



DOES CHEATING INCREASE WHEN UNIVERSITIES ADOPT E-TESTING AND E-PROCTORING?

By

Emmanuel Ifeduba

Department of Mass Communication, Redeemer's University, Ede, Osun State, Nigeria. +2348033821430

Abstract

This paper presents a faculty participant's perspective to the online testing and proctoring challenges faced by a Social Science faculty during the 2020 Covid-19 lockdowns. Preliminary data on available e-testing and e-proctoring solutions were collected online whereas e-learning data were collected over three months by participant observation and interviews. Choosing from a list of e-testing and e-proctoring solutions, the faculty was able to bring online malpractice under control. Though the propensity to cheat increased online, effective e-proctoring with relevant technologies brought cases of online cheating under control, maintaining a pattern similar to student offline cheating behaviour. This study exposes the inadequacy of available learning applications, drawing attention to the need for more precise proctoring technologies that could go beyond objective testing, especially for Social Science and related disciplines. It also provides a useful list of online cheating methods, proctoring strategies and proctoring software in one document.

Keywords: E-learning, proctoring, quality assurance, cheating, online examination, covid-19

Introduction

The series of city lockdowns and campus shutdowns occasioned by the COVID-19 pandemic from March 2020 disrupted study calendar in universities globally (Sturgis & Lamb, 2022). Due to the lockdown, employees and students of a faith-based university in Nigeria could no longer come together for normal activities, anxious parents were calling to suggest campus shutdown and university supplies were literally drying up. By the last week of March, the university under study announced a campus shutdown “till further notice” but explained that classes would continue online even when it was obvious that no one was fully prepared for the online-only mode. Fully aware that making the switch, just like many other institutions, had become inevitable (Ureta; Fernández & Teixeira, 2021) the very first step towards addressing the challenge was to undertake an analysis of strengths, weaknesses, opportunities and threats (SWOT).

First Assignment: A team of researchers set out to provide answers to the following questions: What is the available strength (capacity and facility)? What is the discernible weakness that might hinder effective online delivery? What is the possible opportunity presented by the challenge? What is the threat inherent in the challenge? Within 48 hours, the team turned in a report summarized as follows:

Table 1

Summary of SWOT Analysis

S/N	Questions	Answers
1	Strength	Existing, under-utilised MOODLE e-learning facilities
2	Weakness	Very little capacity for online-only delivery
3	Opportunity	To develop capacity for e-learning generally
4	Threat	Nearly zero capacity in e-testing and e-proctoring

Though the report was not looking as gloomy as many expected the need to ensure full class participation in lectures and tests and the fear of cheating needed to be addressed urgently. And this led to the second assignment:

Second Assignment: Review relevant literature to identify and list online cheating methods employed by students and online proctoring methods deployed by other institutions.

Relevant Literature

Available information indicated that the disruptions compelled faculty and students to quickly respond with internet-enabled digital mobile technologies in various ways (Mahyoob, 2020). Studies indicate that some universities conducted quick research in order to find their bearing and respond to the challenges; and some of the studies investigated factors that affect the acceptance and use of e-learning as a teaching tool among staff members (Zalat, Hamed & Bolbol, 2021). Others examined the strengths and weaknesses of the e-learning system in universities (Arash, et al., 2022) whereas others studied examination and proctoring strategies (JiyouJia, 2021).

White (2021) observed that students face pressures to engage in misconduct in online learning and assessment, and seem to perceive online academic misconduct as something justifiable and also hold complex perceptions of such attitudes towards academic integrity. Ali et al. (2022) recommended that educational institutions need to provide appropriate technology and increase staff capacity for online assessment that would not compromise integrity and authenticity. The study emphasised the need for a robust online assessment practice integrated with e-proctoring systems in every university. In another study, remote proctoring resulted in significantly lower final examination scores for quantitative courses, suggesting that cheating was controlled by effective proctoring. However, besides proctoring threats, it is also suggested that the hasty adoption of Open, Flexible, and Distance Learning (OFDL) methods as an emergency response to the COVID-19 pandemic in universities comes with the risk of undermining its capacity to support learning and teaching at scale and serve those that conventional approaches have been unable to reach (Naidu, 2022).

In the same vein, examination outcomes of qualitative courses which were proctored online resulted in significantly lower final examination scores than non-proctored exams (Davis, Rand & Seay, 2016). Yet another study states that the pandemic highlighted both practice and policy problems that need rapid reforms and forced institutions to address issues revolving around the relationship between emergency planning and decision-making, quality and institutional policy (Freeman, Leihy, Teo, & Kim, 2021). Some of the COVID-19-related online learning studies also seem to demonstrate that the pandemic was useful in highlighting where the institutions are in terms of e-learning readiness and what decisions they must make in order to achieve smooth and successful implementation of online learning (Perrin & Wang, 2021). Unarguably, one of those

decisions revolves around methods of dealing with cheating in online examinations. And this gap accentuates the need for effective proctoring.

