Academic Integrity Policies, Procedures, and Good Practices for Online Assessment in Computing Education

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Preface

Some of the results presented in the report have already been published in various articles. These are listed below and will be referenced in the text.

I. Simon, Jha, M., Leemans, S.J.J., Berretta, R., Bilgin, A.A., Jayarathna, L., & Sheard, J. (2022). Online Assessment and COVID: Opportunities and Challenges. ACE '22: Australasian Computing Education Conference. February 2022, Pages 27-35, https://doi.org/10.1145/3511861.3511865.

II. Jha, M., Berretta, R., Simon, Bilgin, A.A., Jayarathna, L., Leemans, S.J.J., & Myers T. (2021). Adaptability of academic integrity procedures and practices in the COVID-19-accelerated transition to online assessment. ASCILITE 2021: 38th International Conference on Innovation, Practice and Research in the Use of Educational Technologies in Tertiary Education, Armidale, Australia. 29 Nov- 1 Dec 2021, Pages 299-303. https://2020conference.ascilite.org/ascilite-2021/

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The team would like to express thanks to the computing education academic community and Australian universities who supported us by giving their time to finish the survey and interviews.

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Introduction

The outbreak of COVID-19, which we shall generally abbreviate to covid, has impacted higher education in many ways, the most obvious of which is a wholesale move to online learning and teaching. Online learning and teaching, now used to some extent by all higher education providers in Australia and worldwide, brings many advantages, such as the possibility to learn from anywhere, anytime, synchronously or asynchronously, thus permitting students to learn as they desire (Singh, Thurman, 2019). However, there are also many disadvantages, such as technological difficulties with online connections and resource downloading, and the perception that online learning is tedious and disengaging (Dhawan, 2020).

One of the major issues faced by all universities worldwide during covid is assessing students in situations where face-to-face contact and physical exam sittings have suddenly become impossible. Assessments were modified to open-book exams, online exams, and take-home exams, which were insufficiently invigilated, giving rise to widespread cheating (Dendir, Maxwell, 2020) and possibly harming the reputation of the Australian university sector. For computing education, the transition was possibly even more difficult because of the nature of assessments involved in computing.

Concerns regarding academic misconduct require Australian universities to establish policies to enforce academic integrity by providing education and training on what constitutes good practice and to mitigate academic integrity risk (Higher Education Standards Framework, 2015; TEQSA, 2017; Bretag, 2017). In 2020, universities around the world became unable to assess students' learning in traditional exam settings: face-to-face contact and physical exam sittings were suddenly impossible. In this emergency situation, where alternative ways of assessment were not readily available or not deemed suitable, many universities opted for online assessments, including online exams that were invigilated insufficiently or not at all and were effectively open book. In early 2020, the Australian government passed legislation intended to address contract cheating (https://www.education.gov.au/tackling-contract-cheating). This legislation "is aimed at those who provide and advertise cheating services and not at students". While the legislation is potentially useful, its application is by no means clear cut, and it is quite possible that no cases will ever be prosecuted under it. On the other hand, the legislation makes it clear that individual students who avail themselves of these services are the responsibility not of this legislation but of their institutions.

Many initiatives have been applied by Australian universities to develop policies to uphold academic integrity. Policies typically require students and staff to uphold academic integrity principles, setting out procedures to follow if they have been breached (Bretag et al., 2011). There have been investigations into the development and implementation of academic integrity policies across Australia, and their efficacy and effectiveness for non-text assessments such as computer programs (Simon et al., 2014). Busch and Bilgin (2014) have summarized the attitude to academic integrity of the students and academic staff at an Australian university.

There are a number of strategies to reduce cheating in exams. For example, Simon (2005) explains a system for watermarking distinct copies of exams, and Fenwick (2017) explains a similar but more sophisticated system to watermark individual assignment specifications in case

they might subsequently appear on contract cheating websites. Byun et al. (2020) propose a system to determine the authors of online exams by their keystroke activity. Graziano et al. (2019) present a system to automatically detect and bid for assignments posted to contract cheating websites, following which the academics actually write solutions for the students – an approach that does raise certain questions of ethics and scalability.

However, there is little evidence that academic integrity policies and procedures explicitly address the current COVID-19 situation. The COVID-19 pandemic in the 2020 academic year brought unexpected disruptions to educational practices, forcing all universities to deliver lectures, tutorials, exams, and other assessments online. Rapid changes occurred from mid-March 2020 in response to government-imposed social distancing rules. Academic staff rapidly addressed the immediate requirements of delivering classes online, upskilling their digital competencies so that the semester could continue with minimal disadvantage to students. In March 2020, academic staff were actively involved in repurposing and redeploying learning and teaching resources, and developing new teaching materials to suit remote learning and/or online education delivery modes (Johnston, 2020). Saunders (2020) notes that TEQSA provided a range of strategies to support academics during the COVID-19 pandemic, including "ongoing flexibility with regard to limitations on online delivery", which suggests changing the way we teach and assess students. TEQSA's admonition was that: "Providers should assure themselves that changes to program delivery arrangements maintain assessment and quality standards and are appropriately documented" (Saunders, 2020). Most universities followed TEQSA's guidelines and rapidly initiated a business continuity plan enabling students to continue their study. There would certainly have been changes to assessments to fit quality standards for the online delivery, with different universities applying different procedures in accordance with TEQSA's guidelines. However, this may not have been documented in the university's academic integrity policy. The rapid change of the online transformation applied an approach of agile transformation where documentation is left to the end. Universities would have used many different approaches, but there is no evidence of what has been done differently to combat plagiarism, collusion, and contract cheating to uphold academic integrity during COVID-19.

