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Safeguarding academic integrity in the face of emergency remote teaching and learning in developing countries

Abstract

With the operationalisation of lockdowns and restrictions on public gatherings, education systems across the entire globe were confronted with an urgent need to reconsider alternative forms of teaching, learning and assessment. Some institutions in developing countries were especially hard-hit by the shift owing to inadequacies in training and infrastructure because unlike their more developed counterparts who had already made inroads into adopting online technologies, some institutions in the developing world had no such technologies in place. As such, the shift to online learning was rushed and somewhat a “learning on the job” experience for students and educators. While remote online teaching, learning and assessment are novel experiences for many higher education institutions, developing countries are incessantly presented with many challenges, particularly when safeguarding academic integrity. Invigilated assessments, which are often considered more secure, are not an option given the current situation, thus detecting any cheating would be significantly challenging. As a result, this study examined assessment security in the digital domain and critically evaluated the practices to safeguard academic integrity in developing countries across three Southern African universities, including associated challenges. Underpinned by the pragmatist paradigm, the study employed a mixed-methods research approach that utilised in-depth qualitative and quantitative data from university managers, lecturers and students to investigate how academic integrity is safeguarded in the advent of online learning. Our findings revealed that although the transition to online learning and assessment was abrupt, higher education institutions have generated creative strategies to secure and ensure the continuity of learning and assessment. Such strategies include administering several versions of the same examination, as well as the use of “text-matching” software to detect the originality of work done by students. Based on the findings of the study, it was recommended that to guarantee the authenticity of online assessment, institutions must ensure that assessment practices relate to real-world needs and the context in which students can apply acquired knowledge.

Keywords: Academic dishonesty; academic integrity; COVID-19; higher education institutions; online assessment; online learning.

1. Introduction

The COVID-19 outbreak posed a serious threat to several sectors, including the higher education sector. As such, most educational institutions were forced to choose between closing their doors or going online due to the new constraints imposed by the COVID-19 pandemic. Investigating the higher education sector's ability to adapt to changing circumstances is more important than ever to handle the uncertainty and developing scenarios connected with the pressing problem of the COVID-19 pandemic and consequent lockdowns, especially in developing countries. While the majority of institutions in the developed world had already made advances into embracing internet technologies before the COVID-19 pandemic, most institutions in developing countries continue to struggle due to a lack of digital expertise and infrastructure. The pandemic, therefore, necessitated an abrupt shift in teaching, learning as well as assessment practices, prompted by concerns about the efficacy, validity and adaptability of internal quality assurance procedures in the developing world (Cirlan & Loukkola, 2021).

While studies comparing academic misconduct in face-to-face and online classes consistently reveal that conventional face-to-face classes had higher rates of self-reported misconduct (Kidwell & Kent, 2008; Hart & Morgan, 2010; Eaton, 2020), such studies reveal students' maturity levels as an important factor that puts them at risk of academic misconduct (Bertram *et al.*, 2015). Therefore, given that emergency remote learning in the case of the COVID-19 outbreak is not the same as online learning, although the technology resources for content delivery may be similar (Eaton, 2020; Hodges *et al.*, 2020), thousands of students and educators were suddenly found working in online environments with little to no training, expertise, and motivation (Eaton, 2020). Educators who had never taught online before had little or no opportunity to think about how assessment in e-learning contexts differs from how students are assessed in face-to-face settings (Eaton & Turner, 2020). Accordingly, many educators had little or no opportunity to examine the implications of these decisions in terms of academic integrity and how it could be safeguarded in the face of emergency remote teaching and learning.

2. Problem statement

While the adoption of online technologies was lauded as the solution to educational challenges that confronted higher education in the face of the COVID-19 pandemic, the developing world continues to struggle in the adoption of technologies in learning and assessment (Daniels, Geogan & Parker, 2021; Muhuro & Kang'ethe, 2021). It is contended that teaching, learning and assessment have been difficult to adapt in the developing world and poor communities owing to challenges such as lack of resources, lack of training, lack of adequate infrastructure and many other factors (Mncube, Mutongoza & Olawale, 2021; Guangul *et al.*, 2020). Effective online assessment, therefore, became difficult to deliver as evidenced in increases in cheating (Chala, 2021). Institutions in the developing world were therefore thrust into a precarious position where they had to rethink assessment practices to effectively measure the progression of students in higher education institutions (Korkmaz & Toraman, 2020; Muhuro & Kang'ethe, 2021). This study, therefore, sought to examine assessment security in the digital domain and to critically evaluate the effectiveness of assessment practices in developing countries across three Southern African universities. One university was selected from each of the countries, namely Botswana, Zimbabwe and South Africa.

