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Online Final Examination: Managing Academic Integrity Issues

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ABSTRACT

Along with the COVID-19 pandemic, higher education has undergone significant changes, including the adoption of online emergency remote teaching and learning. Academicians are facing the issue of developing e-courses and finding appropriate techniques to assess students learning in an online setting while at the same time preserving academic honesty. Academic honesty is extremely critical in higher education. The core principles of academic integrity's are to protect a university's reputation and produce a better attitude of the graduates. Therefore, this paper summarizes methods used in minimizing academic dishonesty at the Fakulti Kejuruteraan Elektronik dan Kejuruteraan Komputer, Universiti Teknikal Malaysia Melaka, which focuses on an online final examination. The programme outcomes attainment of physical and online assessments is also compared and discussed. As students' attitude and integrity utmost everything, fair and preventive approaches are then outlined.

1. Introduction

When Universiti Teknikal Malaysia Melaka (UTeM) embarked on the emergency remote teaching and learning (ERT&L) in early 2020, the awareness of an academic integrity during an online assessment is off-guard. The terms academic misconduct, academic dishonesty, academic integrity and cheating which is refer to an unethical academic behaviour have regularly come across. Whoever commits this behaviour will reflect on the knowledge, skills and attitude of its holder which is the student and effect the institution reputation. When all courses are required to go online during to the pandemic, some researchers conclude that most educational institutions are totally unprepared for such a sudden move. Based on the experience conducting an online assessment, a main concern of academicians is on how to retain the academic integrity. Previous researchers **Error! Reference source not found.**, **Error! Reference source not found.** reviewed current research on academic

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integrity in higher education, which focused on an online assessment since the introduction of online learning in 2006. The authors have comprehensively covered the factors that lead to cheating and found ways of identifying cheating.

2. Academic Assessment

2.1 Literature Review

According to scholars, the primary goals of an assessment are to guide and direct students' learning, enhance the quality of the teaching and learning process, and promote improvement of an academic programme **Error! Reference source not found.** TeachThought, an organization that dedicated to innovation in education through the growth of innovative proposes six (6) different forms of learning assessments as in Figure 1. At the same time, previous researchers **Error! Reference source not found.**, **Error! Reference source not found.** emphasised the need for assessment in an online teaching and learning. According to research, online assessments gave some degree of challenges, not only to students but also for the lecturer who devised and developed the assessment. The difficulties of virtually assessing the learners were also highlighted in the same study. Previous researchers **Error! Reference source not found.**, **Error! Reference source not found.** shared their experiences and examined the adoption of online summative assessment and challenges in their respective institution of higher learning. Utilizing diversifying assessment methods were also suggested by previous researchers **Error! Reference source not found.**, **Error! Reference source not found.**, which allowed for more inclusive approach in designing an assessment. While previous researchers **Error! Reference source not found.** suggested that continuous and structured assessment was the main characteristics of an online assessment, which included immediate feedback for learners' improvement. As far as assessment is concerned, lecturers must make changes of traditional assessments and ensure they would fit the virtual environment. The author also suggests that the assessment instructions should be different in both online and physical assessment.