In this project, we conducted exploratory research to identify approaches to prevent and detect cheating that have been employed to ensure academic integrity in online assessments, and how effective these approaches have been.

To this end, we investigated the academic integrity procedures for computing courses in light of Australian universities' move to online assessments triggered by COVID-19. We compiled a comprehensive list of policies and procedures used during COVID-19 in Australian universities for computing courses and identified strong and weak points around the procedures used for addressing academic integrity for online assessments. The research further analysed the policies and procedures to identify good practices to address academic integrity for online assessments, and supplemented this analysis by surveying and interviewing pertinent academic staff.

In light of the move to online assessments sparked by covid, we identify the current academic integrity policies and procedures of nationwide universities, and survey and interview pertinent academic staff, to address the following research questions:

Research question 1 (RQ1): What are the perceived disruptions to assessment in computing education in Australian universities due to COVID-19, and what changes were made to address academic integrity in response to those disruptions, as reflected on by computing academics?
Research question 2 (RQ2): How, if at all, have academic integrity policies and practices changed for non-invigilated (non-proctored) assessments in computing courses due to the move to online assessments that followed from COVID-19?
Research question 3 (RQ3): What are similarities and differences between the academic integrity practices in different computing schools/departments in Australian universities, and how effective are these?
Research question 4 (RQ4): What preparation/education is given to students for academic integrity in general and during COVID-19 by Australian universities?

The remainder of this report is organised as follows: we first provide background and study existing literature, then detail our methodology, followed by a description of the results and their discussion. Finally, we finish the report with our conclusion and recommendations.

Literature Review

Academic integrity – "acting with the values of honesty, trust, fairness, respect and responsibility in learning, teaching and research" (Universities Australia, 2017) – is fundamental to learning and teaching at universities, is the basis of ethical academic practices, and is considered a top priority of Australian universities (Universities Australia, 2017). Australian universities are required to uphold academic integrity by three major pieces of legislation: The Tertiary Education Quality and Standards Agency Act 2011; The Higher Education Standards Framework 2021; and The Education Services for Overseas Students Act 2000 and the related National Code of Practice for Registration Authorities and Providers of Education and Training to Overseas Students 2007. According to the Higher Education Standards Framework (TEQSA HESF domain 1, 2021), methods of assessment should be considered in conjunction with the overall design of the course of study, and students' achievement of the course learning outcomes is to be credibly assessed by the education providers. With the move to online education, breaching academic integrity may be easier for students. According to TEQSA's Online Learning Good Practice (TEQSA Online learning good practice, 2021), maintaining academic integrity is a concern in the higher education sector, and the change to online delivery of education has the potential to exacerbate the problem. Writing for TEQSA, Martin (2021) suggests that:

- the higher education provider should review its academic integrity policies and procedures to ensure that they allow for additional challenges of academic misconduct that may be easier in the online environment;
- the current processes may require amendment and extra safeguards built into academic management and assessment; and
- steps should be taken to authenticate online assessment.

Concerns about academic misconduct require Australian universities to establish policies, practices, and procedures to enforce academic integrity, by providing education and training on what constitutes good practice, and to mitigate the risks to academic integrity (Bretag, 2017;

TEQSA Guidance note: academic integrity, 2019). Policies typically require students and staff to uphold academic integrity principles and set out procedures to follow if these principles are breached (Bretag et al., 2011). There have been investigations into the development and implementation of academic integrity policies across Australia, and into their efficacy and effectiveness for non-text assessments such as computer programs (Simon et al., 2014). Online education with the introduction of technology has created new opportunities for "e-cheating" (Harmon and Lambrinos, 2008; King and Case, 2014). Online education forced by COVID-19 has caused widespread changes to higher education, resulting in many institutions adopting online learning formats.

There is a great deal of research into academic integrity at institutions of higher education, both in Australia and elsewhere. Investigating the attitudes to academic integrity of the students and academic staff at an Australian university, Busch and Bilgin (2014), identified a mismatch between the perceptions of the two groups. Academics believe that most students do not understand what plagiarism is, while most students believe that they do know what it is. Citing the increased number of international students and their different cultural expectations, Busch and Bilgin (2014), advise academics to be aware of unintentional plagiarism due to students' poor understanding of what constitutes plagiarism. A recent study by Curtis et al. (2021) of 4098 students at six universities and six independent higher education providers in Australia concludes that eight percent of students have paid commercial sites to ghostwrite assignments for them, and 11% have submitted assignments written by other people. In another recent study, Reedy et al. (2021) surveyed 308 students and 24 academics at three Australian universities. Some of their findings are that both academics and students are confused about what constitutes cheating in online examinations; that it is important to move to assessing higher-order thinking skills; and that students (but not academics) believe that cheating is harder in online exams than in face-to-face exams.

Methodology

This research explored the practices adopted by computing educators in Australian universities for upholding academic integrity as a result of moving to online learning and teaching in universities forced by covid.

To explore policies, procedures, and practices for academic integrity in Australian universities, we use a mixed-method research design (Creswell, Klassen, Plano Clark, & Smith, 2011; Tashakkori & Teddlie, 2009) in multiple stages. As the investigated context warrants an in-depth understanding, we used both interviews and online surveys as the data collection techniques, which enabled a rigorous exploration of the context. Moreover, interviews as an effective qualitative research method facilitated survey instrument development in the later stages of the research. Employing mixed research methods further enables the triangulation of study findings. The research design took place in multiple stages as shown in Figure 1.