3. Research questions

- i. What strategies have been used to enhance assessment security in the digital domain?
- ii. To what extent do these assessment practices safeguard academic integrity?

4. Literature review

4.1 An overview of academic integrity

The concept of academic integrity relies on five values namely: responsibility, respect, honesty, fairness and trust (Bretag, 2016; McCabe, 2016). It is argued that these five values are critical in addressing academic conduct in institutions of learning (Eaton & Turner, 2020). Bretag (2016) argues that academic integrity is the code of conduct in academia. Ultimately, academic integrity lays the foundation for students for a vibrant academic life and responsible citizenship (International Center for Academic Integrity [ICAI], 2021). Cheating in academic circles contradicts the very principles upon which academic integrity is founded (McCabe, 2016). Cheating is defined as any action or attempt aimed at gaining an unfair advantage over other students by undermining the values of academic integrity (Vučković *et al.*, 2020). Cheating typically happens in four ways: (i) information transfer between individuals, (ii) the use of assisting tools, (iii) exploitation of weakness and (iv) copying answers or information (Chala, 2021). This, therefore, raises the critical question of how much is actually being learnt, which has implications for professional careers beyond university.

While learning happens in three domains, namely the cognitive domain, affective domain and psychomotor domain, this study focuses on assessment in the cognitive domain. Learning in this domain is typically measured through class discussions, tutorials, quizzes and problem-based learning amongst many others (Kasilingam & Chinnavan, 2014). The cognitive domain involves the development of mental skills and the acquisition of knowledge as measured by six categories. The categories involve students' ability to recall information (knowledge), the ability to understand the meaning of what is known (comprehension), ability to utilise knowledge in a new situation (application), ability to differentiate between fact and opinion (analysis), ability to integrate different concepts in order to establish a new meaning (synthesis) and the ability to judge the importance of concepts (evaluation) (Bloom *et al.*, 1956; Hoque, 2016).

4.2 Assessment in developing countries

While debates on academic integrity have been ongoing, the abrupt adoption of online learning in the developing world makes it more critical for a review of assessment practices. Alin (2020) contends that the emergency adoption of online learning in developing countries resulted in a continuation of face-to-face assessment practices by faculty members. As a result, students began to attain higher grades than they would generally do in face-to-face assessments (Fontaine, Frenette & Herbert, 2020). The three main purposes for conducting assessment in higher education institutions are summed up in three main agendas: (i) provide support for learning through appropriate feedback systems in conjunction with formative and summative assessment; (ii) to entrench accountability by providing evidence of learning and (iii) to provide certification for intended outcomes, progress and transfer (Guangul *et al.*, 2020). The COVID-19 stringency has forced institutions to adopt remote assessment and learning methodologies, albeit with relatively limited preparation of institutions, students and educators (Mncube *et al.*, 2021; Reedy *et al.*, 2021). Remote assessment can be classified into two broad categories namely proctored exams and open-ended assessments.

Proctored exams are time-bound and invigilated in a classroom setup; this can be done remotely through digital learning management systems (Guangul *et al.*, 2020). In most cases, institutions in developing countries were caught off-guard, this meant that effectively invigilating examinations was out of their reach and some had to forego exams (Mncube *et al.*, 2021). Remote assessments have been criticised for some problems, chief of which is that such assessments are more stressful for students than contact-based ones, thus significantly affecting performance (Clark *et al.*, 2020). Furthermore, proctored exams require well-established infrastructural setups (software and hardware), but this is usually a problem for students at some institutions who bemoan the lack of internet access and the digital divide between them and their more urban counterparts (Gamage, de Silva & Gunawardhana, 2020). Stable internet connections are a problem in such communities owing to developmental deficits in most developing countries (Muhuro & Kang'ethe, 2021). It is also argued that some students may in some cases be uncomfortable to undertake examinations under camera supervision due to personal or cultural reasons (Guangul *et al.*, 2020).