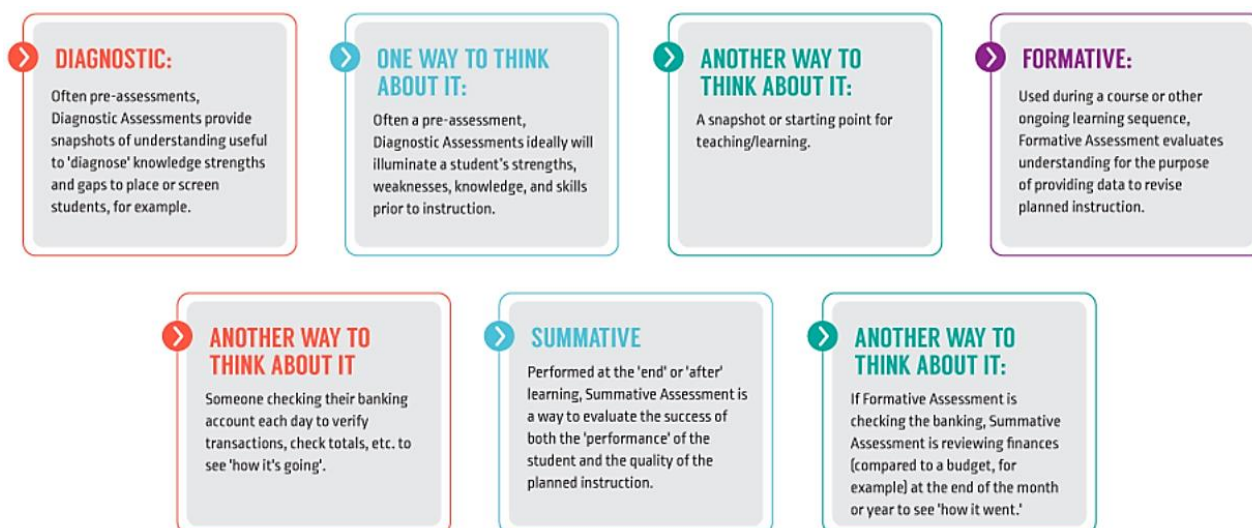


Fig. 1. Different types of assessment of learning by TeachThought

Summative assessment is a form of evaluation used to measure the students' performance at the end of an instructional period. Summative assessments are generally a major component of the assessment. Final examination is a well-known example of summative assessment. Although summative assessments can be conducted in both physical and virtual learning environment, the

implementation transition requires detailed design in order to maintain the quality of the assessment and the course, which indirectly reflects on the attainment of the programme outcomes (POs).

Past research **Error! Reference source not found.-Error! Reference source not found.** studied the effectiveness of online final examination implementation during ERT&L. Technology readiness, examination system applications, ease of use and communication were found to be the factors that have contributed to the success of online final examination implementation. Previous researchers **Error! Reference source not found.** summarized the implementation of online final examination which focused on authenticating learning and the integrity issues. According to previous researchers **Error! Reference source not found.**, a total 73.6% of students claimed it was easier to cheat during online examinations compared to face to face examinations. Thus, the use of technology was believed could minimize cheating, however [16] proved that the tools used were ineffective.

Previous researchers **Error! Reference source not found.** has given an insightful overview of academic misconduct issue in Malaysian public universities context. Based on a three-years survey (2018-2020) by **Error! Reference source not found.**, the level of academic dishonesty among Malaysian universities students remained at moderate level. The study focused on the written assignments and report writing, where the academic dishonesty found were related to “cut and paste” and citation issues. To echo to the previous study, previous researchers **Error! Reference source not found.** discovered that during online tests and examinations, students were prone to copy their peers' solutions. Other than that accessibility to online sources during online examination have promoted to academic dishonesty among students. There is similar published work from countries other than the United States, the United Kingdom, and Australia. However, the key contributing factors that driving academic dishonesty are different from those found in developing countries due to sociocultural, level of awareness, the system of education, and cultural beliefs.

2.2 Theoretical Framework

A comprehensive theoretical framework for academic dishonesty in higher education was provided by previous researchers **Error! Reference source not found.**. The author explored various theoretical frameworks for conceptualising academic integrity, as well as the evidence that supported each paradigm and its limitations. According to the author, five prevalent elements of theoretical framework were:

- i. deterrence theory
- ii. rational choice theory
- iii. neutralisation theory
- iv. planned behaviour theory
- v. situational ethics

2.3 Malaysian Legal Provisions

The Malaysian Ministry of Higher Education (MOHE) has made proactive measures to address issues of education and integrity. The Educational Institutions (Discipline) Act 1976 (EIDA 1976), the Universities & University Colleges Act 1971 (UCCA 1971), and the Private Higher Learning Educational Institutions Act 1996 (PHLEIA 1996) have been published concerning academic dishonesty in higher education. Legal perspectives focusing on academic integrity has been thoroughly covered in **Error! Reference source not found.**. Academic Regulations handbook of Universiti Teknikal Malaysia Melaka 0 also has a clear policy dedicated to academic misconduct.