Theoretical Perspectives in Literature

Effort was also made to explore available theoretical perspectives in search of e-learning solutions. One of the theories addressing the need is the e-learning theory proposed by Haixia He (He, 2020). The framework is built on cognitive science principles demonstrating how the use and design of educational technology can enhance effective learning (David, 2015; Wang 2012). The basic proposition of this framework is that “if teachers design principled tasks with educational technologies that reduce extraneous cognitive load and manage germane and intrinsic load at appropriate levels for students, they can learn effectively” (He, 2020; Mayer; Moreno & Sweller, 2015).

After reviewing the literature, the team held a discussion with faculty to harmonize available information. Subsequently a list of online cheating and proctoring methods was drawn from the literature search results and from inputs made by staff and students. The report is presented starting with a range of online cheating methods available to students as reported online and offline is presented in Table 2.

Table 2
Online Cheating Methods and Operational Styles

SN	Cheating Method	Modus Operandi
1	Screen Sharing/Reflection	Some students share screens or use multiple monitors to approach a friend’s exam question simultaneously and provide answers.
2	Small Bluetooth devices	Some students use smaller, practically undetectable Bluetooth devices to cheat in online examinations.
3	Use of traditional methods	They use calculators that can store formulas and other data as well as hand-written notes and writings on their bodies, jeans trousers and palms.
4	Mobile Phones	Using mobile phones, connected devices help candidates store answers to share with fellow test-takers or external sources.
5	Auto Coding Software	Some candidates use auto coding software to clear the exams. The software creates the programs without the examination candidate writing any code himself.

6	Navigation Offers	In online tests some students to log in to unauthorized websites, paste questions into the URL, and find the best solution they can steal.
7	Impersonation	As often reported in offline examinations, some candidates take examinations for someone else.
8	Use of External Devices	They use hard drives, USBs, micro SDs and other external smart devices that are easy to hide and difficult to detect, for the purpose of copying the questions so they can sell them to other students who are yet to take the exam. Or they could just share it online.
9	Exam conference with family friends	Some gather in the same room to help a family member or friend to cheat. They usually stay off the focus of the webcam or stay behind the screen. They either write the answer or whisper quietly.
10	Copy-pasting and other keyboard shortcuts	It is common for cheats to copy and paste the answers from documents or notepads, usually prepared in a separate window before the test begins. These are simple ways to trick some remote proctoring software which have no information about what is happening on the screen. IRIS Invigilation software does record screen activity so in this case the student would be caught cheating.
11	Deliberately exiting from the test	Students often try to outdo proctoring software by deliberately excluding themselves from the examination. They use excuses such as poor internet connection or power outage to exit the exam and shut down the camera recording so they can quickly look up answers to questions, then they log back to continue.

Suggested Proctoring and Control Mechanisms: Many control mechanisms were suggested across board. The most common solution is the use of examination proctoring software specifically designed with features such as automated monitoring, ID verification, and computer lockdown with the aim of enabling students to take online examinations devoid of cheating. Some of the mechanisms are presented in Table 3.

Table 3
Cheating Methods and Suggested Control Mechanisms

SN	Cheating Methods	Suggested Control Mechanisms
1	Screen Sharing/Reflection	Social distancing and room light control
2	Small Bluetooth devices	A thorough search can detect small Bluetooth devices. It may also be possible to configure dedicated systems to detect or disable such devices.
3	Use of traditional methods	Deploy ProctorU, which integrates webcams with microphones that enable well-trained live proctors to monitor or record test-takers by watching eye movement and body language to indicate suspicious behaviour.
4	Mobile Phones	Reduce the document viewing area with screen shield and watermarked filter to discourage screenshots during online exams.
5	Auto Coding Software	To prevent candidates from using auto coding software to clear the exams, ...
6	Navigation Offers	To prevent students from logging into unauthorized websites and pasting questions into the URL, to find a solution they can steal, ...
7	Impersonation	Use authentication technologies to electronically affirm an online student's identity, webcams to verify physical features like facial structure that can be checked against officially recognised identity cards. Deploy software called BioSig-ID that uses keystroke analysis to recognize keyboard typing patterns, based on rhythm, pressure, and style for accuracy. Another is ProctorU, which integrates webcams with microphones that enable well-trained live proctors to monitor or record test-takers by watching eye movement and body language to indicate suspicious behaviour.
8	Use of External Devices	Send questions to students by email through secure document attachments, and supervise them throughout the exam duration using a webcam from the moment they access the questions.
9	Exam conference with family friends	Identify suspicious third-party assistance with tracking logs that reveal the location and IP address of the user. Moreover, if there is very little time to do the test, those who gather to help a family member or friend to cheat might not have much time for the conversation.

