2021), lecturers think that the more adaptable and flexible nature of online education has produced some advantages, such as easy access to subject matter experts, exposure to learning environments, a variety of course types, and participation in student communities. Staff in the field of content delivery experience problems with material delivery and decreasing student interest because there aren't enough face-to-face meetings, there isn't enough control over student groups, and there is a barrier to resolving these problems. The teaching team's virtual teaching strategies are unaffected by the increased demands created by the background of the coronavirus pandemic. The ability of the teaching staff to adapt to the new criteria, however, is significantly impacted by how they were developed. The teaching staff with access to online courses and digital resources is less likely to struggle with the difficulties presented by online courses and is more assured to continue teaching in the new environment (Butnaru et al., 2021). Teaching via video, either live or digitally broadcast, is the simplest solution for the academic staff in the Covid-19 pandemic setting.

Students' Opinions of Online Learning's Effectiveness

According to Kituyi and Tusubira's (2013) research, the majority of students do not regard online learning to be very beneficial. According to Armstrong (2011), ICT tool availability is important in terms of students' learning support system. Despite the fact that Olayemi et al. (2021) claimed that elective courses had higher quality than required ones. Scholars assumed the high caliber learner of distance classes (Gómez-Rey et al., 2018). Contrarily, Armstrong (2011) explained that students thought in-person training was more challenging intellectually than online instruction. Similar to Bali and Liu's (2018) findings that students believe face-to-face learning to be superior, Matsunaga (2016) discovered that students selected e-learning mode to in-person other instructional modes. Students believe that an effective online teacher is the person who (a) is able to support the learning, (b) tries to become coupled with scholars in the teaching space, (c) parts the experience, (d) is amicable, (e) forms common well-being, and (f) is attentive to students' requirements, giving the investigation by Frazer et al. (2017). Apprentices reported that effective online teaching techniques reduced their stress levels, improved their work, helped them think critically, and made them more receptive to criticism.

With reference to Almahasees et al. (2021) findings, e-learning education is helpful hard time situations. The lecturers and the students both came to this conclusion. Even yet, technology is not as effective as in-person instruction and learning. The faculty and students have acknowledged a lot of tasks related to online learning, together with their adjustment, chiefly for people with hearing disorders, a lack of motivation as well as contact, ICT issues, worries about information confidentiality, and security. They also agreed that online education has advantages. The main benefits included self-learning, affordable rates, ease, and flexibility. Research on faculty members' perceptions and attitudes toward online learning brought to light the significance of instructors in encouraging communication and collaboration with students. The primary success elements, according to the instructors, were instructional design and subject-matter experience.

Therefore, the design, delivery, and completion rates of the curriculum are crucial for success in both online and in-person learning (Nemetz et al., 2017). The COVID-19 outbreak switches in-person instruction to online courses while the school is on lockdown. Thanks to this improvement, educators

are better able to instruct students using cutting-edge technical skills (Isaeva et al., 2020). Students' and faculty members' opinions were disregarded differently when delivering laboratory courses online (Beck & Blumer, 2016). According to a study conducted at a medium-sized public university, Hidayat (2020) discovered that students see online and distance learning technologies as having some advantages, even though these advantages aren't always knowledge-related. Butnaru et al. (2021) report that students who value involvement in conventional classroom courses think it's critical to engage with academia for a clearer understanding.

Research Problem

Despite the fact that technological advancements have created a variety of opportunities for lecturers in education, the change of the comfortable usual in person education location carriages limits to both the tutor and the apprentice due to the complex nature of technological system (Landrum et al., 2020). According to research (Chandran et al., 2020; Pérez-Pérez et al., 2020; Suryawanshi & Venugopal, 2020), online learning environments fall short of improving learners' generic competencies. Additionally, if comparing with in person locations, learners interact as well as engage in virtual education environments differently, which changes the consequences of their learning. The problem is made more difficult by instructors' decreased connection with students and by the absence of prompt feedback and responses (Littlefield, 2018). Studies have stressed that compared to regular classrooms, online learning demands a different methodology and set of abilities (Boling et al., 2012).