2.4 Implication to Educational Development

Academic dishonesty involves a variety of negative consequences for students, lecturers, educational institutions, and the educational system. For example, students who participate in academic dishonesty once are more likely to do so again in the future, perhaps leading to a life of dishonesty. Furthermore, academic dishonesty produces an environment that is not conducive to learning, which impacts both honest and dishonest students. Academic misconduct lowers the quality of graduates produced and gives a negative impact on the reputation of the educational institution **Error! Reference source not found.,0.**

3. Research Questions

The following research questions will be addressed in this article:

- i. How and why academic dishonesty occurs?
- ii. What is the nature of academic dishonesty?
- iii. How to prevent academic dishonesty?

4. Research Methodology

4.1 Methodology

The research was conducted in three stages. In stage one, POs attainment of the individual course were compared between two different academic sessions, 2018/2019 and 2019/2020. 928 students from 2018/2019 session went through physical assessment, while 643 students from 2019/2020 session undergo fully online assessments.

Based on stage one data, samples were taken on the obvious achievement in assessment for academic year 2, 3 and 4. Year 1 students were excluded from the study as there were no similar courses were offered that could be compared with. The online examination score which contributed the highest percentage was analysed and a thorough discussion was conducted at various departmental meeting and Examination Board Meeting. During the second stage, feedback from respective lecturers were obtained regarding the attainment of the POs. The evidence for the misconduct was gathered through direct observation of the answer script and an online search of a specific examination questions.

During the final stage, conclusion and preventive strategy were proposed to reduce academic dishonesty among students.

4.2 Objectives

The academic integrity issues have become an academic dilemma and major discussion topic worldwide especially in an online learning environment. The chances of academic misconduct are widely open since less monitoring is conducted during examination compared to physical examination. Given the increased use of online assessments as a consequence of the pandemic, the purpose of this study is to share experience on how the unethical behaviour can be minimised. This paper will help academics and institutions to understand and plan an appropriate approach in reducing academic misconduct effectively.

5. Assessment Implementation

With referred to Engineering Accreditation Council (EAC) guideline 0, the assessment methods during ERT&L shall be appropriate to, consistent with, and support the attainment or achievement of the POs and precautionary measures in handling integrity issues must be ensured. There is a flexibility to conduct assessment as per normal practise or adopt continuous assessment. The faculty has decided to retain assessment practice where a total of 40% is a coursework assessment (tests and assignments) and a total of 60% is for final examination. Since large portion of the assessment percentage comes from final examination, this paper concentrates on academic integrity during online final examination.

Towards maintaining the quality and academic integrity of online assessment, precaution approaches implemented by the faculty is comprehensively discussed.

5.1 Open Book Examination

The summative assessment is designed by adopting the open-book assessment. Suitable open-book examination questions with optimum answering time are designed for the online test and final examination. Multiple sets of question are prepared, with a minimum number of two sets per course.

5.2 Higher-Order Thinking Skills (HOTS) Questions

In addition, the assessment questions are designed to incorporate a high order taxonomy level and complex problem solving (CPS) criteria as outlined in the EAC standard 0. In general, complex engineering problem question will involve a wide range of engineering issues, requires originality in analysis and thus there is no obvious solution, cannot be resolved without in-depth engineering knowledge. Thus, the examination questions must comply with complex problems characteristics (WP) and must consist of WP1 and some or all of WP2 to WP7, as listed in the standard. Each complex problem-solving criteria is clearly defined in the moderation form.

5.3 Questions Moderation

Double-layer moderation process is adopted in which the internal and external moderation are conducted. The internal moderator is selected amongst subject matter experts within the faculty. The roles of the internal moderator are to validate either the designed assessment satisfies the outline criteria and questions developed are up to the standard including the suitability of complex problem-solving criteria set for the question. Meanwhile, the external moderator functions as a second layer of moderation. The external moderator is the faculty appointed external examiner.