10	Copy-pasting and other keyboard shortcuts	IRIS Invigilation software does record screen activity so in this case the student would be caught cheating. One can also reduce the document viewing area with screen shield and watermarked filter to discourage screenshots during online exams.
11	Deliberately exiting from the test	Not Available

Other suggested solutions include the deployment of a document security solution such as Digify. This has the capability to limit who can access the question and the capability to revoke access anytime. Other recommendations include email verification as an extra layer of security and authentication, prevention of unauthorized access and distribution of examination questions with restricted forwarding and downloading and reduction of the document viewing area with screen shield and watermarked filter to discourage screenshots. A list of proctoring software was drawn for the consideration of the authorities. Details are presented in Table 4.

Table 4

List of Available Examination Proctoring Software

SN	Proctoring Software	Features
1	Examity	Can be implemented with any test delivery platform Auto and Live proctoring, AI-based software, Curriculum management, ID verification
2	ExamOnline	AI-Driven Remote Proctor, Auto authorization of candidates using facial recognition, Automated alerts and warnings if there are, No face present, Wrong face present, Multiple faces present, Object detection – mobile, books, etc, Facial movement detection, Exam window navigation, Human speech detection, Lite, auto and human proctoring modes, Provision of secondary camera video feed for 360-degree candidate view and Desktop screen capturing during the exam.
3	SpeedExam	Automated Proctoring, Screen Recording, Candidate Verification
4	Mercer Mettl	Candidate tracking, Self-service portal, Options between AI-based proctoring and manual remote proctoring, 3-point candidate authentication, Image recognition, mobile phone prevention
5	Examus	It has an algorithm that helps analyze online user behavior. The tool has a tech stack that uses a webcam for facial

		recognition and emotion detection. It is ideal for users who do not wish to share their data.
6	ProctorU	Session launch with a live proctor, Multi-factor identity verification via a live proctor, AI-based behavior analysis, Verifies the surrounding quickly, Convenient to use for exams conducted from homes
7	Verificent	Automated remote monitoring, Remote workforce management, Delivers 95% accurate identity verification, User-centered design of the software
8	AIProctor	Interfaced AI proctoring, Secondary device monitoring, Quick facial recognition, Multiple voice detection and tracking
9	ExamSoft	Automatic immediate assessment, Showcases a report to candidates, Intuitive app with secure testing
10	Proview	Test scheduling, Automated proctoring
11	Conduct Exam	Has a personal mobile app for easy proctoring
12	ProctorExam	Wide-range modular monitoring solutions, Allows the 360-degree view of a candidate's workspace, Optimized data design
13	PSI Bridge	Automated test security, Custom reporting and analytics, Smart onboarding, Enables multi-modal delivery, Easy identity verification
14	Pearson VUE	AI combined with live proctoring, Face-matching technology, ID verification, Session monitoring
15	MeritTrac	Easily deployed on the cloud, SaaS, and web, Automated proctoring

With such long lists as presented in tables 1-4, recommending some clear, definite and feasible methods, techniques and strategies was a daunting task. Thus, it is necessary to, first, present the cases to which they were applied in order to understand them clearly.

Overview of the Cases to Which the Methods, Tools and Strategies Were Applied

The researcher participated in discussions and strategy meetings with regard to several courses. However, this study is based on two courses that the researcher taught and proctored, and the details of the cases are presented below:

Case 1: Studies in Leadership: By design, the content of this first year course is traditionally delivered by face-to-face classroom engagement whereas assessments are computer-based, except where a lecturer decided on essay-type of test, in which submissions could be offline or both offline and online. Computer-aided presentations are done in the classroom using e-boards. At the point

of course completion, students were expected to be in position to: Define leadership from a general perspective, explain the general characteristics of a good leader, discuss types of leaders and leadership, write a term paper on the profile of a selected leader, write a paper on the problems of leadership in Nigeria, discuss the importance of integrity in leadership drawing examples from the mass media and other professions, write an in-class assignment on patriotism and nationalism, carry out a group collaborative leadership project

By the time students were directed to leave the campus, only three weeks of effective lectures had taken place, covering only the first three topics, when the university switched to the default mode.