Teachers in underdeveloped nations like Ghana are required to switch to online instruction with little to no training. Ghana's situation is particularly challenging because of the country's enormous student population and weak technical and communication infrastructure. For instance, the Valley View University-Techiman Campus is located in a region where most of scholars live in country areas with potential net problems. Additionally, the majority of these children may lack the tools needed to continually be online and access educational content. This is probably going to have a bad impact on how university education is provided for and accessed. Existing literature explains various tactics, tools, structures and importance of online learning systems with little focus of how teachers and learners perceive it. This study adopted an investigation into finding out how mathematics final year students and lecturers perceived the online (e-learning) means of instructing, learning and assessments.

The benefits of distance classes over traditional classroom instruction, according to Li and Lalani (2020), also include the possibility for students to study individually, return to use documented trainings, and read from electronic resources. However, other researchers assert that because of the digital divide, poor internet connectivity, and limited access to digital resources like computers, online learning is not as effective as classroom instruction (Goldstein et al., 2020; Lau et al., 2020; Govindarajan & Srivastava, 2020). Similar to this, according to Goldstein et al. (2020), a reduced number of students in the COVID-19 era are enrolled in online courses because of persistent absenteeism and poor performance on assignments. Govindarajan and Srivastava (2020) found that as of 2018, just 21.3 percent of pupils have PC or tablets in their classrooms. Lau et al. (2020) contend that a tangible academia location is unique and the crucial to in-depth comprehension. Despite this, there are few studies that examine lecturer-student views on distance education. In order to further the body of knowledge, this research aims to find out how instructors and students at Valley View University evaluate its online learning system.

Research Focus

Valley View University usually embark on regular, weekends, distance and sandwich modes of teaching using face-to-face interaction. The Covid-19 pandemic era demanded a full transition of instructional strategies called *e-Learning*. Students and lecturers had divergent experiences and

perception of the electronic way of teaching and learning and rendering assessment, discussions and among others. The aim of this research was to investigate the vision of distance education by students and lecturers during the Covid-19 Era contrary to the normal regular in person instructional interactions. The study's specific objectives were to: (a) investigate how lecturers at Valley View University view online learning, (b) find out how students at Valley View University view the

effectiveness of online learning, (c) determine whether there is a statistically significant difference in students' perceptions of online learning based on their gender and age, and to (d) determine whether there is a statistically significant difference in lecturers' and students' perceptions of online learning.

Research Aim and Research Questions

The overall aim of the research was to evaluate how lecturers and final year students at Valley View University's Techiman Campus in Ghana, West Africa, perceived the online instructional mode of teaching in times of pandemic. The paper specifically answers the questions: (a) How do lecturers at Valley View University view online learning, (b) How do final year students at Valley View University view the effectiveness of online learning, (c) Is there any statistically significant difference in students' perceptions of online learning based on their gender and age? (d) Is there any statistically significant difference in lecturers' and students' perceptions of online learning.

Research Methodology

General Background

According to Saunders et al. (2009) reviews, there are three (3) main categories of study project: explanatory, exploratory, and descriptive. The explanatory research design is used in this study. Explaining the connection among the features of a state or phenomenon is the main goal of the explanatory study. The connection among the dimensions or qualities of people, groups, conditions, or events is studied using inferential analysis. The t-test and ANOVA analysis were evaluated in this paper's descriptive research design. The research assumed the descriptive paper structure because apart from examining the perception of lecturers and students' perception on online learning, it also evaluates the use of inferential data analysis for determining the presence of statistically important changes in students' opinions of online learning based on their gender and age.

Sample / Participants / Group

The residents of the research comprised lecturers and student of Valley View University – Techiman Campus in Ghana. The population size consisted of 36 lecturers and 2341 students. For the lecturers, all 36 lecturers were used in the study to constitute a census sampling. The study, therefore, used the purposive sampling technique. In purposive sampling, respondents are selected based on a criterion. Students and lecturers were selected on the criterion that, they participated in the online teaching and learning during the covid-19 era and hence deemed to have their perception of online teaching strategies. In this study members in the population are lecturers at the university; either part-time or full-time teaching online as well as the registered students to the courses they teach. In all, a total of 378 respondents comprising 36 lecturers and 342 students, were used in the study. The researchers deemed this representative and appropriate since a census sampling was considered to give equal chances for everybody in the population to be part of the study. Research choice of census sampling (for such students studying mathematics by online modes) is sufficient, efficient and unbiased about any estimation about the population mean and variances in parametric and inferential statistical analyses (Creswell & Creswell, 2017).