The criteria's outlined for moderation are as follows:

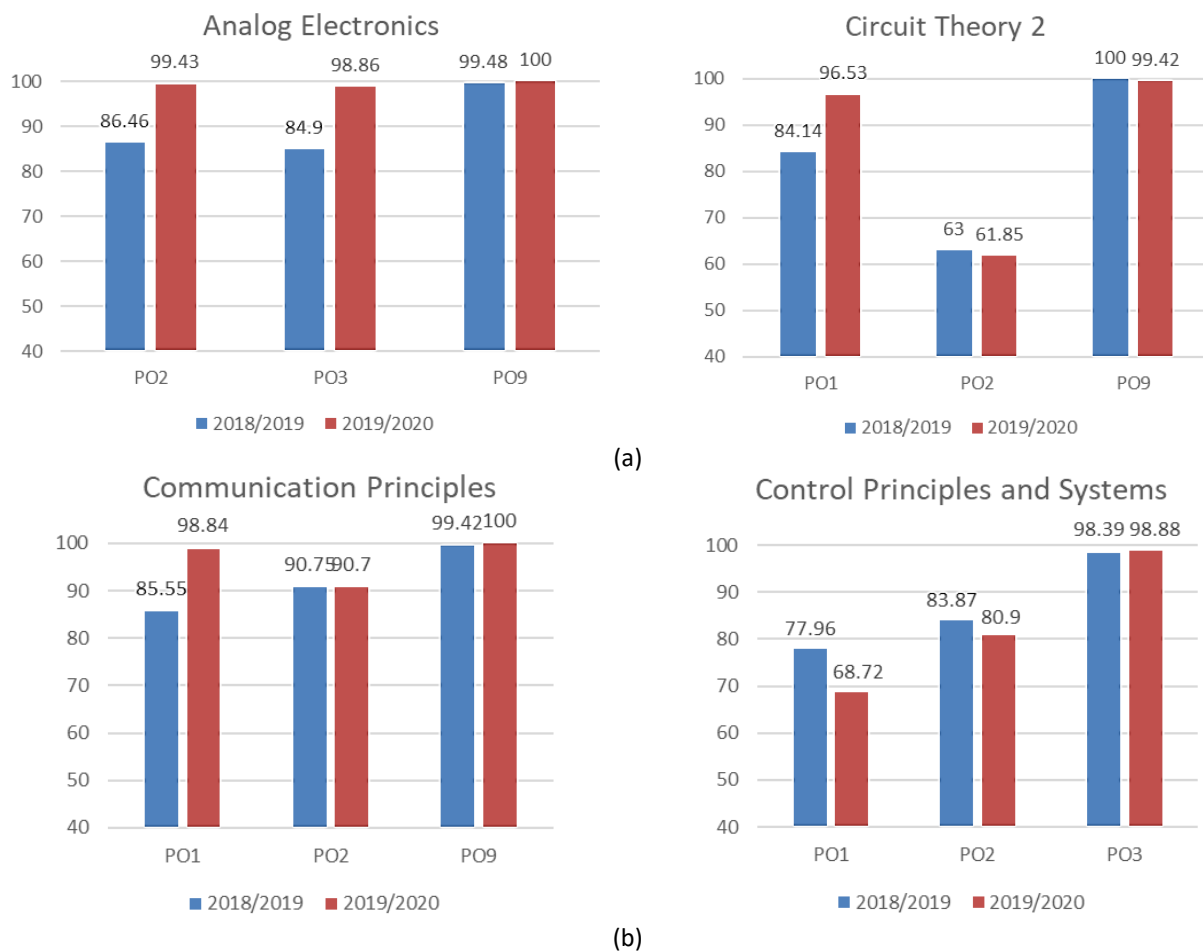
- i. fulfil the learning outcome and POs of the intended course
- ii. satisfy the range of CPS characteristics
- iii. provide solutions, points and arguments to questions
- iv. project difficulty level and time required to answer the question
- v. follow standard formatting use in the assessment sheet