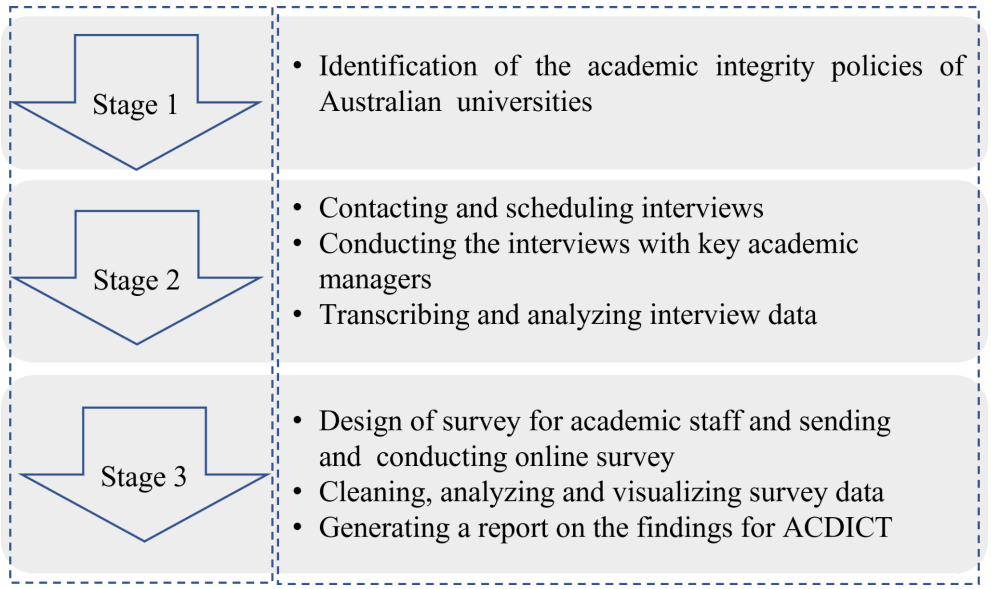

Figure 1. The three stages of the research project

Stage I

The first stage of the research involved examining the public-facing web pages of all Australian universities to filter the universities that offer computing programs. We identified 41 universities in Australia with the inclusion criteria of those who offer computing programs. We focused on bachelor's and coursework master's degrees rather than doctoral studies and other research. The web pages examination further extended to search policies, if accessible, for mentions of online learning and assessment in the identified 41 universities.

Examination of the public web pages of Australian universities identified that most universities have the policies available on their public websites. We collated academic integrity policies and documents from 41 universities (40 public and one private) that offer computing courses. We reviewed these policies and documents with the intention of answering three main questions:

1) whether the document provides a specific listing of policies and procedures for the online assessments?
2) whether the document appears to acknowledge the possibility of online exams?
3) how does it describe any integrity precautions related to online exams?

Stage II

The second stage of the research involved conducting interviews with key academics in computing education. This stage focused on answering research question 2 (RQ2): “How, if at all, have academic integrity policies and practices changed in the move to online teaching and for non-invigilated (non-proctored) assessments in computing courses due to COVID-19?”.

We searched the websites of the selected universities to identify appropriate academics and sent them email requests to participate in interviews. We approached 10 academics who agreed to participate in interviews out of the 41 academics who were invited. Exploring the accessible academic integrity-related policies of the selected universities, the research team developed an interview protocol to investigate the research question RQ2. It involved 12 questions identifying

the strengths and weaknesses of the procedures used during covid to address academic integrity for online assessments in computing courses. The interview questions are listed below:

(1) What types of assessments were conducted online or remotely in computing courses at your university before covid?

(2) What types of assessments were conducted online or remotely in computing courses in your university during covid?

(3) What is the normal support provided for designing, creating, and administering online assessment tasks? What are people expected to do?

(4) What were the challenges for moving to online assessments in such a short time? What kinds of difficulty did you face?

(5) Were there any changes in the support provided for designing, creating, and administering online assessment tasks during covid?

(6) What were your experiences with academic integrity with online or remote assessments before covid?

(7) What were your experiences with academic integrity for online or remote assessments during covid?

(8) Do your academic integrity policies and procedures explicitly address the current covid situation?

(9) Which policies and procedures for online assessments worked well and which did not work so well during covid? Did the pandemic bring to light any deficiencies in the policies and procedures?

(10) Was there any workload adjustment for the impact on stress and time?

(11) In your opinion, what should be done to ensure academic integrity in online or remote assessments?

(12) Do you have any suggestions for dealing with academic integrity in online or remote assessments?

Before the interviews with the participants, we conducted pilot interviews with two members of the research team to ensure the quality and reliability of the interview questions, confirm the estimated interview time, and check the functionality of the interviewing, recording, and transcribing process. As we did not identify any changes to the questions from the insights of the interviews with research team members, we included those interviews with the ten subsequent interviews. This resulted in a total of 10 transcriptions for the analysis. All interviews were conducted online using zoom and were recorded with the permission of the participants. We also maintained additional research notes during the interviews and with the recorded audios for effective capturing of ideas, reflections, and reference points for identifying insights. The interviews were conducted between May and June 2021.