Instrument and Procedures

Statistics used in this study came from many sources. Data collected from respondents through surveys makes up the main sources of data. The main data is information that is directly gathered by the researchers for the study task and is information that is especially gathered for a research endeavor. The researchers decided to use questionnaires for this investigation. Google Documents form was used to build two online questionnaires. There were two sections to the survey for lecturers. The demographic profile was in the first section, while the second asked about professors' opinions of online learning. The survey given to the pupils has 2 sections as well. The demographic portion made up the first section. The second part had questions on the perceived efficiency of distance education at Valley View University. Scientific Research procedures were followed to ensure validity, reliability and ethical consideration for study participants through the data collection process. Google online questionnaire survey forms revealed validity and reliability coefficient of 0.91 which was highly strong and reliable.

Data Analysis

Data were analysed with the help of the SPSS (Statistical Package for Social Sciences software). Both descriptive and inferential data analysis were implemented in the study. The 1st objective examines the perceptions of lecturers on online learning in Valley View University. The one-sample t-test was used in the research. Objective two investigated how students perceive the efficiency of distance education at Valley View University. Also, the one-sample t-test was adopted. The third objective evaluated whether there is a statistically important differences in scholars' attitude toward distance education based on their gender and age. The study used both the independent t-test and the ANOVA analysis. The fourth objective also examined whether there is a statistically significant difference in lecturers' and students' perceptions of online learning at Valley View University. The independent t-test analysis was adopted for that analysis.

Research Results

A one-sample t-test in order to evaluate how lecturers felt about online learning was used. Using a one-sample t-test, it was possible to found if the model means differed statistically from a real or imagined residents mean. On the basis of a five-Likert scale, the study is appraised. The conclusion is that students strongly agree with the statement and expressed a favourable perception when a factor is significant (sig. 0.05) and the mean difference is positive, as opposed to when it is negatively perceived.

From the results (Table 1), it is observed that lecturers negatively perceive that online learning provides clear instructions for students' comprehension (mean difference = -0.133, sig = 0.000). Lecturers also negatively perceived that online learning is costly (mean difference = -0.260, sig = 0.001). There was also a negative but non-significant perception that online learning promotes students to learn effectively (mean difference = -0.740, sig = 0.214 > 0.05).

In terms of instructional delivery, lecturers positively perceive that there are increased flexibility and learning opportunities (mean difference = 0.240, sig = 0.000 < 0.05). Additionally, there is a favourable opinion that online education gives the opportunity to use a diversity of learning resources to aid in learning (mean difference = 0.421, sig = 0.015 < 0.05) but the quality of the content is compromised in online learning delivery (mean difference = 0.251, sig = 0.000 < 0.05).

Table 1*Opinions of Lecturers on Distance Education*

	t	Sig. (2-tailed)	Mean Diff	95% Confidence Interval	
				Lower	Upper
Test value = 4					
INSTRUCTIONAL DELIVERY					
Provides clear instructions for students' comprehension	-9.908	0.000	-0.133	0.153	0.103
Increased flexibility and learning opportunities	10.001	0.000	0.240	0.140	0.340
Utilizes a wide range of learning sources to support learning	4.619	0.015	0.421	0.031	0.811
The quality of contents is compromised in online lesson delivery	11.141	0.000	0.251	0.182	0.380
LECTURER INVOLVEMENT					
There is reduced time for lesson delivery	5.115	0.012	0.331	0.130	0.582
Improve on lecturers' digital creativity	8.704	0.000	0.410	0.305	0.515
The possibility to deliver lessons everywhere makes online learning more convenient	7.127	0.000	0.231	0.210	0.252
This means of lesson delivery is costly	-5.678	0.001	-0.260	-0.49	-0.03
STUDENT INVOLVEMENT					
There is lower student interest due to the lack of in person meetings	8.903	0.000	0.660	0.480	0.840
Promotes students' motivation in learning	3.045	0.214	-0.740	-0.97	-0.51
Promotes autonomous learning environment	10.400	0.000	0.402	0.222	0.582
Lessons are flexible and everybody can learn individually	8.911	0.000	0.310	0.301	0.319
Students actively involved with learning	8.078	0.000	0.480	0.301	0.660
Possibility for solutions to be sought from the internet	9.021	0.000	0.580	0.451	0.711

