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An examination of the impact of COVID-19 on assessment practices in higher education

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ABSTRACT

The COVID-19 pandemic resulted in a rapid pivot to online learning across many higher education institutions globally. This paper investigates to what extent assessment strategies changed as a result of this pivot. It explores the case of Technological University Dublin (TU Dublin) in Ireland and finds that 95% of respondents altered their assessment practices in some way. Beyond identifying changing practice, the paper also develops a TARC (Typology of Assessment Responses to COVID-19) model which shows four categories of responses. *Reactors* are those academics who simply moved their assessments online. *Adaptive Responders* modified assessments slightly for the online environment. While *Opportunists* are those who used the opportunity of the pandemic to implement strategies they had been considering, the *Committed Innovators* engage in innovation in teaching and assessment strategies on an ongoing basis and, thus, they continued to do what they always did. The key factors that were considered in the decision-making about how to alter assessment strategies were pedagogical, practical considerations and the availability of support.

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Assessments; COVID-19; online learning

Introduction

COVID-19 has radically altered higher education internationally impacting learning, teaching methods, assessment strategies, student and academic experiences, the learning environment, and higher education policy making. The pivot to online learning has been rapid and the implications for learners, academics, management, and universities have been enormous (Anderson 2020; Marinoni, Van't Land, and Jensen 2020; Bartolic et al. 2021). As noted by Anderson (2020, 453), higher education has 'faced a challenge of achieving the equivalent of a ten-year digital learning strategy in mere months'. Daniel (2020, 91) suggests that COVID-19 is the 'greatest challenge' ever experienced across education at all levels. Bartolic et al. (2021, 12) describe the 'overwhelming, short term tidal wave effects' of COVID-19 on teaching and learning.

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While there has been some discussion about the shift to online learning (Anderson 2020; Watermeyer et al. 2021; Marinoni, Van't Land, and Jensen 2020), there has been little focus on assessment and feedback and yet, as Sadler (2010) notes, they are central to the development of effective learning. Slade et al. (2021,1) conclude that assessment is often 'an afterthought' in comparison to the more pressing demands of module delivery when considering the pivot, although it is notable that there was much discussion about proctoring examinations, as a result of COVID-19 (Kharbet and Daabes 2021; Sando, Medina, and Whalen 2021). Due to COVID-19, changes in quality assurance procedures meant that much more rapid changes in assessment strategies were facilitated. This paper examines how assessment strategies have been altered in one university, Technological University Dublin (TU Dublin), as a result of the pandemic, following three semesters of online learning and so reflecting both the immediate and medium-term response. This research is significant as it provides insight at this salient juncture in higher education and explores how this might impact future strategies. Furthermore, it identifies different types of academic responses and develops the TARC (typology of Academic Responses to COVID-19) model to represent this.

Literature review

The context: the pivot to online learning

Nordmann et al. (2020) observe that the pivot to online learning is an emergency response as a result of the pandemic. They note that it is very important to distinguish this temporary pivot from online learning modules and programmes which are designed for distance learning from the ground up. Watermeyer et al. (2021, 623) noted 'the experience of rapid online migration of LTA (learning teaching and assessment) has revealed much of the deficiencies of the higher education sector and much perhaps of what needs to change in universities'. Similarly, Fuller et al. (2020, 785) ask 'can we regard this as our TINA (there is no alternative) moment for assessment?'

Several issues regarding the impact of the pivot on assessment strategies have been identified in the literature thus far. Guangul et al. (2020, 519) state that the core problems highlighted regarding online assessment include the potential for cheating and a lack of sufficient infrastructure. Slade et al. (2021) observe that the initial academic papers about the pivot to online delivery and assessment, disseminated the individual experiences of academics (e.g. Wong and Zhang (2020), and Ng and Harrison (2021)). Others have explored this pivot from the students' perspective and identified levels of satisfaction with new teaching methods (de Fátima Goulão 2020) and online assessment strategies (García-Peñalvo et al. 2021). This recent research reflects the practical and immediate nature of the response to the COVID-19 crisis, but it will also be interesting to see how future strategies are affected.

The role of assessment in teaching and learning

Assessment and assessment feedback are central to the development of effective learning (Sadler 2010) and are important for academic, personal, and professional development (Boud and Molloy 2013; Evans 2013; Lizzio and Wilson 2008; Nicol 2010). Price et al.