Case 2: Feature Writing: By design, lecture content for this second-year course is delivered by face-to-face classroom engagement, and assessments are also done by classroom engagement after students have done their research and feature writing assignments—a minimum of five write-ups per semester. Presentations, discussions and corrections are made interactively in the newsroom. At the point of course completion, students were expected to be in position to: Discuss the difference between news and feature, explain the characteristics of a feature story, explain types of feature article, write profiles of people, places and organisations, write personal experience articles, write adventure stories or travelogues, write confession stories, write interpretative articles, write utility or how-to-do-it articles, conduct interviews and write interview articles.

By the time students were directed to leave the campus, only three weeks of lectures had taken place and some basic feature writing styles and techniques had been taught. Take-home assignment topics had also been given out with deadlines.

Third Assignment: The third task was to recommend methods, facilities and strategies to conduct online learning, testing and proctoring that would enable the departments not only to cover the syllabus online but to do so successfully. The recommendations and implementation steps are presented under the sub-heading—choices and implementations.

Choices and Implementation

After a lengthy argument, the team had to make a choice from asynchronous delivery systems whereby most of the contents are delivered online to students who can participate from anywhere at any time; or a synchronous system whereby students may participate in real-time online

meetings, and can login from anywhere. But this must be done at the same time or in a combination. Thus, the department had to creatively and courageously combine in-house mobile facilities with already available LMS solutions such as MOODLE. In summary, the following choices were made:

To make effective use of the available LMS, there was need for intensive staff training and motivation. So, the Directorate of Academic Planning and Quality Assurance quickly arranged for several training sessions for faculties.

To ensure that the knowledge gained from the trainings was not lost, a rule was made to compel lecturers and instructors to leverage on the online solutions for the delivery of at least 35% of lectures. This includes oral deliveries and digital textual contents as well as tests.

Students were trained on the effective use of the learning solutions and the need to avoid cheating. Online verification and tracking systems were developed in-house to improve on the quality of learning outcomes.

Timing and duration of examinations were managed effectively by proctors across the faculties depending on the nature of each course. For instance, students had twenty minutes to answer 30 objective questions in the General Studies course. Quality improvement discussions are on-going. For examinations slated to be taken later within the brick-and- mortar school, the University ICT staff designed a system that combined both the internet and the intranet to beat cheats.

Implementation: These choices were implemented in teaching, testing and monitoring class participation. Course-specific details are presented as follows:

- 1. Teaching, Testing and Participation in Studies in Leadership:* The University's e-learning app was designed to augment face-to-face engagement, and so it was inadequate for distance learning challenges such as interactive audio deliveries. Applications such as Zoom, Google classroom and Google Meet were among the options tried but the challenge of poor participation constrained the class to settle for Whatsapp group chats and messages since the majority of the students use android mobile telephone handsets along with university supplied apps.

The researcher digitized lecture notes and shared on the platform, and through e-mail to those who had challenges participating through the group platform. Short teaching and short answers to questions were given through Whatsapp voice messaging service. Assessment was easy from teacher's perspective but a number of students had huge challenges taking their tests at the stipulated time. The highest participation rate achieved for discussions was 48% whereas the test was taken by 50% within the stipulated period, and alternative arrangements had to be made to allow more students take the test later.

Regarding the final examination, management decided that if government should fail to approve resumption soon, the university, already equipped to administer the final examination online through the official application designed for General Study courses, would proceed with online-only administration of examinations. This raised fears about digital invigilation. However, many lecturers were able to invigilate successfully using digital camera facilities in their laptops, monitoring the online enrolment and attendance as well as shortening the time allowed for each paper to ensure that students did not have enough time to screenshot questions and send to friends or to communicate while writing the examinations. The results only showed little or no upset in the expected outcome per student, using previous performance as yardstick. In all, it was impossible to attribute unexpected individual improvement in performance and unexpected poor performance to examination malpractice since other intervening variables (such as parents and sibling motivating) could have played significant roles in the performances.

- 2. *Teaching, Testing and Practical Works for Feature Writing:*** Attempt to teach this course through whatsapp voice messages and chats was practically not feasible for a class of 91 students dispersed in different cities and villages with varying degrees of facility adequacy. Thus, a different strategy was needed. The remaining notes for the course were digitized, with assignment topics and deadlines, and sent to students through their class whatsapp chat group. Then, a whatsapp group, specifically for the course, was created and students were instructed to reserve their questions until they had read the eleven-page notes. (This is a digital class control mechanism introduced to avoid students asking flimsy questions on content they had not studied with seriousness). This instantly reduced the number of irrelevant questions and chats.