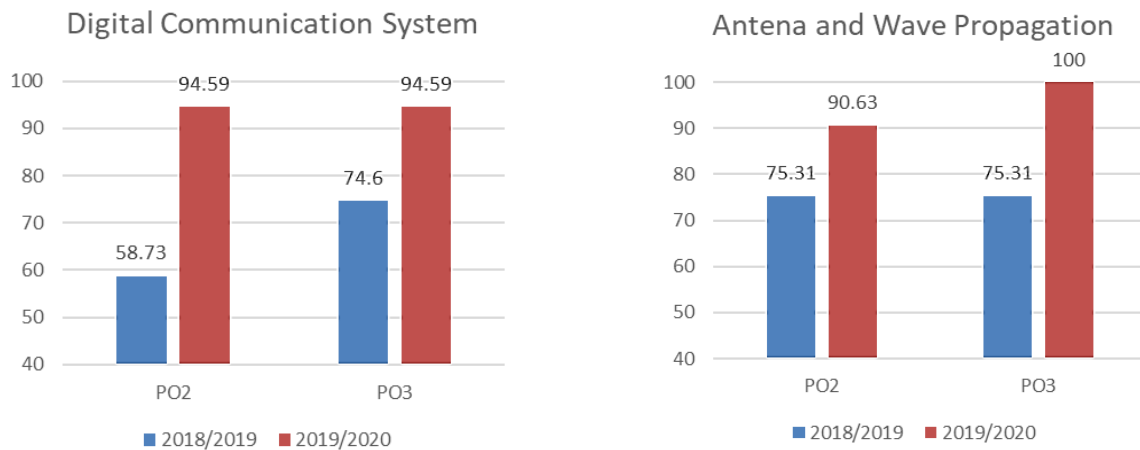
5.4 Official Examination Portal

Schedule examination is conducted using University Examination Portal. Students are required to sign an online academic honesty and integrity pledge before they can proceed to the examination question. The other strategy uses during the examination is to randomly distribute multiple sets of question to a different group of students. This is to prevent background discussion amongst them. The examination question is only to be displayed at a specific date and time to the authorized students' only. Thirty (30) minutes grace period are given for scanning and uploading purposes.

6. Findings and Discussion

The evidence of the study was obtained from the POs attainments and final examination answer script. The programme outcomes (POs) attainment for two different academic sessions was compared where the attainment for academic session 2018/2019 was based on physical assessment, while for academic session 2019/2020 the attainment was based on the online assessment, as shown in Figure 2(a)-(c) for Year 2, 3 and 4. The samples were taken based on obvious differences of the POs attainment. An increment between 0.52% to 13.96% was discovered for Year 2 and Year 3 courses. The increment in PO attainments of certain course's is surprisingly unexpected. Almost similar trend is observed for the other courses in the programme.





(c)

Fig. 2. Comparison of POs attainment based on physical and online assessment for different academic sessions (a) Year 2 courses (b) Year 3 courses (c) Year 4 courses

As for Year 4 courses, there was a tremendous increase between 15.32% to 35.86%. Further investigation for the ridiculous PO attainment for Year 4 courses results in two important findings which seldom be found during physical examination. First, lecturers claimed that more than two identical answer scripts were detected. The students were believed to copy the answer from someone or have a background discussion prior to solve the question. Similar answers could also be found for questions that involved calculation, although each set of questions will have different parameters. Students appeared to be copying the answer without comprehending that a different parameter was provided. Based on the critical reasoning questions, a nearly identical solution was obtained or left unanswered, thus no critical thinking components can be assessed. As a result, the students' score in online final examination was questionable.

On top of that, some of the questions were found on the Academic resource sharing (ARS) sites, such as Chegg, Course Hero, StudySoup, Quizlet and many more. The most popular ARS site for UTeM students is Chegg. Figure 3 is a sample of final examination question.