For the analysis of interview data, we performed a thematic analysis which enabled us to identify the ideas and concepts from the interviews. As the first step of the analysis, we did

substantial editing of the transcripts provided by zoom to correct the errors of automatically generated transcriptions by the platform. To ensure the quality and reliability of the transcriptions, we did a thorough check of the transcriptions where each of them was checked and edited by three members of the research team. This editing process helped the research team highlight the passages of interest to identify possible themes which have been copied to NVivo for further analysis. As such, qualitative data analysis included six distinct phases:

1) transcribing and editing the Zoom interview, and reading and checking for errors on the transcripts;

2) generating the initial codes related to online assessments and integrity;

3) combining the initial codes to develop themes;

4) examining the themes and data to see the similarities and patterns of the coding and categorize them together by comparing the extracted codes to each other;

5) performing a comprehensive analysis around the themes and identify similarities and patterns;

6) reporting on the themes that make meaningful contributions to the examination of academic integrity before and during covid.

To ensure a rigorous coding process most or all of the members of the research team carried out an iterative analysis together in a series of Zoom meetings. This helped to enhance the reliability of the coding procedure resolving any initial disagreements through discussions.

Stage III

Stage three of the research design informed the quantitative data collection of the research investigation. For the quantitative element of the mixed-method research design, we employed the survey method using Qualtrics online survey platform. We used interview insights to develop the survey instrument. For example, interview insights (see qualitative findings section) revealed a number of different online assessment methods employed in Australian universities before and during the covid period. As such, the survey instrument (Appendix 1) developed including several key aspects: 1) the type of the assessments conducted before and during the covid; 2) the measures used to reduce or prevent academic misconduct before and during the covid; 3) the measures used to identify breaches of academic integrity before and during the covid; 4) challenges around preventing academic misconduct during covid; 5) the type of academic integrity violations observed during covid, and 6) the changes of the proportion and the number of academic integrity violations between before and during the covid period.

We distributed the online survey via email invitations. As such the survey link was distributed via email to all the academics that were initially identified from 41 Australian universities. This is inclusive of the academics who participated in the preliminary interviews in stage I of the research. The consent to the survey participation was considered as the submission or return of the completed survey. The survey information sheet was also attached to the email in which the online survey link was distributed. Survey distribution and the reminders took place between December 2021 and February 2022.

Results

In this section,we outline the findings of the project in each stage. Stage 1 section provides the results of investigating policies of respective universities that are sourced from universities' public websites. Stage 2 section summarizes the results of the interviews conducted with key academics in computing education. Stage 3 section outlines the results of the survey that has been conducted for computing academics.

Stage I Results

Stage I of the project aimed to identify the Australian universities that offer computing programs to examine their policies on academic integrity for online assessments of these computing programs.

Results of stage 1 shows that out of 41 universities investigated 38 universities offer online/ distance education for computing courses. However, only five universities (one each in Queensland, Victoria, the Australian Capital Territory, South Australia, and New South Wales) acknowledge the possibility of online exams in their policies. The main fact that these universities' policies highlight is that they do not specify any policy differences between online and face-to-face assessment tasks. It appears to be that the general academic integrity rules and regulations are to be used for all assessment tasks, including online tasks. Only three universities found who list detailed procedures for running online assessments and have explicit policies and/or procedures for addressing academic misconduct in online assessments.

Stage II Results

This stage focused on answering RQ2: "How, if at all, have academic integrity policies and practices changed in the move to online teaching and for non-invigilated (non-proctored) assessments in computing courses due to COVID-19?". Results of this stage outline insights from 12 interviews with key academics in computing education across 41 universities identified in Stage I.

The insights particularly address the challenges universities face with the quick move of all the teaching, including online assessments to an online environment using learning management systems and other online tools. There are six assessment themes (i.e., group project work, exams, assignments, practical assessments/ lab works, quizzes and presentations) resulting from the analysis that discusses the challenges of delivering these assessments during covid 19 period.

Team-based projects or other teamwork is a requirement for accreditation of computer courses (per Accreditation Manual of Australian Computer Society). Facilitation of this group work has become a major challenge with the online transition due to covid which reduces the face-to-face engagement in teams. Students have found it hard to adapt group work to online study. Adoption of different online collaboration platforms such as SLACK and JIRA boards were some help in subsequent semesters. However, this has raised other concerns for some academic staff regarding the professional development on how to use new technologies to cater to the requirements of online learning and teaching.

In terms of the formal examination, most interviewees recognized that moving exams online required immense changes where the transition from supervised mode to unsupervised mode was the major challenge. Even proctoring services which have been the tool for specific courses in some of the universities were unable to expand to cover all the courses with the online transition. Open-book exams being the necessary component of unsupervised exams online, it has rendered certain types of questions unsuitable. This caused the implementation of many changes in the exams to adapt to online space including changing the style of the questions and replacing many questions even though they are useful question types. However, on the other hand, academics recognized that this shifting from offline to online seems to be an opportunity to assess higher levels of learning according to Bloom's taxonomy. In addition to that, the inability to reuse the questions which undoubtedly increases academic misconduct, required creation of completely new exams for each exam . These are raised as challenges due to moving to fully online. The introduction of vivas, post-exam interviews, and practices beyond the policies was helpful to minimize the academic integrity violations.

A typical form of assessment in computing courses is assignments in which students work on a project individually or in a group over some time. According to the interviewees, covid has not made a big impact on the assignments. The only challenge regarding this has been the difficulty of verifying the programming assignment(s) was the work of the student since the in-person interviews which facilitated this verification process are no longer available in the online setting. The other assessment types that created challenges during covid are the practical assessment/ lab work, quizzes, and presentations in which the non-invigilation is the main issue raised.

Stage III Results

Participants demographic information

Stage III identifies the current practices of academic integrity, how effective they are and what is done at the unit/course levels to prevent misconduct, which involves quantitative data collection. With the online survey designed by the project team, we received 47 completed surveys from academics at different universities. Table 1 provides the demographics of the participants and the level of units that they taught. The majority of responses are related to first year and post-graduate level courses followed by the second year, third year, and fourth-year or honours. The majority of the respondents are senior lecturers and more than 50% of the respondents had more than 10 years of teaching experience at the tertiary level of education.