Discussions on specific issues and assignments took place on the platform and through phone calls, voice notes and video calls. The experience was almost distressing because it was not easy to have the usual rigorous evaluation and discussion of student writings, errors and achievements online. Submissions were done through e-mail because it was discovered that students could spy the submissions of those who submitted before them on the university app. This meant that the lecturer had to receive 91 mails, assess and revert to 91 students. The number of practical write-ups they could do by this means was reduced to two. Participation was about 60% for discussions and over 90% for practical assignments.

As final examination approached, online administration of examinations was contemplated with trepidation and so many meetings were held to assess the existing facilities and the number of Information Technology staff on ground, not locked down elsewhere. This was particularly worrisome due to the practical nature of the course and the degree of subjectivity and variety expected in student responses to questions. Eventually the department settled for objective questions, but only on the grounds that more marks should be allotted to the essay-based tests and assignments. The stress-free marking and grading done by computer seemed to partly compensate for the stressful process occasioned by sudden change.

Constraints and Challenges

With so many online cheating strategies already in place and many online proctoring solutions hastily designed to meet the challenge, making a choice was not easy, especially when the expected outcome could not be guaranteed. The uncertainty of outcome was an issue of concern but paying for such services in hard currency at a time when the local currency had been devalued by almost 200% was unthinkable. One, there was no planned budget for the sudden need for upgrading online learning solutions. Two, like other institutions worldwide, the university's cash flow was badly affected by the disruptions occasioned by the pandemic. Three, there was no grant covering such unplanned expenses.

- 1. Challenges on Studies in Leadership:** From the researcher's side of the story, the researcher often could not get to the university campus to use the wifi due to restrictions in movement, and network at home was too poor for any meaningful work. The same was the case with many students who could not join in the chats and discussions due to energy, connectivity, device, network or data-funding issues; and finding ways of making up and carrying everyone along was a daunting task, especially given that the switch was sudden. To meet these challenges, several technological options were tried out, depending on the peculiarity of one's location and infrastructure adequacy. Applications such as Zoom, Google Classroom and Google Meet, Moodle Learning Management System (LMS) emailing of lecture notes and Whatsapp group chats, calls and video messages were among the options tried out. In the end, online lectures, tests and examinations were only partially successful whereas practical works suffered an unquantifiable set back. Due to all these challenges, only one test was administered and deadline rules were relaxed to enable everyone participate using the university's learning app. And it was feared that this could have increased chances of malpractice beyond teacher's control.
- 2. Challenges on Feature Writing:** As in the case of the general studies course, the researcher often could not get to the university campus to use the Wifi due to restrictions in movement, and network at home was too poor for any meaningful work. This was applicable to many members of staff. In the same vein, many students could not join in the chats and discussions due to device, network or data funding issues; and giving make-ups and carrying everyone along was very challenging. It was impossible to measure student writing abilities with objective questions, and this was a major challenge. However, reports of cheating in online examinations and the possible consequences on the quality of certificates awarded were of exceptional concern to the university. Thus, faculty members examined the reports hoping to gain insight into this phenomenon, with a view to gaining a deeper understanding towards proffering a solution.

Did Cheating Increase when the University adopted E-Testing and E-Proctoring?

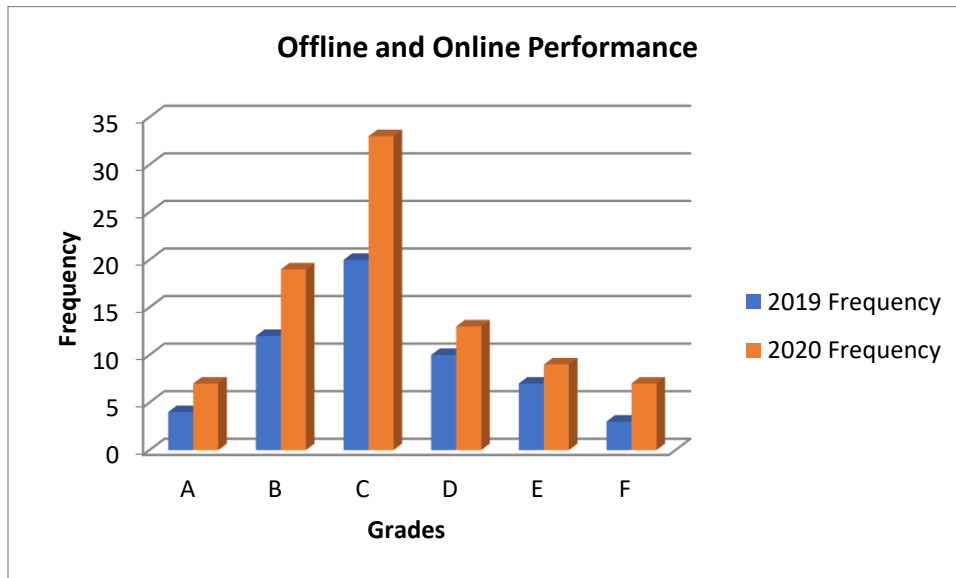
The outcomes of the choices made are best presented as questions and answers through the summarized expressions of the participants:

How effective were the proctoring strategies from students' perspective? A respondent said: "Many students who planned to cheat could not do so because the time to attempt the questions was too short for any communication with external devices or fellow students participating in the same examination". Another explained: "Everyone was struggling to answer all the questions he could and so had little or no time to cheat. Even those who gathered to write the exam in a group and cheat together recorded very little success while some regretted trying. Only a few students said they were able to cheat on a few questions" Another student answered: "Students also discovered that proctors were monitoring the enrolment time and pattern, verifying identities and sending queries to students with suspicious behaviour. This made people afraid, especially since they know that proven cases of exam fraud attract expulsion".

How effective were the proctoring strategies from faculty perspective? "A good number of attempted cheating cases was frustrated using time management and verification strategies. However, fears that much cheating might have taken place despite the observed successes persisted" according to a faculty respondent.

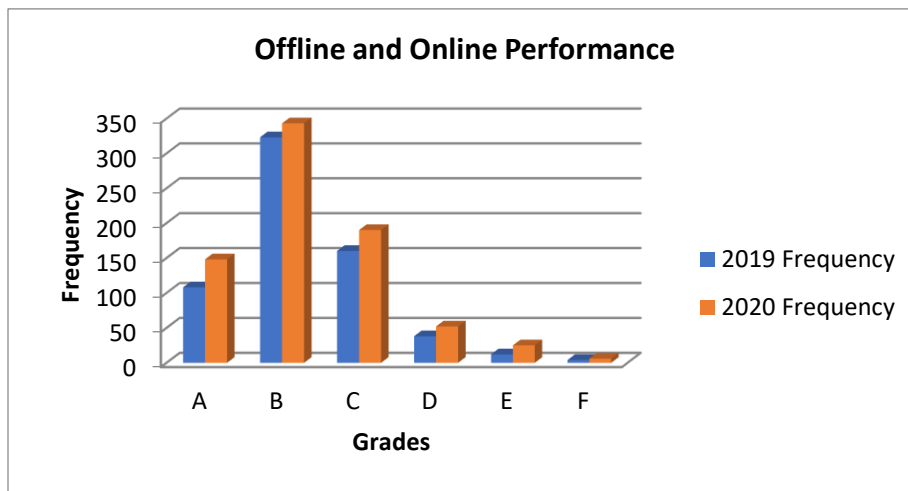
Fourth Assignment: Comparison of Results and Outcomes

The study set out to answer the question: Did examination malpractice increase when online testing and proctoring were introduced? So, the fourth task was to compare student online test performance with previous offline performance in the same subjects to ascertain if the results maintained a normal curve or produced wild variations. The results of the online examinations were compared with previous classroom results on those courses to search for unusual or outrageous behaviour and outcomes. The comparison showed that both maintained normal curves and none of the online examination results was top-heavy or bottom-heavy. Details are presented in Figures 1 and 2.

Figure 1*Feature Writing Grades for 2019 and 2020 Compared*

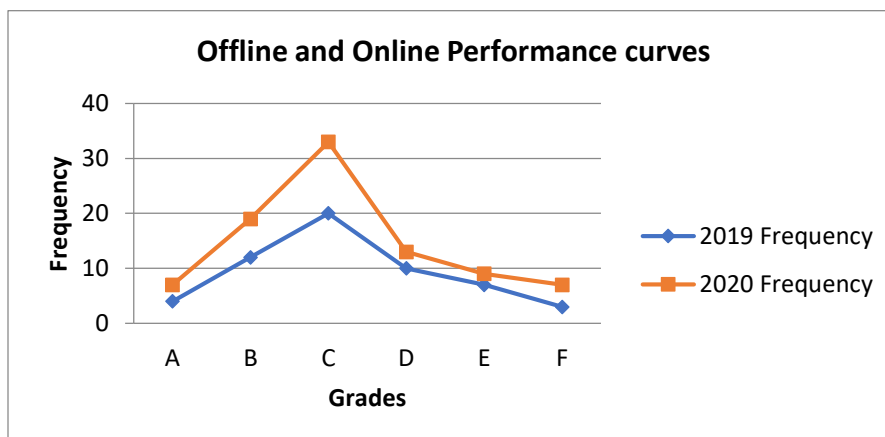
The comparison in Figure 1 indicates that there is no deviation from previous pattern of performance in the Journalism course. The seemingly higher figures shown for 2020 are accounted for by the increased number of students from 56 in 2019 to 88 in 2020. The increase in figure 2 for the General Studies course indicates that there is also no variation from previous pattern of behaviour and performance. In the same vein, the seemingly higher figures shown for 2020 are accounted for by the increased number of students from 645 in 2019 to 764 in 2020.