(2010) describe how assessment is simultaneously expected to promote learning, provide motivation, challenges and feedback to students, and generate grades for certification purposes, even though these purposes may often conflict with one another. The appropriate use of formative, summative, authentic, and sustainable assessment contribute to the improvement of assessment and learning strategies, practices and approaches in higher education, and beyond graduation (Cookson 2018; Boud and Soler 2016; Jenkins 2010; Gibbs and Dunbar-Goddet 2009). All forms of assessment were considered during this research.

Despite the aforementioned importance of assessment, Boud (1995, 35) noted that 'interest in assessment in higher education has been at a low point for about a decade and it has only been in the 1990s that it has started to pick up again … Assessment is back, centre-stage, and is of wide interest and concern'. Although Worthen (2018) suggests this can be problematic and is concerned about the growth of the assessment industry which develops and sells assessment tools and states 'without thoughtful reconsideration, learning assessment will continue to devour a lot of money for meagre results'. It is therefore pertinent to explore how assessment strategies have been affected in the context of COVID-19.

Assessment feedback

A key issue in the literature is that of feedback. Price et al. (2010), argue that assessment feedback is the most important part of the assessment process. Yet Carless (2015 online) cautions that 'feedback is one of the most problematic aspects of the undergraduate student experience'. Similarly, Brearley and Rod Cullen (2012) describe the main problems and issues associated with feedback, including the difficulty for academics, with large classes and workloads, to provide constructive feedback in a timely manner. In addition to this, academics can experience a reluctance on the part of students for meaningful engagement with feedback. Students may find the academic terminology of feedback difficult to understand (Carless 2015; Winstone et al. 2017), fail to act on feedback received (Pitt and Norton 2017), or fail to feed-forward for future learning and close the feedback loop (Boud and Molloy 2013; Duncan 2007).

There are equally well acknowledged problems associated with the traditional, conventional, monologue model of feedback that is very much lecturer driven, where learners are passive recipients of feedback, rather than active participants, engaged with, and creators of feedback (Boud and Molloy 2013; Carless 2017; Nicol 2010; Winstone et al. 2017). The dialogue model of feedback attempts to engage the student in all aspects of the assessment process and involves greater interaction with their lecturer, peers and technology to enhance the assessment and feedback process (Boud and Molloy 2013; Nicol 2010).

In terms of the discussion regarding feedback, much of the focus is on the individual; as Carless and Boud (2018) highlight, the key is for the student to appreciate the feedback, make judgement about it and manage their emotions. Chong (2021) introduces the concept of there being another, contextual element, and frames the discussion about feedback literacy within an ecological perspective. The higher education ecosystem has changed significantly due to COVID-19 and factors that are important in terms of feedback such as the creation of a 'trusting teacher-student and student-student relationship' (Chong 2021, 99), effective feedback literacy, workload management of online

feedback provision and the emotional aspects of feedback (Pitt and Norton 2017), in turn must have been affected by the pandemic.

Use of technology

As assessments are used to evaluate the achievement of learning outcomes (Boud and Soler 2016), a wide variety can often be used across different modules and programmes, furthermore, as Mottiar et al. (2019) identified several different tools / technologies can be used to implement each assessment practice. As a result of the pivot to online learning, Watermeyer et al. (2021) note that several types of assessment have been put on hold or substituted during the pandemic. The ubiquitous in-person exams, an often relied upon form of assessment, became more challenging in the online environment. Guangul et al. (2020) outline the experience in a university in the Middle East, where academics utilised several different alternatives including proctored examinations and project-based assignments. Montenegro-Rueda et al. (2021) summarise the types of online assessment discussed in 13 papers that investigated the assessment methods employed during the pandemic.

The online environment created opportunities for using technologies such as video and audio feedback, quizzes, electronic submissions, and various software. For some educators, these were technologies they were already aware of, or using, but as Guangul et al. (2020) and Montenegro-Rueda et al. (2021) state, the biggest challenge was a lack of preparation time. Similarly, Scherer et al. (2021) note different levels of readiness among academics.