Table 1. Participants Demographics and level of units taught– Survey Data Collection*

N (number of participants)	47		
Teaching experience in tertiary level	Less than 5 years	3	6.4 %
	5-10 years	4	8.5%
	More than 10 years	28	59.5 %

Current Job Level	Tutor	1	2%
	Associate lecturer	1	2%
	Lecturer	8	17 %
	Senior lecturer	13	27 %
	Associate professor	7	25 %
	Professor	5	10 %
Level of the unit	First year	14	29.7%
	Second year	11	23.4%
	Third year	7	14.8%
	Fourth year or honours	1	2%
	Postgraduate	14	29.7%

*Due to missing demographic data, the counts do not equate to the total number of responses.

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As mentioned in the methodology section, the results of this stage mainly address the differences that have been placed between before and during the covid periods in terms of the assessments types and academic integrity practices of those assessments in computing programs. Below we described the findings of this stage in four key aspects: 1) types of assessments that have been used in computing education before and during covid, 2) what measures have been taken to reduce and prevent academic misconduct, 3) what measures have been used to detect the academic misconduct, and 4) what challenges academic staff has faced in the attempts of preventing misconduct.

Types of assessments in computing programs

A range of assessment types has been observed in computing courses including lab assessments, individual and group assignments, oral presentations, quizzes, in-term tests, and final exams. Use of all these types of assessment can be seen both before and during covid however with an increase of online mode of conduction during covid. As a significant change, invigilation of the assessments has been greatly reduced due to the challenges that occurred during covid compared to before covid. This is highly visible in final examinations in which face-to-face invigilation was considered an essential component before covid. As per respondents' extended views on this, some universities have conducted invigilated exams as take-home exams in a window of 24-hour exam time during covid. A tendency to more frequently use practical examinations and peer assessment styles as components of evaluation are the other changes that can be seen in the online assessment of computing education when transferring to the online mode due to covid.

Measures that have been used to reduce or prevent academic misconduct

Several strategies have been applied to prevent or reduce academic misconduct. As a key fact, the percentage of using invigilated assessments has been increased with the unfolding of covid, for instance using TestInvite and Moodle Proctored. This highlights that different software tools have started to be used as part of the online assessment while some assessments were replaced with take-home exams. Designing assessments at the higher levels of Bloom's taxonomy is another strategy that has received the attention of academics during the covid period. However, no significant changes have been highlighted during covid in terms of educating students and enhancing students' awareness of academic integrity (Figure 2).

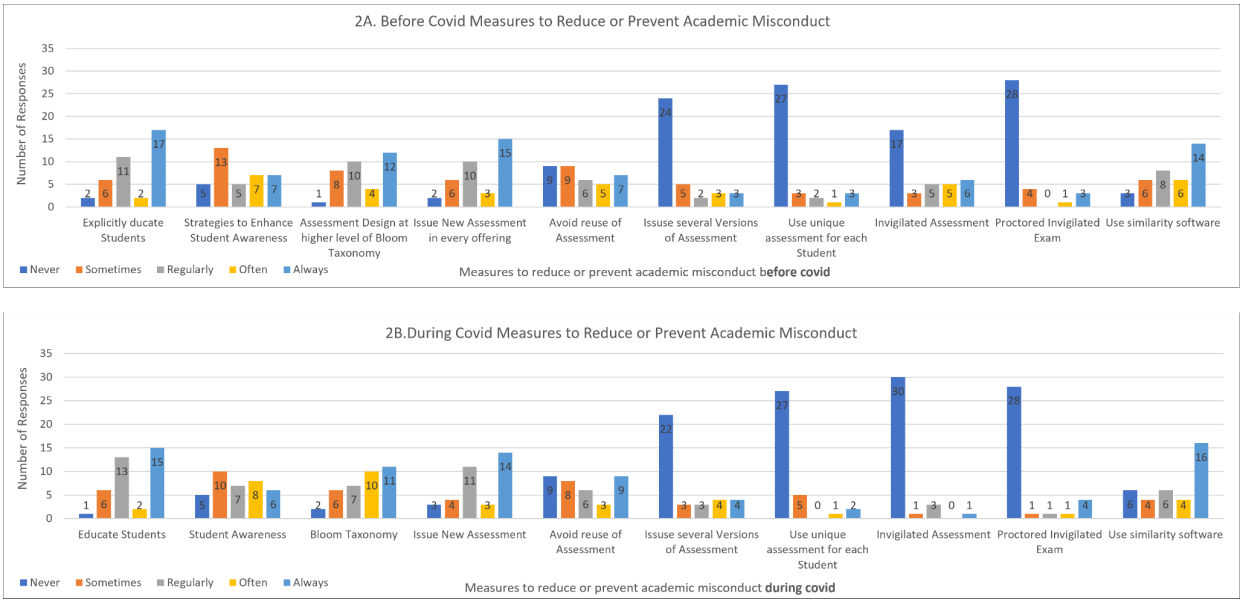

Figure 2. Comparison of measures implemented to safeguard Academic Integrity

In addition to these, respondents provided other strategies as their additional comments which included allocating more hours to assessment marking, having extra alerts for the submissions with unusual metadata (e.g., different author name) and following up on those cases, and designing the questions in the assessments in which students are required to provide explanations for their answers. While these strategies have been applied during covid to prevent academic misconduct, some have highlighted that the nature and the design of the projects already ensure academic integrity even before covid which makes it easy to continue during covid. For instance, in capstone project course units the assessment is already designed with the requirement of individual unique outcomes which ensures the intensive individual effort that can minimize academic integrity violations. Besides, some academics raised the point that instead of getting into the discussion of academic integrity issues, staff had to focus more on moving online due to the challenges faced with a quick transition.