Open-ended assessments on the other hand use assessments such as quizzes, open-book/take-home assessments, presentations/demonstrations and portfolios of evidence (Guangul *et al.*, 2020; Daniels, *et al.*, 2021). It is contended that open-book/take-home assessments are highly vulnerable to cheating, and they ultimately disadvantage the cheater and other hardworking students in the same class whose hard work is not rewarded accordingly (Fontaine *et al.*, 2020). This would potentially harm student morale and in some cases influence students to engage in academic dishonesty (Alin, 2020). Quizzes have been criticised for offering low stakes for students to demonstrate their understanding of taught content, but the randomisation of questions makes it more difficult for cheating to happen (Dicks, Morra & Quinlan, 2020). Presentations as a remote assessment during the pandemic have been conducted using web-based online conference systems such as Microsoft Teams, Skype, Zoom, etc. (Gamage *et al.*, 2020). Regarding portfolios of evidence, students are expected to compile their best work from a given learning period and to critically reflect on what has been taught. This is done so that students can demonstrate what has been learnt through critical reflection (Daniels *et al.*, 2021).

4.3 Assessment security in the digital domain

The notion that digital technology may aid the transformation of education, particularly assessment, is not new. This is because of its potentially positive features or affordances such as delivering more customised, immediate or engaging assessment experiences (Oldfield *et al.*, 2013). However, assessment reform and security are becoming increasingly evident, especially if such reforms and security are to keep up with other theoretical, cultural and technical advancements that influence teaching and learning. In the subject of digital security, the term “*security*” is rarely adequately defined on a conceptual level, this is because, issues of security sometimes fall into dichotomous, binary conceptions, where anything is either judged “*secure*” or “*insecure*” (Organisation for Economic Co-operation and Development [OECD], 2019). However, when it comes to online learning, security implies that all authorised users have access to learning materials when they are needed (Adams & Blandford, 2003).

As hostile actors in recent times continue to take advantage of the COVID-19 pandemic, the danger of digital insecurity continues to grow, as evidenced by the rise in scams, academic cheating and phishing efforts connected to the COVID-19 pandemic (Riskiq, 2020). Various sectors such as education and businesses, as well as their different value chain partners,

relevant stakeholders and other external parties, remain exposed to danger. Given that online learning takes place over the internet, every component of an online learning system can be hacked or attacked which might result in illegal changes to educational assets and/or their destruction (Adams & Blandford, 2003; Chen & He, 2013; Riskiq, 2020).

In terms of online assessment, for students to complete their university education and show that they have attained the essential learning outcomes, both academic integrity and assessment security are required. Gamage *et al.* (2020) therefore argue that assessment security focuses more on preventing cheating in assessments and discovering any cheating that has happened, while academic integrity aims to provide students with the skills and beliefs needed to engage in ethical scholarship. While the two main purposes of assessment are to provide certification of achievement and to facilitate learning, assessment techniques, such as benchmark exams, online tests, and assignments run the danger of contract cheating (Gamage *et al.*, 2020). Alin (2020) defines contract cheating as a form of academic dishonesty in which a student pays someone to do their work. This has increased ghost-written assignments, theses and other learning outputs (Chala, 2021). Similarly, while formal written tests may minimise contract cheating, they do not allow for the assessment of all forms of learning.

To ensure assessment security across several universities, vivas were used to prevent academic cheating and ensure assessment security (Gamage *et al.*, 2020; Korkmaz & Toraman, 2020). Universities have begun to devise ways of ensuring assessment security, for example, annual university reviews aimed at improving the learning experience for everyone involved, including students, faculty and programme directors (Gamage *et al.*, 2020; Clark *et al.*, 2020). Similarly, while some universities maintain assessment security through adherence to strict deadlines, there is considerable evidence that deadlines are no longer effective in preventing students from cheating (Gamage *et al.*, 2020; Eaton, 2020). In addition, academics might use “checkpoints” or advanced drafts, in maintaining assessment security. According to Gamage *et al.* (2020), checkpoints may be used to see if students are genuinely engaged in their academic work. It may also be used to keep track of research findings and conversations, as well as to perform online testing and evaluate group work in the face of emergency remote teaching and learning.