QUESTION 2

- (a) As an engineer in one telecommunication company, you are asked to study the voltage distribution relation of an AM transmission that is going to be designed. Explain your finding by using the mathematical expression of the carrier signal, modulated signal, and side frequencies for single-tone AM. Describe the relationship between the amplitudes when the modulation index, $m = 0.5$, $m = 1$ and $m = 1.5$. Draw an appropriate voltage spectrum to aid your explanation.

[11 marks]

Fig. 3. Sample of final examination question

Figure 4 is the result that appears on Chegg.com search.

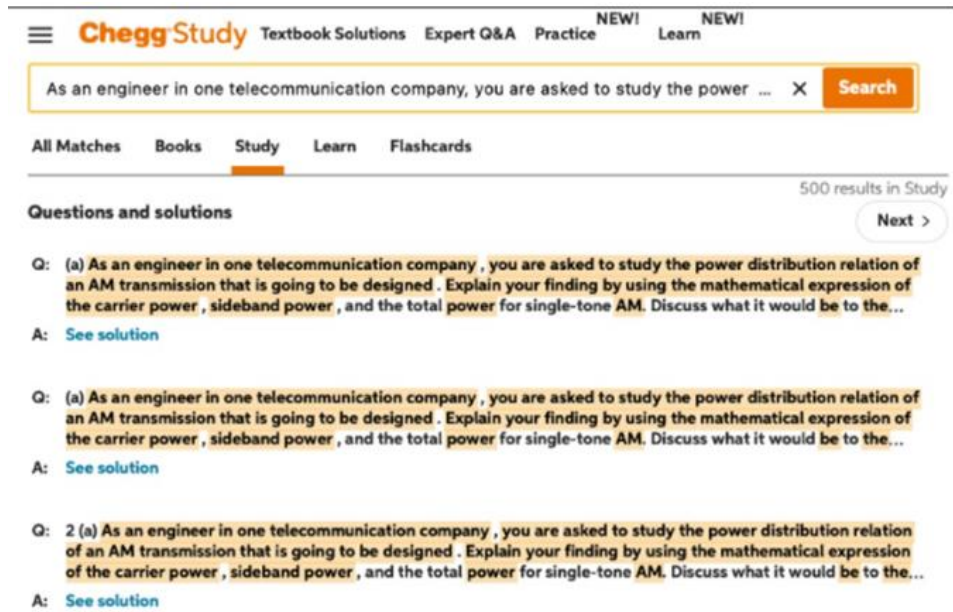


Fig. 4. Result from Chegg website question search

Almost ten possible answers were suggested on the website, as illustrated in Figure 5.

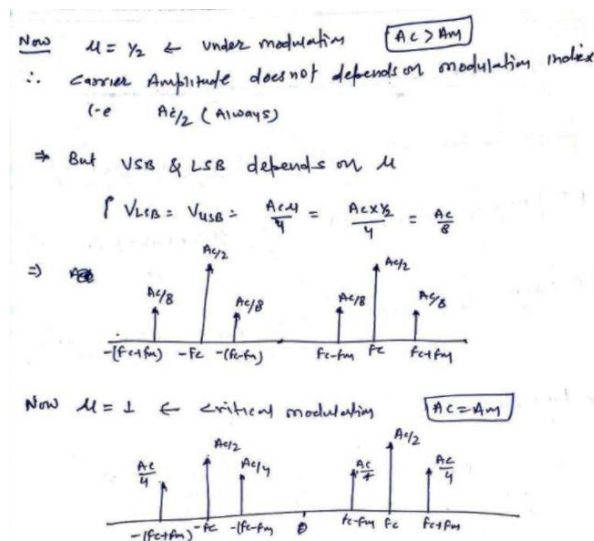


Fig. 5. Sample answer from Chegg website

Sample of student answer script which was almost identical to Chegg suggested answer was found as in Figure 6. With these evidences, the lecturer had the options to lodge a misconduct report as outlined in the academic regulation handbook or give zero marks to the student.