Measures that have been used to detect or identify breaches of academic misconduct

We collected academics' views on several measures they have used to detect integrity violations before and during covid. These include; using similarity software, strategies to make the

marking intensive, using self and peer reflections, applying more oral parts for the assessments (e.g., viva), and watermarking the assessment questions for later identification. Results did not indicate any significant changes in the use of these strategies between before and during covid. This may be due to academics' attempts to ensure academic integrity is more toward changing the design or the delivery of the assessments as a preventing strategy rather than a detecting strategy. Besides, some academics have mentioned that they checked the IP addresses of the students to flag them if they use more than one IP address as another strategy that they have used to detect academic misconduct. Plagiarism is the most evidenced integrity violation in computing programs followed by collusion and contract cheating. As an overall view of academics who participated in the survey, the proportion of the detected academic integrity violations stayed the same during the covid compared to before covid (Figure 3). This implies that the detection has been a challenge even before covid in computing education.

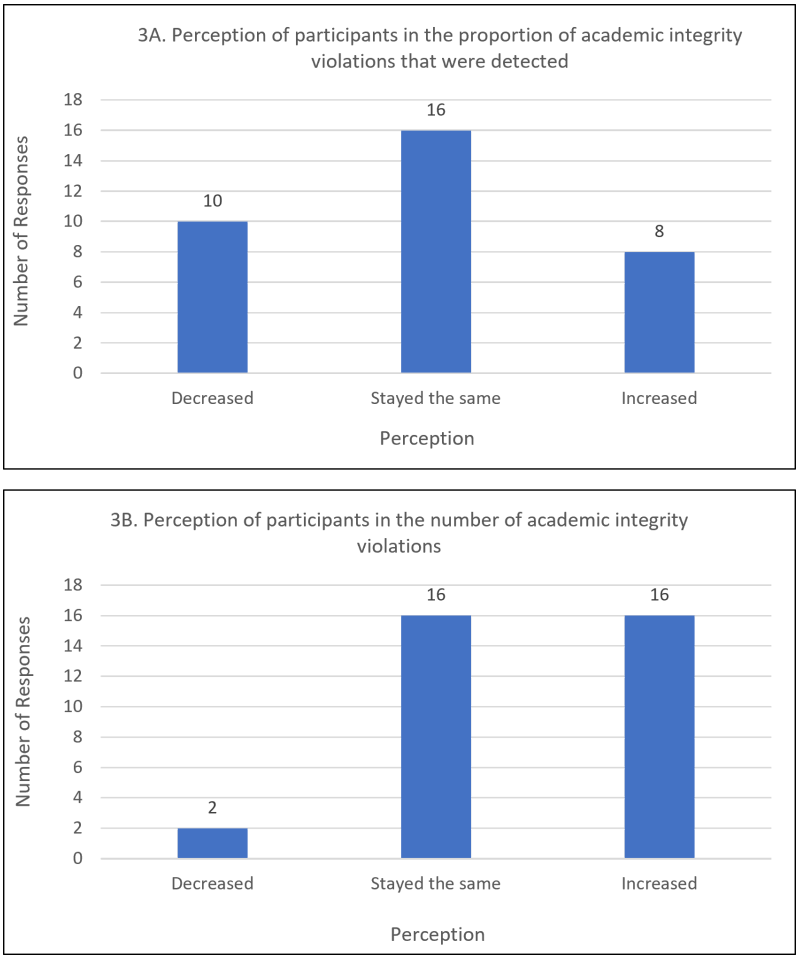

Figure 3 Perception of participants regarding the detection of AI violations

Challenges around preventing academic misconduct during Covid

Various challenges have been highlighted by the academics that they faced around preventing academic misconduct during covid. These are spread across the assessment delivery and design,

difficulties caused due to the opportunities opened to academic integrity violations due to online transition, and policy-based loopholes.

In terms of designing and delivering the assessments, the inability to invigilate online assessments has been identified as a key challenge. Some academics have also mentioned that the coordination during exams particularly dealing with collusion in online exams, and changing the assessment structure to ensure academic integrity such as introducing new and more assessment tasks are other challenges they have faced in terms of assessment delivery and design. In another aspect, the increase of opportunity to cheat including a significant increase in collusion, and difficulty to prove the misconduct such as due to the unavailability of effective tools have been mentioned as the challenges caused due to the online transition during covid. Some academics also mentioned other challenges that have been raised due to the weaknesses of existing academic integrity-based policies. For example, some academics are concerned about the inability of policies to provide effective outcomes for integrity violation cases highlighting that the policies are too slow to react and the unsatisfied outcome of the review of the integrity violation process of the university . An academic quote on the issues is below:

"Many students are given warnings by the 'review', so the 3 hours of paperwork is not worth the punishment, any excuse that a student gives is automatically believed. Despite overwhelming evidence of plagiarism. Also, students claim to have not done the AIM to get reduced punishments. It's inconceivable that a year 3 student does not know what plagiarism is... yet they are given warnings and no real consequences".