5. Theoretical framework

This study is underpinned by the Hexagonal E-Learning Assessment Model (HELAM) that was developed by Ozkan and Koseler (2009). HELAM is a conceptual assessment model used to evaluate learner satisfaction in online learning and blended modes of learning (Ozkan, Koseler & Baykal, 2008). In this framework, the effectiveness of online learning is assessed in line with six dimensions: (i) technical issues: system quality; (ii) technical issues: service quality; (iii) technical issues: content quality; (iv) social issues: learner perspective; (v) social issues: instructor attitudes and (vi) supporting issues (see Figure 1 below).

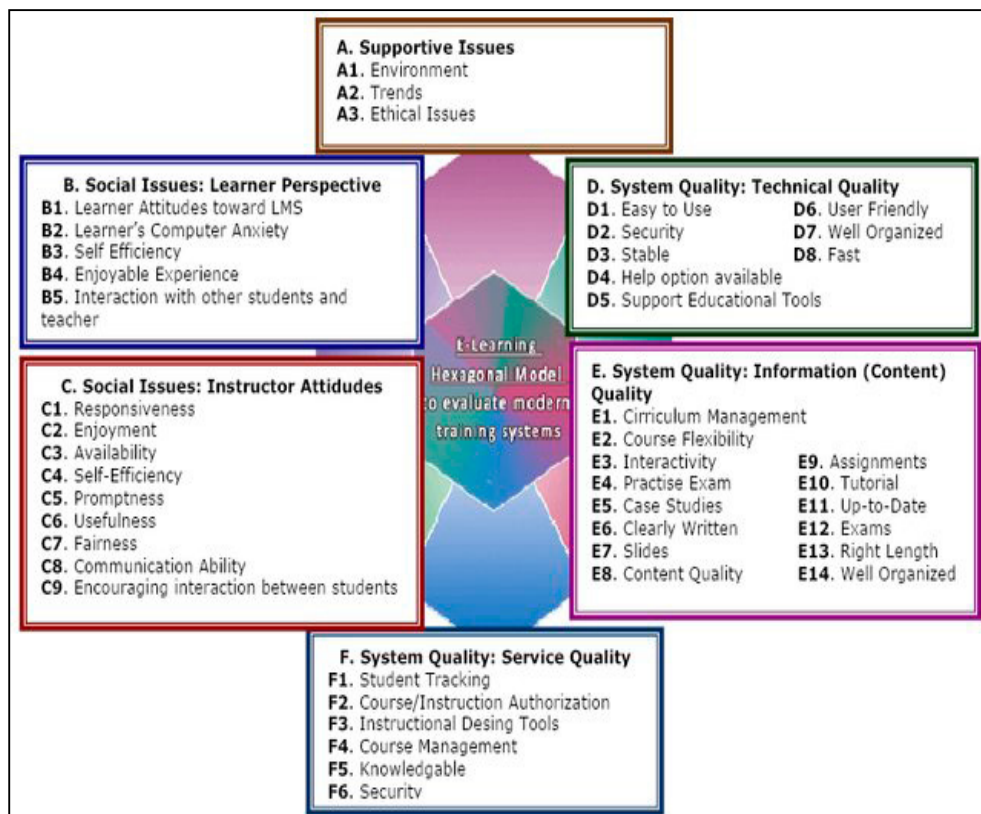


Figure 1: Ozkan and Koseler's (2009: 117) Hexagonal E-Learning Assessment Model

This study has only focused on sections E and F of HELAM and in particular F6 which relates to security. Security in online learning and assessment platforms aim to proof users from unauthorised access, secure learning-related data and other such aspects (Ozkan, Koseler & Baykal, 2008). Adopting this part of the framework was beneficial for this study because, in many ways, online learning systems are consumer-oriented, but their protection mechanisms focus on the organisational end, which is not necessarily consumer-oriented. As such, organisations safeguard their learning resources through firewalls and antimalware, yet most online security issues are attributed to a user's poor knowledge of security procedures and lack of education. This often has the consequence of information manipulation and loss of confidentiality.

6. Research methodology

6.1 Research paradigm

The present study is underpinned by a pragmatist paradigm. Pragmatism as a research paradigm has its philosophical foundation in the historical contributions of the pragmatism philosophy (Maxcy, 2003), and as a result, it embraces a wide range of methods (Kaushik & Walsh, 2019). Pragmatism is founded on an inter-subjective ontological attitude that gives room to the existence of one and multiple realities (Kaushik & Walsh, 2019). According to Creswell and Plano Clark (2011), pragmatism recognises that there may be a single or

numerous realities that may be investigated empirically. This means that pragmatism is not bound by any particular philosophical system or reality (Kaushik & Walsh, 2019). The pragmatist paradigm was found suitable for this study because it encourages researchers to concentrate on the two methods of inquiry (Morgan, 2014; Kaushik & Walsh, 2019) to solve practical issues in the actual world rather than categorise post-positivism and constructivism as two distinct ontological and epistemological groups.