Figure 2
Grades for Studies in Leadership 2019 and 2020 Compared

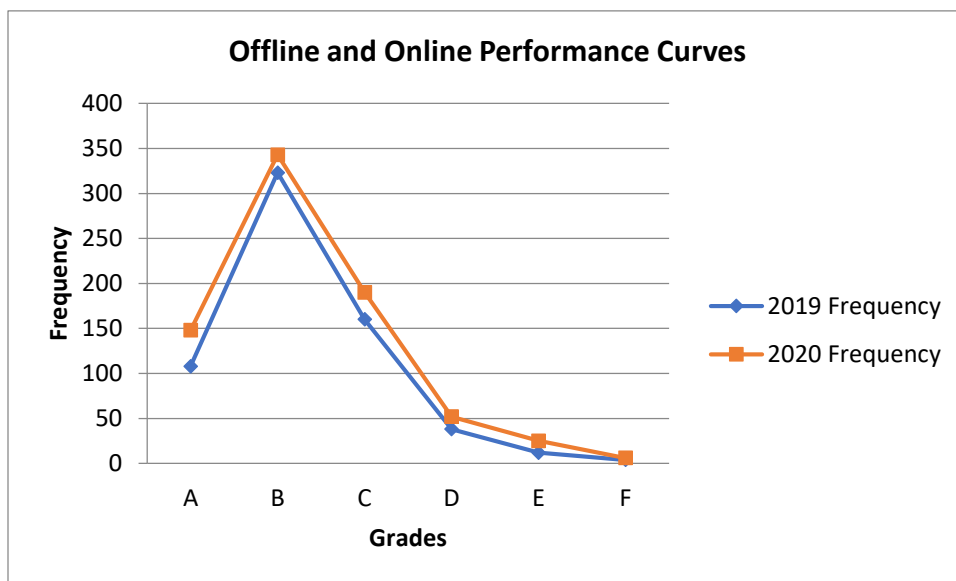


Student Performance Curves: Generally, student performance in any sizeable class has always been known to produce a normal curve when the examination questions are appropriate, exam conditions normal and efficient proctoring system successfully implemented. Such was the case in the current study. Details in Figures 3 and 4 indicate normal curves:

Figure 3
Grades for Feature Writing 2019 and 2020 Compared



The performance curves for studies in leadership in 2020 were similar, exhibiting insignificant variations. Details are presented in Figure 4.

Figure 4*Grades for Studies in Leadership 2019 and 2020 Compared*

Discussion of Findings

The findings support the basic propositions of the e-learning theory which assumes that when teachers design principled tasks with educational technologies that reduce extraneous cognitive load from learners and manage relevant and intrinsic load at appropriate levels, students can learn effectively (He, 2020; Mayer; Moreno & Sweller, 2015). The actual performance of students and their perceived performance were found to be similar and consistent with the assumptions of this theory.

Proctoring was not as difficult as initially taught because faculty staff in collaboration with skilled Information Technology experts were able to reduce cheating to a level not above that of offline examinations. This implies that where appropriate technology is available to trained and motivated staff, e-learning, e-testing and e-proctoring could be implemented without anxiety, using a combination of appropriate technologies (David, 2015). This is particularly important for journalism faculties as complementing classroom face-to-face teaching with online mode aligns with global trend in journalism education (Ureta, Fernández & Teixeira, 2021).

Conclusion

Switching from a classroom-based mode to an online mode mid-semester was quite challenging. At the same time, it opened up an opportunity for leapfrogging development in the direction of online modes and diversifying to distance learning, which seems to be the trend in developed economies. This experience born out of the adversities of a pandemic accentuates the need for facilitative technologies which can go beyond objective testing to the measuring of complex skills, such as reasoning and problem solving, through exercises such as feature article writing and essays in the digital environment. If the teaching environment must shift to the digital space, it calls for a different balance of teaching interventions and pedagogy whereby technology for different subject areas must match pedagogy in specific subjects.