Despite these, different other challenges have also been provided by the respondents as particularly relevant to the student perspectives. For example, lack of student engagement has been noticed by academics as a difficulty to overcome during covid. Sometimes, students' complaints about the resource availability have made the teaching staff use alternative assessments to minimize academic integrity violations. These aspects of the challenges or the difficulties that were raised from student perspectives might have caused the increase in academic integrity violations during this period. Below quote is reflecting student perspective observed by an academic:

"Online exams and tests were a big challenge. Students sometimes complained that their laptops froze or their internet connection dropped out midway through the test. Such cases demanded the need to develop a new set of questions"

Perception of whether the university academic integrity policies and procedures helped to ensure academic integrity during Covid..

Inadequate policies and the weak process around the integrity violations is one of the mainly highlighted challenges by computing academics. Some of these policy related issues are time consuming procedures with the non-visible outcome and policies just for specifying academic integrity limits for not imposing actual activity limits. However, while highlighting that the policies don't prevent misconduct but provide awareness of the consequences, some other academics have mentioned the usefulness and benefits of the policies and procedures to address the challenges around academic integrity violations. For example, some have mentioned that the university's academic integrity policies have heightened the student awareness of the impact and consequences of violations. Others pointed out that the policies are more vigilant and take quick

actions to maintain academic integrity. Policies are active guidelines and the foundation to deal with integrity issues is another positive aspect that has been highlighted. Moreover, there are some suggestions and strategies made by the academics to address the inadequacy of strong policies and procedures to address the academic integrity issues. These include changing the assessment styles, active and continuous promotion of the importance of academic integrity and the consequences of violations, and invigilating the exams and the assessments.

Conclusion

This report presents the findings of an investigation on the impact of the COVID-19 pandemic in assessments, specifically in computing courses at Australian universities, due to the transition to online teaching delivering mode.

The initial stage indicated that only a few Australian universities consider online assessments in their policies and procedures and acknowledge the integrity precautions related to those exams.

Next, the study aimed to investigate whether assessment policies and practices, particularly regarding academic integrity, changed in response to the move to online teaching due to covid. We interviewed 12 key academics, performed a thematic analysis, and identified several challenges and opportunities. While the main challenge was academic integrity in many types of assessment, the knowledge and innovation generated by the transition to an online setting while trying to maintain academic integrity have increased interest in designing higher-level assessment items, and have led some universities to consider moving entirely to online exams. However, assessment policies have not changed, which suggests that universities need to review their assessment procedures and policies based on the massive switch to online education's knowledge, experiences, and innovation generated by the.

Lastly, the third and final stage of the study was to survey Australian computing academics to gather quantitative data on the questions that have arisen from this qualitative analysis. We interviewed 47 academics. We finish this report with a summary of several recommendations:

Recommendations

1. That university assessment policies, procedures and guidelines be reviewed in light of the recent changes to the educational landscape to ensure that they specifically address academic integrity in online settings.
2. That universities encourage academic staff to monitor and report any breaches of academic integrity and provide adequate support for them in terms of training, guidance, resources, and workload.
3. That invigilation methods (technological or otherwise) appropriate for online settings are developed.
4. That professional development programs be developed for ICT academic staff that focus on the design of assessments to ensure academic integrity in current educational settings.
5. That collaboration between ICT staff nationally is facilitated for the purpose of sharing good assessment practices and resources. We propose that ACDICT could take a leading role with establishment of a repository of resources and facilitation of dissemination forums.
6. That further research investigates assessment practices in other STEM disciplines for the purpose of finding good practices that could be used for assessment in ICT.

7. That further research is needed to explore ICT students' experiences with assessment in the new educational landscape and determine the effectiveness of any new or modified assessment strategies and policies. In doing so there should be a particular focus on contract cheating.

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Appendix

Investigating Australian Universities' Academic Integrity Policies, Procedures, and Good Practices for Online Assessment in Computing Education during the COVID-19 Pandemic.

This work is being undertaken as part of a research project funded by the Australian Council of Deans of Information & Communications Technology. The purpose of this project is to investigate current policies, procedures, and practices for the prevention and detection of academic integrity violations in the computing disciplines in Australian universities.
You are invited to participate in this research project because you are a teacher in computing at anAustralian university.
Please read the survey information sheet.

When answering this survey, please choose and focus on a single unit that you taught both before andduring COVID-19. A unit is a single offering, typically lasting one semester, for which a formal result is awarded. Units are also known as courses or subjects.

1.A. What is the level of the unit you are using to answer this survey?

- ○ First Year
- ○ Second Year
- ○ Third Year
- ○ Fourth Year or Honours
- ○ Postgraduate

1.B. What types of assessment have you used for this unit before COVID-19?

(Please indicate each assessment type that you used; then, for each type that you used, choose all applicable options. For example, a quiz might be conducted during class or not, might be online or not, and might be invigilated or not)

	Used in unit	During class	Online	Invigilated
Lab assessment	☐	☐	☐	☐
Individual assignment	☐	☐	☐	☐
Group assignment	☐	☐	☐	☐
Oral presentation	☐	☐	☐	☐
Quiz	☐	☐	☐	☐
In-term		test ☐ ☐	☐	☐
Final exam	☐	☐	☐	☐
Other	☐	☐	☐	☐

Please mention any other assessment types you use before COVID-19?

1.C. What types of assessment have you used for this unit during COVID-19?

(Please indicate each assessment type that you used; then, for each type that you used, choose all applicable options. For example, a quiz might be conducted during class or not, might be online or not, and might be invigilated or not)

	Used in unit	During class		Online	Invigilated
Lab assessment	☐	☐		☐	☐
Individual assignment	☐	☐		☐	☐
Group assignment	☐	☐		☐	☐
Oral presentation	☐	☐		☐	☐
Quiz	☐	☐		☐	☐
In-term		test ☐	☐	☐	☐
Final		exam ☐	☐	☐	☐
Other	☐	☐		☐	☐

Please mention any other assessment types you use before COVID-19?