6.2 Research approach

To capture the widest range of data, a mixed-method research approach was chosen. A mixed-method research approach was possible because of the adoption of a pragmatic research paradigm. According to Creswell (2014), a mixed-method research approach is the combination of quantitative and qualitative approaches. The mixed-method approach was found suitable because it allowed the researchers to critically investigate the assessment practices in universities in developing countries and to examine how these universities have responded towards safeguarding academic integrity in the face of the emergency remote teaching and learning.

6.3 Research design

Based on the use of the mixed methods research approach, the present study employed a sequential exploratory mixed methods study design. In line with Berman (2017), we began with a qualitative data collection and analysis, followed by a quantitative data collection and analysis, after which the researchers entered a final phase of integrating the data from the two phases. The development of the quantitative survey questionnaire used was informed by the themes that emerged from the qualitative data analysis. This design proved useful in answering the research questions and drawing larger inferences from the findings.

6.4 Population, sample, and sampling technique

The population for our study comprised university managers, lecturers and students in the three (3) Southern African universities. The participating universities were from Botswana, Zimbabwe and South Africa. We utilised the convenience sampling technique for the qualitative phase and a simple random sampling technique for the quantitative phase of our study. This was informed by Creamer (2018) who argues that the main benefit of combining probabilistic and non-probability sampling techniques is that it easily supports the argument that results are generalisable to different contexts and populations. The sample for the qualitative phase comprised ten (10) students, three (3) lecturers and two (2) managers from each institution making a cumulative total of forty-five (45) participants who were conveniently sampled. In the quantitative phase, participants were selected using a simple random sampling technique through which thirty-five (35) students, five (5) lecturers and three (3) managers were selected for participation from each of the three institutions, making a collective total of one hundred and twenty-nine (129) participants.

6.5 Data collection instrument

In the qualitative phase, we utilised semi-structured online interviews because they offered rich in-depth explanations of the phenomenon under investigation while the quantitative phase utilised a survey questionnaire. According to Neuman (2014), a survey may be used for explanatory, descriptive and exploratory research. These data collection tools were essential

in offering insights into assessment practices in Southern African universities and how they safeguard academic integrity in the face of emergency remote teaching and learning.

6.6 Data analysis and trustworthiness

For this study, data collected in the qualitative phase of the study was analysed thematically while data collected in the quantitative phase was analysed using descriptive statistics. During data analysis, qualitative and quantitative data were integrated to get deeper insights into the state of academic integrity in developing countries. To ensure data trustworthiness, triangulation was achieved using more than one unit of analysis. As such, responses from students, staff and faculty managers across the three (3) selected universities were triangulated to ensure the credibility of the research findings.

6.7 Ethical considerations

Ensuring anonymity and informed consent were the primary ethical concerns for this study. This was discussed and agreed upon before the commencement of data collection. Permission was also obtained from the respective university gatekeepers before the commencement of data collection. Before the participants' consent was requested, they were given information about the research's aims, procedure and data usage. As such, the participants were also given the option of withdrawing from the study at any time, with the data from that respondent not being used.

7. Results and discussion

We set out to investigate assessment security in the digital domain and to critically evaluate the assessment practices employed to safeguard academic integrity across three Southern African universities. In this section, results and discussions are presented under the following themes:

- Strategies used to enhance assessment security in the digital domain
- The effectiveness of assessment practices

7.1 Strategies used to enhance assessment security in the digital domain

To gather data on strategies used to enhance assessment security in the digital domain, we asked participants, "What strategies have been used at your institution to enhance security in online assessment?" Findings from the qualitative phase revealed that although the transition to online learning and assessment was abrupt, higher education institutions have generated creative strategies to ensure the continuity of learning and assessment. These strategies include the administering of several versions of the same examination, presenting students with case studies to apply theories learned, changing variables in examination papers to create uncertainty among the students and using "text-matching" software to detect plagiarism and check for originality of work done by students. A case in point can be drawn from a lecturer who opined,

To ensure that students do not cheat in online assessments, I usually give out questions that cannot bring immediate answers using search engines such as Google and the like. So, what I do is that before giving an online assessment, I Google the questions to see what comes up then I fine-tune the questions if Google provides an immediate answer. I do not like questioning that does not require knowledge application (Lecturer 3, University Z).