Source: authors' development.

With the involvement of lecturers in online learning, there was a positive perception that there is reduced time (mean difference = 0.331, sig = 0.012 < 0.05), improvement on lecturers' digital creativity (mean difference = 0.410, sig = 0.000 < 0.05) and that online learning provides the possibility to deliver lessons everywhere makes online learning more convenient (mean difference = 0.231, sig = 0.000 < 0.05). With student involvement, lecturers perceived that there is low student interest due to the lack of in person meetings (mean difference = 0.660, sig = 0.000 < 0.05), promotes autonomous learning environment (mean difference = 0.402, sig = 0.000 < 0.05) with flexible lessons where each student can learn from his/her own pace (mean difference = 0.310, sig = 0.000 < 0.05). In addition, lecturers positively perceived that online learning gives the opportunity where students actively participate in learning (mean difference = 0.480, sig = 0.000 < 0.05) and that there is a possibility for solutions to be sought from the internet (mean difference = 0.580, sig = 0.000 < 0.05). On whether the online instruction helps promotes students' motivation in learning, it was tested to be insignificant. Hence students seem to be displeased or unsatisfied with the new trend of teaching compared to their face-to-face instructional delivery.

Opinions of Students on Distance Education

The study adopted the one sample t-test. The grades are offered in Table 2.

Table 2

Perceptions of Students on Online Learning

	t	Sig. (2-tailed)	Mean Diff	95% Confidence Interval	
				Lower	Upper
Test value = 4					
INSTRUCTIONAL DELIVERY					
Provides clear instructions for students' comprehension	-9.011	0.000	-0.132	0.151	0.105
Increased flexibility and learning opportunities	9.987	0.000	0.052	0.021	0.081
Utilizes a wide range of learning sources to support learning	12.870	0.000	0.333	0.203	0.463
The quality of contents is compromise in online lesson delivery	-5.765	0.010	-0.071	0.129	0.021
LECTURER INVOLVEMENT					
There is reduced time for lesson delivery	8.704	0.000	0.316	0.306	0.416
Improve on lecturer's digital creativity	7.127	0.000	0.123	0.106	0.136
Possibility to deliver lessons everywhere makes online learning more convenient	8.903	0.000	0.660	0.487	0.847
This means of lesson delivery is costly	8.176	0.000	0.480	0.301	0.661
STUDENT INVOLVEMENT					
There is lower student interest due to lack of in person meetings	7.717	0.000	0.680	0.538	0.838
Promotes students' motivation in learning	8.872	0.000	0.460	0.321	0.605
Promotes autonomous learning environment	8.098	0.000	0.780	0.651	0.915
Lessons are flexible and everybody can learn individually	9.008	0.000	0.780	0.642	0.927
Students actively involved with learning	-9.216	0.000	-0.640	-0.851	-0.437
Possibility for solutions to sought solution from the internet	-5.975	0.003	-0.360	-0.596	-0.133

Source: field data survey.

From the results, there is a negative student's perception that online learning provides clear instructions for students' comprehension (mean difference = -0.132, sig = 0.000 < 0.05) and that the quality of contents is compromise in online lesson delivery (mean difference = -0.132, sig = 0.000 < 0.05). Students also negatively perceived that they are actively involved with learning (mean difference = -0.640, sig = 0.000 < 0.05) and that there is a possibility that they can seek solution from the internet (mean difference = -0.640, sig = 0.000 < 0.05) mean difference = -0.360, sig = 0.000 < 0.05).