Above all, though the experience at the university showed that students usually have greater temptation to cheat online, but the fears of uncontrollable cheating online were largely unfounded as student results showed normal curves and were neither top-heavy nor bottom heavy. Student responses also indicated that some of the proctoring strategies, especially those relating to timing and question structure were largely successful.

Acknowledgement: The researcher attended meetings convened by the Directorate of Academic Planning and the Director of General Studies of the university as a participant observer. The logistics supports and cooperation provided by these directorates is hereby acknowledged.

Disclaimer: This case is intended to be used as the basis for discussion and comparison of notes among e-learning technology-adopting faculties and institutions. It does not in any way illustrate either effective or ineffective handling of a management situation in the organisation studied.

References

- Ali, I., Narayan, A.K. & Gedera, D. (2022). Transforming assessment in accounting education to align with online learning", *Pacific Accounting Review*, Vol. ahead-of-print No. ahead-of-print, <https://doi.org/10.1108/PAR-05-2021-0058>
- Arash, S et al. (2022). The university students' viewpoints on e-learning system during COVID-19 pandemic: the case of Iran, *Heliyon*, 8(2). <https://doi.org/10.1016/j.heliyon.2022.e08984>

- David, L. (2015). E-learning Theory (Mayer, Sweller, Moreno) *Learning Theories*, <https://www.learning-theories.com/e-learning-theory-mayer-sweller-moreno.html>.
- Davis, A. B., Rand, R. & Seay, R. (2016). Remote Proctoring: The Effect of Proctoring on Grades. *Advances in Accounting Education: Teaching and Curriculum Innovations*, 18, pp. 23-50. <https://doi.org/10.1108/S1085-462220160000018002>
- Freeman, B., Leihy, P., Teo, I. & Kim, D. K. (2021). Rapid, centralised decision-making in a higher education emergency", *Quality Assurance in Education*, 29(4), 393-407. <https://doi.org/10.1108/QAE-12-2020-0154>
- He, H. (2020). Theoretical Models for Teaching and Research: E-Learning Theory, <https://opentext.wsu.edu/theoreticalmodelsforteachingandresearch/chapter/e-learning-theory/>
- JiyouJia, Y. (2021). The design, implementation and pilot application of an intelligent online proctoring system for online exams. *Interactive Technology and Smart Education*, *19*(1), www.researchgate.net
- Mahyoob, M. (2020). Challenges of e-Learning during the COVID-19 Pandemic Experienced by EFL Learners, *Arab World English Journal*, 11(4), 351-362. <https://dx.doi.org/10.24093/awej/vol11no4.23>
- Mayer, R. E., Moreno, R., & Sweller, J. (2015). *E-learning theory*. <https://www.learning-theories.com/e-learning-theory-mayer-sweller-moreno.html>
- Naidu, S. (2022). Threats and tensions for open, flexible, and distance learning post-COVID-19, Pages 349-352, *Distance Education*, 43(3). <https://doi.org/10.1080/01587919.2022.2088482>
- Perrin, S. & Wang, L. (2021). COVID-19 and rapid digitalization of learning and teaching: quality assurance issues and solutions in a Sino-foreign higher education institution, *Quality Assurance in Education*, 29(4), 463-476. <https://doi.org/10.1108/QAE-12-2020-0167>
- Sturgis, I., & Lamb, Y. R. (2022). Pivot! Teaching Communications Online During COVID-19, *Journalism & Mass Communication Educator*, 77(1), 123-139 <https://doi.org/10.1177/10776958211038152>
- Ureta, A. L., Fernández, S. P. & Teixeira, J. F. (2021). Online Journalism Teaching and Learning Processes Beyond the Classroom and the University: Experiences in International Virtual Collaboration on Multimedia Projects, *Journalism & Mass Communication Educator*, 76(1) 5-28 DOI: 10.1177/1077695820916620 <http://journals.sagepub.com/home/jmc>
- Wang, V. C. (2012). Understanding and promoting learning theories. *International Journal of Multidisciplinary Research and Modern Education*, 8(2), 343-347.

White, A. (2021). May you live in interesting times: A reflection on academic integrity and accounting assessment during COVID19 and online learning. *Accounting Research Journal*, 34(3), 304-312. <https://doi.org/10.1108/ARJ-09-2020-0317>

Zalat, M. M., Hamed, M. S., & Bolbol, S. A. (2021). The experiences, challenges, and acceptance of e-learning as a tool for teaching during the COVID-19 pandemic among university medical staff. *PLoS ONE* 16(3): e0248758. <https://doi.org/10.1371/journal.pone.0248758>