Similar innovative strategies were also unearthed in the responses of students who noted that lecturers have managed to reduce the incidence of online cheating using diverse strategies where the same component is tested in different ways in the same class. For instance, a student stated,

Our lecturer is very clever, we never know what is coming unless after the exams have been written. He sometimes uses the same examination, only changing the numbers, names of things, or rearranges the exam questions in the paper to create uncertainty among the students...even if we wanted to copy, trying to figure out if we have the same thing takes too much time and you can end up exceeding the time limits. I think this has helped reduce cheating (Student 3, University X).

In support of the above, a lecturer also noted that,

We are encouraged by the faculty to create several versions of the same exam and to randomly distribute these different versions of the same exam to different groups of students. So, they often will not know who has a similar question paper with them... remember these are timed assessments so they cannot spend time trying to get the other students they have been grouped with (Lecturer 1, University X).

Responses from the university managers across the universities also echoed similar sentiments, albeit acknowledging the complexity of assessment in the context of developing countries. A case in point can be drawn from a manager who said,

It is very difficult to ensure assessment security with very limited resources...we can never guarantee that our assessments are hundred per cent secure. However, because we know that there are upright students who are principled, we usually provide platforms where reporting of collusion amongst students can be reported anonymously. We want to protect those reporting incidents of cheating so that they do not suffer any backlash (Manager 2, University Y).

Similarly, another participating manager in one of the universities stated that,

We encourage lecturers to employ a system in which students write their exams after receiving a password-protected paper (PDF or word) and after answering the questions by hand, they upload their scanned answer scripts for online marking. Another strategy that we employed for assessment security is to divide a long paper into smaller parts which are administered over smaller time frames (Manager 1, University Z).

Research findings from participants across the three universities further revealed that assessment security is ensured by setting high cognitive level questions that are not solely based on students' ability to recall information but premised on students' ability to apply theories learned. This could include asking students to provide a detailed explanation of processes followed to answer questions as opposed to merely providing answers without justifications. Our findings further revealed that universities use online platforms such as Blackboard Collaborate for oral presentations for smaller student groups, as well as asking students to sign and subscribe to the ideals of honour codes which holds them morally responsible to the values of academic integrity.

Research findings from the quantitative phase of the study in Table 1 below shows the different strategies that have been used across the participating institutions to deliver assessment and the frequency at which these strategies were employed to enhance security in online assessment.

Table 1: Strategies employed to enhance assessment security

	Variables	Frequency	Percentages (%)
1	The use of “text-matching” software e.g. Turnitin, SafeAssign, Wcopyfind, MOSS, etc.	72	61
2	Using moral codes to ensure students’ accountability	15	12
3	Encouraging students to report cheating and collusion	113	88
4	Online invigilation e.g. the use of software such as SpeedExam, Mercer Mettl, etc.	18	14
5	Adjusting questioning techniques	93	72

In the table above, research findings revealed that 88% of the participants believed that assessment security is enhanced in their institution by encouraging students to report any form of academic misconduct. This strategy was the most frequently identified followed by the adjusting of questioning techniques which was identified by 72% of the respondents. Furthermore, 61% of the participants acknowledged that their institutions were utilising text-matching software to detect plagiarism. The least acknowledged strategies were the use of online invigilation which stood at 14%, as well as students’ adherence to moral codes which dissuades academic dishonesty, acknowledged by 12% of the participants.