However, students positively perceive that online learning increase flexibility and opens up opportunities for learning (mean difference = 0.052, sig = 0.000 < 0.05), utilizes a wide range of learning

sources to support learning (mean difference = 0.333, sig = 0.000 < 0.05), lead to a reduction time for lesson delivery (mean difference = 0.316, sig = 0.000 < 0.05), improves lecturers digital creativity (mean difference = 0.123, sig = 0.000 < 0.05), present possibility to deliver lessons everywhere (mean difference = 0.660, sig = 0.000 < 0.05) and that online lesson delivery is costly (mean difference = 0.480, sig = 0.000 < 0.05).

There was also a positive perception that student interest decreases due to the lack of in person meetings (mean difference = 0.680, sig = 0.000 < 0.05), that online promotes students learning (mean difference = 0.460, sig = 0.000 < 0.05), promote autonomous learning environment (mean difference = 0.780, sig = 0.000 < 0.05) and that online lessons are flexible and everybody can learn individually (mean difference = 0.480, sig = 0.000 < 0.05).

To evaluate if there is a statistic important differences in students' perceptions of distance learning based on their gender

To determine whether there is a mean alteration in observation between males and females, the study performed an independent t-test analysis. Determine whether there is a statistically important alteration among two means of dissimilar groups using the independent t-test. Males and females are the unrelated groups in this study.

Table 3

Group Statistics of Students' Perceptions of Online Learning Based on Their Gender

Variable	Category	Mean	Std. Deviation
Gender	Female	3.13	2.523
	Male	4.52	1.626

Source: field data.

According to Table 3, the male mean is 4.52 with a average aberration of 1.626 and the feminine mean is 3.13 with a average aberration of 2.523. The average mean value for males is higher than the average mean value for females, according to the provided averages. The standard deviation indicates the degree to which each person's perceptions diverge from the mean. The majority of the responses are likely to be grouped around the average if the standard deviation is smaller. A high average aberration indicated that the data were discrete. The females have a wider value based on the standard deviation readings. This indicates that perceptions of female respondents are more widely distributed. Table 3 shows the analysis of the Levene's Independent Sample Test.

Table 4

Levene's Independent Sample Test Analysis

Category	Levene's Variance	Test of	t-test for Equality of Means		
	F	Sig.	Sig. (2-tailed)	Mean Diff	Std. Error

Gender	Equivalent alterations presumed	7.719	0.009	0.970	-1.39	1.25719
	Equivalent alterations not presumed			0.007	-1.39	1.25719

Source: field data.

As seen in Table 4, the F-test statistic for the Levene's test corresponds to the Sig. p-value in the column for the Levene's test for equality of variances. According to Table 4, the Levene's test result (0.009) is less than 0.05, indicating that there is a substantial difference in the variance of the perceived mean values between males and females. As a result, the analysis uses the column for equal variance not assumed. The analysis indicates that there is a significant difference between the mean value for males and females because the sig (2-tailed) value for this column is similarly less than the 0.05 significance level (therefore, p-value = 0.007 0.05) period such that the males highly perceives improvement in online than females by 1.39 times.

However, Perkowski (2013) found that males positively perceived online learning than females. Cuadrado-García et al. (2017) revealed that the use of online learning by male and female students differed significantly. Gašević et al. (2016) looked at how men and women behaved differently when using computers and discovered that men utilized computers far more frequently and had more positive sentiments around it.

To evaluate whether there is a statistically significant differences in students' perceptions of online learning based on their Age, the study utilised the Chi-Square test statistic for the analysis. The Chi-Square test was then used to ascertain the association between the age and perception of students on online learning. The results of the Chi-Square test are indicated in Table 5.

Table 5

Chi-Square Tests of Students' Perceptions of Online Learning based on their Age

	Value	df	Asymptotic Sig. (2-sided)
Pearson Chi-Square	26.340a	15	0.135
Likelihood Ratio	26.217	15	0.036
Linear-by-Linear Association	2.853	1	0.091
N of Cases	342		

Source: field data.