The impact of COVID-19 on future teaching and learning

While the pandemic created many additional pressures, it also provided an opportunity for academics to trial, in a relatively low-risk environment, assessment strategies they had previously considered but had not implemented. The quality assurance mechanisms for changes to modules and assessments had to be fast-tracked and institutional environments became open to significant and rapid changes in this regard. Gatti et al. (2020, 4) observe 'what stands out is the agility of universities' response to the unexpected and sudden challenges and their flexibility in terms of adjustment of practice'. Going forward, the choices are to go back to the assessment methods that were used in the past, retain the new versions, or use a mix. Daniel (2020, 95) intimates that the changes implemented during the pandemic will leave 'a lasting trace', Clout (2020) suggest that COVID-19 innovations in teaching and assessment will continue to be used and Guppy et al. (2022) report that across all university stakeholders there is a belief that there will be more blended/hybrid instruction post-pandemic. However, these are general views and statements, not all changes will remain in place; academics will individually reflect on what worked and what did not. They will also be guided by the learning support departments in their universities, which will have conducted similar evaluations of the collective response to the pandemic. Furthermore, there will be institutional rules and guidelines that will influence which strategies continue in the longer term. Kandri (2020) suggests that

> COVID-19 has struck our education system like a lightning bolt and shaken it to its core. Just as the First Industrial Revolution forged today's system of education, we can expect a different kind of educational model to emerge from COVID-19.

Fuller et al. (2020) use the royal society for arts, manufactures and commerce, RSA framework to discuss four possibilities going forward: a range of elements that lecturers wish to restart once they are back in the lecture room (Restart). The categories also include strategies that worked well during online learning that they will continue to use (Amplify), and methods that were responses to the situation which will be ended now face to face lectures have returned (End). The final 'Let go' category represents the approaches that were stopped due to the pandemic and have now been recognised as not fit for purpose, so they will not be reinstated.

Although there is much academic literature and research published regarding assessment and feedback, it is a key component in quality assurance in universities, it forms the backbone of much teaching and learning training, yet fundamental change is slow. Issues such as useful and timely feedback, moving away from exams and shifting to more formative assessments have all been long discussed but extensive change is not evident. The changed context of an educational ecosystem that suddenly went online has potentially created a significant driver for change in assessment and feedback internationally.

The focus of this research

This research addresses key questions: Were assessment strategies changed as a result of the pandemic? What factors influenced those changes? Did academics focus on assessment or were changes mostly related to teaching methods? How has assessment feedback been altered? Were new technologies adopted to support online assessment? How will future assessment strategies be affected by the changes implemented as a result of COVID-19?

The primary research seeks to address these questions but, as argued by Slade et al. (2021, 1), 'attention is shifting towards a deeper exploration of the academic response to inform improved pedagogies and assessment in blended and online learning environments'. Thus, based on the findings related to these questions, this paper develops the TARC model which conceptually presents four different academic responses to COVID-19 in terms of assessment and feedback.

Methodology

Context of research

TU Dublin is the first technological university in the Republic of Ireland, established in 2019 (though it has existed as an Institute of Technology since 1992). Pathways are offered from Apprenticeship to PhD. In total, there are approximately 28,500 students and approximately 1,750 lecturing staff across a breadth of disciplines including both STEM and non-STEM categories.

In March 2020 the university shifted all, or almost all, lecturing online due to COVID-19 and this remained the case until September 2021. TU Dublin has an active Learning, Teaching and Technology Centre which offered many sessions to help academics with

this pivot and over the three semesters there were almost 6,000 registrations at such training sessions. No proctoring solution was brought to bear for remote assessments as the university did not acquire or support proctoring software. The inequalities amongst the student population, as discussed by Gillis and Krull (2020), was acknowledged by the university and in response to this in September 2020 individual schools introduced laptop loan schemes to support students who could not afford to purchase IT equipment. This research was conducted at the end of the third semester of online learning (May/June 2021) so the reflections by participants are based on both their immediate reactions in the first semester of lockdown but also their more considered approached during the 2020/21 academic year.

Research methodology and data analysis

An online questionnaire was drafted based on the literature reviewed and the lived experiences and positionality of the researchers (Artino et al. 2014; Holmes 2020). This research took a largely quantitative approach with some open-ended questions to gain a deeper insight into individual strategies and views (Cohen, Mannion, and Keith 2017). The questionnaire was prepared using Microsoft Forms and took approximately 10 min to complete. Data protection information and a request for respondents' consent were included at the beginning of the questionnaire. Following ethical approval by the university ethics committee, the questionnaire survey and information sheet were distributed via a central university email to all staff in the university and two reminders were sent; this approach focussed on capturing as many respondents as possible across the university (Vehovar and Manfreda 2017). The primary intention of this approach was to ensure a broad representation across discipline areas, within a single time frame. Thus, a single stage sample was utilised (Wu and Thompson 2020).