2.A. To what extent have you used the following measures to reduce or prevent academicmisconduct before COVID-19?

	Never	Sometimes	Regularly	Often	Always
Explicitly educating students about academic integrity	○	○	○	○	○
Other strategies to enhance student awareness ofacademic	○	○	○	○	○
Designing assessments at the higher levels ofBloom's taxonomy	○	○	○	○	○
Issuing new assessments in every offering	○	○	○	○	○
Completely avoiding reuse of any assessment parts	○	○	○	○	○
Issuing several versions of the same assessment	○	○	○	○	○
Issuing a unique assessment for each student (for example, based on their student ID)	○	○	○	○	○
Conducting invigilated assessments	○	○	○	○	○
Conducting a proctored/invigilated online exam	○	○	○	○	○
Checking each submission with Turnitin or other similarity detection software	○	○	○	○	○

If you conducted a proctored/invigilated online exam before COVID-19, how was this done?

2.B. To what extent have you used the following measures to reduce or prevent

academicmisconduct during COVID-19?

	Never	Sometimes	Regularly	Often	Always
Explicitly educating students about academic integrity					
Other strategies to enhance student awareness of academic integrity	○	○	○	○	○
Designing assessments at the higher levels of Bloom's taxonomy	○	○	○	○	○
Issuing a new assessment in every offering	○	○	○	○	○
Completely avoiding reuse of any assessment parts	○	○	○	○	○
Issuing several versions of the same assessment	○	○	○	○	○
Issuing a unique assessment for each student (for example, based on their student ID)	○	○	○	○	○
Replacing major assessment items with smaller, more frequent items	○	○	○	○	○
Supplementing assessment tasks with more individual components such as vivas, presentations, distinct case studies	○	○	○	○	○
Conducting invigilated assessments	○	○	○	○	○
Conducting a proctored/invigilated online exam	○	○	○	○	○
Checking each submission with Turnitin or other similarity detection software	○	○	○	○	○

If you conducted a proctored/invigilated online exam during COVID-19, how was this done?

2.C. Is there anything you would like to add concerning steps that you have taken, eitherbefore or during COVID-19, to help prevent or reduce academic misconduct?

3.A. To what extent have you used the following measures to detect or identify breaches ofacademic integrity before COVID-19?

Using Turntin or other similarity detection software to detect similarities	Never	Sometimes	Regularly	Often	Always
Having each question marked by the same marker for all students	○	○	○	○	○
Having each student's work marked by the same marker for all assessments across semester	○	○	○	○	○
Using self and/or peer reflections, for example in group work	○	○	○	○	○
Conducting vivas (interviewing some or all students after the assessment)	○	○	○	○	○
Searching particular websites for questions posted by students	○	○	○	○	○
Watermarking assessment questions for later identification	○	○	○	○	○

If you used any other measures **before COVID-19** to detect or identify breaches of academic integrity, please tell us about them.

3.B. To what extent have you used the following measures to detect or identify breaches ofacademic integrity during COVID-19?

Using Turntin or other similarity detection software to detect similarities	Never	Sometimes	Regularly	Often	Always
Having each question marked by the same marker for all students	○	○	○	○	○
Having each student's work marked by the same marker for all assessments across semester	○	○	○	○	○
Using self and/or peer reflections, for example in group work	○	○	○	○	○
Conducting vivas (interviewing some or all students after the assessment)	○	○	○	○	○
Searching particular websites for questions posted by students	○	○	○	○	○
Watermarking assessment questions for later identification	○	○	○	○	○

If you used any other measures **during COVID-19** to detect or identify breaches of academic integrity, please tell us about them

4. What have you seen as the particular challenges around preventing academic misconduct **during COVID-19?**

5. What types of academic integrity violation were you aware of in this unit **during COVID-19?**

- ☐ Plagiarism
- ☐ Collusion
- ☐ Contract cheating
- ☐ Other

If you selected Other, please tell us what additional types of violation you experienced.

6. Not all breaches of academic integrity are detected. Comparing the period **during COVID-19** with the period **before COVID-19**, what change do you think there has been ***in the proportion*** of academic integrity violations ***that were detected?***

	Decreased	Stayed the same	Increased
Proportion of academic integrity violations that were detected during the COVID-19 period	○	○	○

7. Some academics have a feel for how many breaches of academic integrity actually takeplace, regardless of how many are detected. Comparing the period **during COVID-19** with the period **before COVID-19**, what change do you think there has been ***in the number*** ofacademic integrity violations?

	Decreased	Stayed the Same	Increased
Number of academic integrity violations thatwere detected during the COVID-19 period	○	○	○

8. In your view, have your university's academic integrity policies and procedures helped to ensure academic integrity during COVID-19, and if yes, how?

Demographic Information

A. How long have you been teaching at tertiary level?

- ○ Less than 5 years
- ○ 5-10 years
- ○ More than 10 years

B. Current Job Level

- ○ Tutor
- ○ Associate Lecturer
- ○ Lecturer
- ○ Senior Lecturer
- ○ Associate Professor
- ○ Professor

C. In which Australian state/territory were you teaching?

- ○ ACT
- ○ NSW
- ○ NT
- ○ Qld
- ○ Tas
- ○ Vic
- ○ WA
- ○ Not in Australia

Where were you teaching this unit?

D. What is the subject matter of the unit for which you responded to this survey?