The Pearson Chi-Square value from the data in Table 5 is 0.135. This value exceeds the significance threshold of 0.05, indicating that there is no statistically important alteration in how students are perceived based on their age.

To identify the Significant Differences between Lecturers' and Students' Perceptions of Online Learning, the study performed an independent t-test analysis. In Table 6, the group statistics are displayed.

Table 6*Group Statistics of Lecturers and Students' Perceptions of Online Learning*

Variable	Category	Mean	Std. Deviation
Perception	Lecturers	4.035	0.785
	Students	3.831	1.018

Source: field data.

From the results, the overall mean for the perception of lecturers is 4.035 with a standard deviation of 0.785 while that for the students is 3.831 and standard deviation of 1.018. There is therefore a variation between the mean perception of lecturers and students with the lecturers registering a higher perception value than the students. To confirm this variation of the difference in the means the Levenes Independent sample test analysis is indicated in Table 7.

Table 7*Levene's Independent Sample Test Analysis*

		Levene's Test of Variance		t-test for Equality of Means		
Category		F	Sig.	Sig. (2-tailed)	Mean Difference	Std. Error
Lecturer- Student Perception	Equal variances assumed	3.187	0.208	0.510	-0.204	0.9671
	Equal variances not assumed			0.087	-0.204	0.8309

Source: field data.

From the results, the significance value for the Levene's test is 0.208 is greater than 0.05. The implication is that there is no appreciable difference between the lecturers' and the students' variance of the perceived mean values for the associated perception. The analysis therefore makes use of the column with the anticipated equal variance. The study's findings indicate that there is no significant difference between lecturers' and students' perceptions of online study because the sig (2-tailed) value for this column is also greater than the 0.05 significance level ($p\text{-value} = 0.087 > 0.05$).

Discussion

Tables 1–7 analysed how lecturers and scholars perceived the distance education and learning environment during the pandemic. The outcomes support earlier findings on how teachers felt about online learning. The study found that throughout the Covid-19 epidemic, applicants had a favourable estimation of the worth and ease of distance learning platforms. According to a comparable study, the majority of respondents (70 percent) are prepared to choose online classes to handle the curriculum during this pandemic. According to Minghat et al. (2020), online learning uses a variety of learning resources and offers clear instructions to help students understand what they are learning. The quality of contents to be delivered is also perceived to be compromised in online lesson delivery (Egielewa et

al., 2021).

To investigate how lecturers at Valley View University view online learning, the findings revealed that most lecturers registered a higher positive perception of online learning than students. This is in consistency with Allen and Seaman (2017), who agreed to the fact that lecturers find it comfortable teaching distance students with necessary ICT tools by digitalised online mode systems. This is also agreed upon and supported by Klapproth et al. (2020) as well as Giovannella et al. (2020) who suggests that teachers should improve their digital literacy to help students better understand mathematics lesson through online modes. There was also a positive perception that student interest decreases due to the absence of face-to-face meetings. Face-to-face teaching approach according students perception promotes students learning, autonomous learning environment with each student having the opportunity to learn at his/her own pace. However, there was no significant difference between the perception of lecturers and students on online studies.

To find out how students at Valley View University view the effectiveness of online learning mode, majority of the students were of the view that, there were no technological resources to guide them while learning at their various homes. They missed the face-to-face lecturing encounter where they can see the lecturer teaching. Teaching mathematics by online can be a little confusing if teachers lack technological skills in the online delivery and hence students perceive online lesson delivery as unbeneficial (Tusubira et al., 2013). There was however, an indication that online learning provides no clear instructions for students' comprehension just like Tusubira et al. (2013) support it. Online teaching and learning are perceived to be cost intensive and do not promote effective students learning participation. Students positively perceive that online learning increase flexibility and opens up opportunities for learning, utilizing a wide range of learning sources, improves lecturers' digital creativity, and present possibility to deliver lessons everywhere.