Research findings from the qualitative and quantitative phase of the study revealed that institutions in developing countries rely more on strategies that do not involve novel technologies, this could be as a result of a lack of resources in the abrupt transition to online learning. As a result, these institutions often resort to the use of non-technological strategies of improving assessment security such as adjusting questioning techniques and setting of high cognitive level questions that do not merely rely on students’ ability to recall information. These findings can be corroborated by Mncube *et al.* (2021) who found that because higher education institutions in developing countries were caught off guard by the COVID-19 pandemic, effective administration of online examinations remains an arduous task. This position can be explained by HELAM, which argues that for effective online teaching and assessment, institutions must ensure that security is effective. This means that systems must be easy to use, stable, user friendly, fast, well organised, support educational tools and must be secured (Ozkan & Koseler, 2009). Furthermore, given that online invigilated examinations require well-established infrastructural setups (software and hardware), this is usually a problem for students at institutions in developing countries who bemoan the lack of internet access and the digital divide between them and their more urban counterparts (Gamage *et al.*, 2020). This has led to problems such as a high incidence of psychosocial challenges in higher education (Clark *et al.*, 2020).

7.2 The effectiveness of assessment practices used to safeguard academic integrity

To elicit evidence on the effectiveness of assessment practices in the digital domain, participants were asked, “How effective are the assessment practices employed at your institution to safeguard academic integrity?” Findings from the qualitative study revealed that while assessment is used to provide learning support, entrench accountability and provide certification for intended outcomes, institutions in developing countries find it difficult to deliver secure assessment because students still find innovative ways of cheating. Participants revealed that students in developing countries sometimes resort to contract cheating, use

online paraphrasing tools to evade detection by text-matching software and search for answers through the internet which undermines the effectiveness of assessment practices. An example can be drawn from a lecturer who opined,

While the university has tried to capacitate lecturers on the use of online assessment, the institution fell short when it came to the issue of capacitating students...I can say that online assessment is not effective because we just do not have the resources to enable its effectiveness. An example is that some months ago, the institution's subscription to Turnitin expired and we could not check for issues like plagiarism...the Blackboard licence usually expires, and we can go for days or weeks without access to online teaching platform - these are some of the challenges we are facing (Lecturer 1, University Y).

These sentiments were corroborated by a student who explained why the online assessment was almost impossible to implement successfully considering the challenges bedevilling developing countries. The student lamented,

Online assessment is not effective at all. It disadvantages students who are from poor rural areas where access to internet connectivity is limited. Sometimes I feel like online assessment is just an assessment of how accessible online technologies are. Why am I saying so? Students just copy and copy and copy – this has become the new way of life, so anyone who has access to mobile data and network connectivity is almost guaranteed of passing (Student 10, University Z).

Participants also revealed that there was a lack of willingness to transition into online learning which impinged on the effectiveness of online learning. A case in point can be drawn from a lecturer who posited,

Online assessment is not effective in our institution...people like me are too old to suddenly be asked to teach online. I have been working for the university for more than thirty years now, and overnight you ask me to teach and assess students online. These platforms of theirs are very confusing, they require intensive workshops for older staff and those whose technological skills are a bit behind...we, therefore, cannot effectively assess these students' work (Lecturer 5, University X).

In addition, students also highlighted that cheating was more rampant among their peers because of the unplanned transition to online learning. An example can be drawn from a student who said,

I have seen increases in the rate of cheating and academic misconduct, many students cheat nowadays as compared to when we were having invigilated assessments. We are not receiving adequate teaching, and some of these exams are just too difficult – some of our lecturers like seeing us failing...to survive, one decides to cheat. It is a matter of cheat or be cheated by the system. The authorities are the last people who can talk about academic integrity, there is no integrity to talk about when adequate teaching has not happened. So, students engage in contract cheating and sometimes you just pay someone – maybe a senior who is well-versed – to write for you. (Student 7, University Y).

A manager also lamented that despite the efforts put in place to reduce cheating, cheating was fast becoming a pandemic in higher education. The manager complained,

There is almost an arms race between students who are forever engineering new ways of cheating...being a rural institution it is difficult to invigilate students online. When we institute for example the use of text-matching software like Turnitin, students will try new strategies...a common tool is paraphrasing tools online. We cannot really say that online assessment is effective – we are just doing what can work in our context (Manager 3, University X).

Research findings from the quantitative phase of the study in Figure 2 below show the rate at which academic dishonesty happens in different online assessment practices according to respondent beliefs.