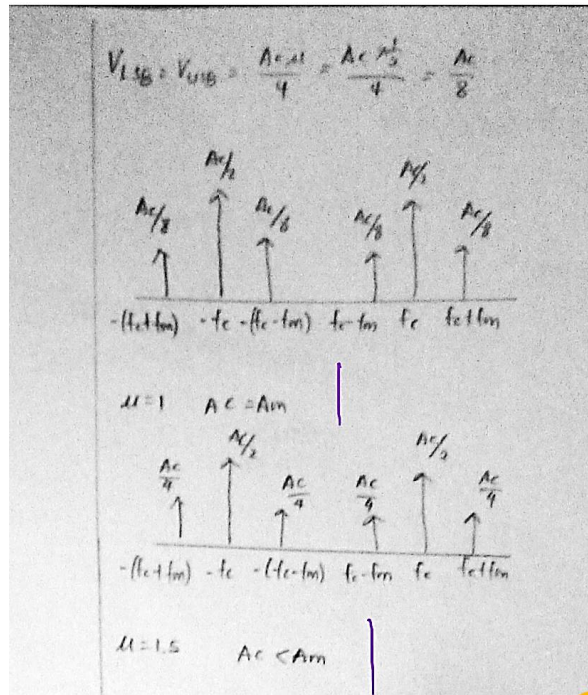


Fig. 6. Sample answer from student

It is believed that cheating on Chegg has a long-term negative influence on society since the students are willing to pay for a membership fee to get the advantages of seeking help in solving problems, using someone else works as theirs and obtain good grades. This subscription gives them access to “homework solutions” and “expert Q&A”. Students are inappropriately exploiting internet content rather than utilising online platforms to connect with other students studying similar topics. This site has evolved into a platform for contract cheating. The role of an online tutor has evolved from assisting students in tutorials to solving test/examination questions, writing assignments, and laboratory reports. Even though Chegg appears to have an Honor Code that asks students not to violate academic integrity. Since there is no timestamp or identification of the requestor, identifying the dishonest student can be challenging.

Although the Academic Regulations handbook [21] has clearly stated that students who commit academic misconduct is going to be suspended from the program, student still cheat in the exams. Amongst the main reasons of cheating during examination is less preparation, ineffective online lesson compares to face-to-face classes and students’ attitude during online class, thus impelling towards academic misconduct. The intention of obtaining good grades has also spark this bad attitude. Overall, academic misconduct has increased the effort of lecturers because it requires designing and evaluating multiple unique examination questions.

7. Suggested Preventive Methods

The preventive strategy is unlikely one size fits all and is suitable for all contexts. A combination of strategies, between knowing our students, knowing the subject and what to be tested may reduce academic integrity in online assessment. The following suggested fair preventive methods to maintain academic integrity in an online examination that leads to the actual POs attainment.

7.1 Use Continuous Assessment

Although the programme is bound by EAC requirements, it permits alternative assessments to be implemented for intended learning outcomes. During emergency remote teaching, small percentage and ongoing formative assessment are more appropriate. The focus is to ensure the POs attainment is achieved. In simple words, continuous assessment means frequent assessment of the learning process. According to past researchers [6], continuous assessment seems to be a fairer mode of assessment, as it does not place the students under unnecessary pressure and allows them to demonstrate their ability in a better way compared to examinations. As a result, plagiarism and academic misconduct may be minimised too.

Examples of possible continuous assessment for the engineering-based programme is project-based learning (PBL), individual and group work assignment, quizzes, tests, presentation and others. A structured, inclusive, and guidance-oriented continuous assessment should also include cumulative aspects of the cognitive, psychomotor, and affective domains, in addition to knowledge. Regular progress monitoring and formative feedback are important as it gives evidence which can be utilised to improve a students' performance as well as improvements in teaching methods **Error! Reference source not found.,Error! Reference source not found.-0.**

7.2 Plagiarism Detection Tools

According to an experienced lecturer, one technique in detecting cheating or plagiarism is to become familiar with a students' writing style, otherwise plagiarism checking software can be used for essay-type examination questions and written assignments.