The study considered determining whether there is a statistically significant difference in students' perceptions of online learning based on their gender and age. There is significant difference between the perception of females and males' students such that the males highly perceive improvement in online than females by 1.39 times. The results were tested to be significant for equal variance assumed for gender disposition in learning of mathematics by online mode. This is in consistency with Owusu-Darko et al, (2017) who investigated into how students engage in mathematics lesson based on their dispositional empathy by gender and age. Mathematics learning seems to be male dominated than females. Age variation in studying seems to favour students who conform to the average age category for grade level, otherwise students becomes deficient in understanding concept.

To determine whether there is a statistically significant difference in lecturers' and students' perceptions of online learning, this variation was however not tested to be significant. Specifically, lecturers perceived an increased flexibility in online learning, with learners utilizing a wide range of learning sources. This according to Panigrahi et al. (2018) may be attributed to lack of technological tools to support online learning. The development of virtual technology may significantly enhance the effectiveness of online teaching and learning. This leads to a reduction in lesson delivery time and improve on lecturer's digital creativity. In addition, lecturers perceived that online learning promotes autonomous learning environment with flexible lessons, giving the opportunity for students to actively participate with learning and presenting a possibility for solutions to be sought from the internet.

As an implication to this findings, Institutions that intends using elearning or online learning system of instruction beyond face-to-face teaching should equip both students and lecturers with the requisite tools, materials, resources such as computers, ipad, tablets and andriod supported apps as well as means of internet access to help stakeholders cope well with online teaching and learning. Students

and lecturer's inability to enjoy online teaching and learning are as a result of necessary resources to support medium of e-instruction.

Conclusions and Implications

In conclusion, lecturers registered a higher positive perception of online learning than students. This variation was however not significant. Specifically, lecturers perceived an increased flexibility in online learning, with learners utilizing a wide range of learning sources, leading to a reduction lesson delivery time and improve on lecturer's digital creativity. In addition, lecturers perceived that online learning promotes autonomous learning environment with flexible lessons, giving the opportunity for students to actively participate with learning and presenting a possibility for solutions to be sought from the internet. There was however, an indication that online learning provides no clear instructions for students' comprehension, is costly and do not promote effective students learning. Students positively perceive that online learning increase flexibility and opens up opportunities for learning, utilizing a wide range of learning sources, improves lecturers' digital creativity, and present possibility to deliver lessons everywhere.

There was also a constructive insight that scholar interest decreases in terms of the lack of in person meetings, promotes students learning, promote autonomous learning environment with each student having the opportunity to learn at his/her own pace. There is an important alteration between the perception of females and males' students such that the males highly perceive improvement in online than females by 1.39 times. However, there was no important alteration between the perception of lecturers and students on online studies.

The study's conclusion is however limited to students' and lecturers' (teachers') perception of online teaching and learning modes during the covid-19 pandemic only. Responses analysed are based on students and lecturer's perception only in the chosen case study. It is however delimited to the chosen study setting of Valley View University online teaching during the Covid-19 era only, a situation which hard-pressed both lecturers and students to find convenient means of reaching out teaching and learning. No generalizability is associated with the key findings and conclusions.

Suggestions for Future Research

There was however, an indication that online learning provides no clear instructions for students' comprehension. Students can interact with the subject more successfully and consequently have more fruitful experiences when provided clear instructions. According to the study, instructors should employ concise, complete, and exact sentences that use specific terminology to help students understand what is expected of them. In order for students to understand what is being taught, professors can also upload videos and voice messages to clarify certain points. Therefore, greater study into this aspect of online system instruction, which is supposed to give teaching and learning meaning, is advised.

From the results, students perceived that they are not actively involved with learning. There is therefore the need for lecturers to incorporate online video conferences and discussions to compensate for the lack of in person meetings. There was an important alteration among the awareness of distance classes for the females and males such that the males highly perceive improvement in online studies than females. There is no doubt however, that online learning has to stay. It is recommended that Universities who hold this teaching modes should frequently organize training session to enlighten students on online learning. This training could target female students so that they could positively perceive online learning as better. It is suggested that further studies should be conducted in other universities to either refute or confirm these findings. Also, future studies should consider working out a model of online learning in tertiary institutions in Ghana.

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