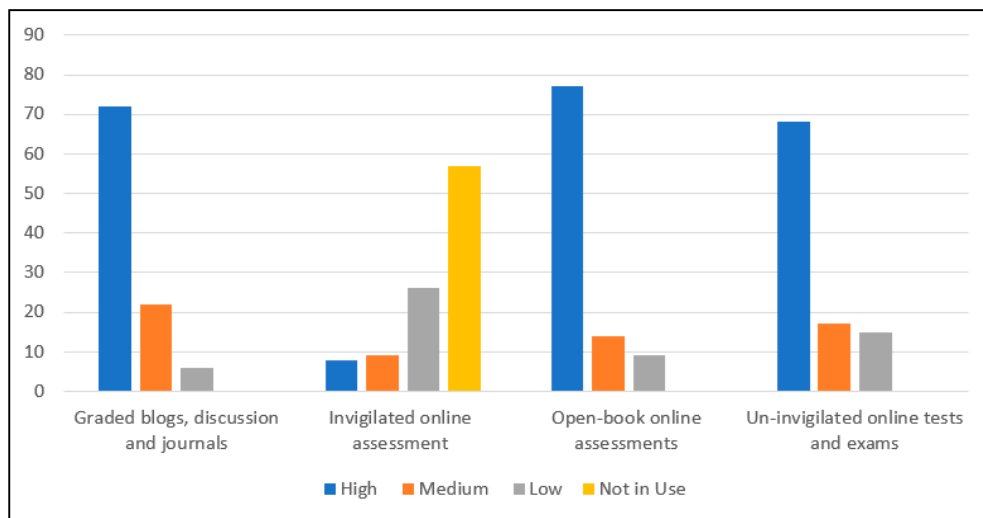


Figure 2: Perceived effectiveness of assessment practices used to safeguard academic integrity

Participants revealed that when assessment is undertaken using graded blogs, graded discussions and graded journals, 72% of the participants believed that a lot of cheating happens, while 22% noted that academic dishonesty was medium and a meagre 6% noted it as low. Furthermore, when it came to invigilated online assessments, a majority of 57% of the participants acknowledged that this form of assessment was not in use at their institution. Twenty-six per cent believed that academic dishonesty was low in invigilated online assessments, while 9% posited that it was low and 8% noted it to be high. When asked to rate the frequency of academic dishonesty in open-book online assessments, 77% of the participants noted that it was high, while 14% noted that it was medium and 9% believed it was low. Concerning the rate of cheating in un-invigilated online tests and examinations, 68% of the participants noted that it was high, while 17% said it was medium and 15% said that it was low.

Findings from both phases of the study reveal that although online assessment was introduced as a panacea to the discontinuity of learning amid the COVID-19 pandemic, the ineffectiveness of online assessment can be noted in the high rates of academic misconduct which has been reported in developing countries. These findings substantiate the view that assessment in developing countries in the wake of COVID-19 is highly susceptible to cheating and academic misconduct because in most cases, the transition to online pedagogies was abrupt and under-resourced (Suryaman *et al.*, 2020). In fact, Ozkan and Koseler's (2009) HELAM (F6) is concisely based on the view that online learning systems are consumer-oriented, but their protection mechanisms focus on the institution. This has potentially harmed students' morale and, in some cases, influenced students to engage in academic dishonesty (Alin, 2020). As such, it is argued that students are increasingly engaging in cheating in online assessments because of the lack of invigilation, pressures associated with trying to catch up

with delayed academic schedules and resource inadequacies, among many others (Fontaine *et al.*, 2020; Korkmaz & Toraman, 2020; Chala, 2021).

8. Conclusion and recommendations

We set out to examine assessment security in the digital domain and to critically evaluate the effectiveness of assessment practices employed to safeguard academic integrity in the context of three Southern African universities. Our results revealed that while higher education institutions endeavour to deliver quality assessment in the context of COVID-19, there exist challenges that impinge on the effectiveness of assessment in the digital domain. Our study established that institutions in developing countries rely majorly on strategies that do not involve novel technologies as a result of a lack of resources in the abrupt transition to online learning. As a result, institutions in developing countries often resort to the use of non-technological strategies for improving assessment security. Based on the findings of the study, we recommend that to ensure the effectiveness of online assessments, faculty members must strive to ensure authentic assessment which seeks to replicate real-world experiences as closely as possible. We further recommend that struggling institutions collaborate with those institutions with suitable infrastructure and knowledge regarding online assessment to allow for the transfer of technological skills, knowledge and competencies. Finally, institutions must also consider focusing on formative forms of assessment and constant feedback mechanisms which can help students to track their progress towards course completion. We propose that this be done in consultation with students.

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