7.3 Browser Lockdown

This methods lockdown all other browsers during the examination period to prevent students from accessing other screens. This is the best option to use to block the use of ARS service. Unfortunately, students can use different devices to access other browsers as well as having background discussions with other students.

7.4 Remote Proctoring

Physical proctoring during online examinations is impractical. Remote proctoring device and software will be able monitor student movement, desktop, webcam video and audio. The recorded data is then transferred to a proctoring service for review. A Second device such as a webcam and mobile phone also can be used as proctoring device.

The strategies discussed in Section 3 and 5 is the efficient and transparent variables that can be controlled. Apart from that, it is difficult to control other personality variables. It is crucial to ensure students have the right attitude. The research on academic integrity has primarily emphasized technical concerns rather than ethical and social challenges. Strategies to develop students' attitudes and integrity are our future works.

8. Advanced Technology Preventive Methods

This section explores the implementation of advanced technology as a means to overcome academic integrity issues in the online assessment process. Several innovative solutions are proposed

and discussed in brief to deter cheating, promote academic honesty, and ensure a fair evaluation of students' knowledge and skills.

8.1 Biometric Authentication

One of the primary challenges of online assessments is verifying the identity of the test-taker. By integrating biometric authentication, such as facial recognition or fingerprint scanning, educational institutions can significantly reduce the risk of impersonation and unauthorized access to assessments. Biometric data ensures that only the authorized student can take the test, enhancing the overall integrity of the assessment process.

8.2 AI-Powered Proctoring

Advanced Artificial Intelligence (AI) proctoring systems can monitor online assessments in real-time, detecting suspicious behaviour and potential cheating attempts. These AI algorithms can track eye movements, facial expressions, and keyboard activity to identify irregularities. Additionally, they can flag instances of plagiarism by comparing answers with an extensive database of academic sources. AI proctoring offers a non-intrusive yet effective approach to maintaining academic integrity.

8.3 Blockchain-Based Certification

Blockchain technology can be employed to securely store and verify students' assessment results and certifications. By decentralizing this information, institutions can enhance the credibility and transparency of students' academic achievements. This method also provides a tamper-proof record of students' assessment history, which can be beneficial for academic and professional purposes.

8.4 Enhanced Data Analytics

Utilizing advanced data analytics, educational institutions can identify patterns of suspicious behaviour and potential cheating trends across large cohorts of students. This technology enables timely intervention and targeted measures to address academic integrity issues proactively.

The integration of advanced technology into the online assessment process offers promising solutions to manage academic integrity issues effectively. By implementing these solutions, educational institutions can ensure that online assessments remain a fair and reliable means of evaluating students' knowledge and skills. However, it is essential to strike a balance between security measures and student privacy, ensuring that the technology employed is both effective and respectful of students' rights.

9. Limitation and Future Research

This study is conducted based on the POs attainment of online final examination and fruitful discussion amongst faculty lecturers during various departmental meetings. There are certain limitations to this work. The work would be best supported by conducting surveys between students and lecturers or other sources than the examination findings. Broader findings may be able to provide a thorough overview of the problem.

10. Conclusion

Examination is designed to fairly assess a students' ability. If the fairness of the examination is jeopardised, the examination results and programme outcomes attainment will be inaccurate in reflecting students' actual ability. Based on the experience, there is a considerable variation between online and physical final examination scores. Students' performance in online examinations is significantly better, unfortunately, the level of academic dishonesty has increased well above expectations.

In conclusion, practical measures must be taken to address this problem. It turns out that a students' attitude is the main factor that provokes academic misconduct. Since rules are to be broken, hence whatever strategies apply as prevention, there are still ways to overrule. The best option is to focus on strengthening students' attitudes and identity. Another thing is, to instil fear in students and make them know and aware that cheating is not tolerable. By this, it is believed that academic misconduct could be prevented and long-lasting. The only things to ponder is how to know our students and how to increase their integrity in the situation where they are remotely located in their hometown.

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