One hundred and ninety-two responses (a response rate of 11%) were collected representing a diverse population of teaching staff (discipline, staff grade, and programme level). Over half of the lecturers who completed the survey (59%) were in STEM subject areas. Respondents taught at levels that were broadly representative of the university's programme catalogue (in line with the Irish National Framework of Qualification). Questions were primarily nominal and ordinal (5-point scale): Nominal questions were reported as a percentage, or number, of responses; Ordinal questions (five-point Likert scale) were summarised as binary agree/disagree.

Systematic data analysis

An initial investigation of all responses was carried out, identifying key statistics associated with changes made, and experiences of, the staff concerned. GraphPad Prism was used to graphically represent the quantitative data. There were several open questions presented, reflecting Singer and Cooper's (2017, 128) view 'that the time has come to give greater voice to respondents in standardized surveys'. The open responses were manually analysed using thematic text analysis (Popping 2015).

In the first instance all data was analysed with respect to each research objective (see Appendix). Following this, *post hoc* inductive analysis was utilised to develop

the typology of Assessment Responses. The TARC framework was then developed to encapsulate the key findings that had been identified from the different levels of analysis undertaken.

Limitations

A limitation to this study is that data were self-reported by academics and therefore potentially less objective. While the responses were detailed, they reflect a small proportion of the overall teaching staff in the university and could reflect a bias towards those more interested in teaching and assessment practices. While the TARC model is a valuable output of the research, it was not possible to assign respondents to these categories in a *post hoc* fashion. Future work will be designed to categorise respondents into these categories for the purposes of further analysis.

Findings

Were assessment strategies changed as a result of the pandemic?

The clear finding of this research is that assessment strategies were significantly altered due to the pandemic, as 95% of respondents indicated that they changed their assessment method during this period. As Table 1 shows, a variety of different changes were noted by the respondents.

The shift to open-book exams was surprisingly enlightening for some as they are a *much better reflection of what happens in the real world* and *real world examples* facilitate the linkage of *learning outcomes to future work experiences*. Eleven percent have no plans to revert to traditional invigilated exams and feel that open-book exams or some other means of continuous assessment are better ways to assess and are more reflective of real life. But for others, the assessment they are keenest to reinstate is invigilated exams. Cheating is a significant concern, with one respondent noting *plagiarism was the highest I've ever seen this year*. Another respondent highlighted that *fear of plagiarism meant essay style exam questions were problematic so time controlled shuffled MCQ were favoured*.

Fourteen respondents highlighted that the change in practice that occurred led to more authentic assessment and/or critical thinking approaches. As assessments had to be re-designed to mitigate against the answers being easily available or plagiarised, it reduced the focus on rote learning. For some this led to decisions to *continue with the new more problem-solving style exam questions, rather than revert back to the mainly first-order questions of previous first and second year papers*. This issue was not only

Table 1. How did assessment practices change?

(1)	53% of new assessment descriptions included references to quizzes or MCQs
(2)	49% changed to open-book exams
(3)	43% introduced some form of online assessment
(4)	38% increased the number of low-stakes assessments throughout the module
(5)	32% replaced an exam with continuous assessments
(6)	31% moved to 100% continuous assessment
(7)	8% changed to group assessment

related to exams; another respondent concluded *essays are not a useful means to evaluate anything, and I will never go back to that approach. Tasks that align to critical thinking and application of theory are far more useful as assessment of learning* and, relating to lab reports, another respondent said '*I had started on more authentic methods previous to this year, but will now get rid of lab reports altogether, [as they are] too easy to cheat, and a waste of time*'.

What factors influenced changes in assessment strategy?

Unsurprisingly, when asked to identify the factors that they considered when deciding whether to change assessment strategies, the largest number of respondents (85%) identified the fact that students would be moving to online learning (Figure 1). Practical considerations of ensuring that learning outcomes would be met (69%) and the potential for plagiarism would be minimised (58%) were also considered.

A key finding of this research is the fact that 72% of respondents made decisions about how to change their assessment strategies based on the desire to increase student engagement. Twenty five percent of respondents used small formative assessment tasks to keep students engaged, often these involved weekly quizzes or discussion board posts, and 43% used online assessment such as quizzes or multiple-choice questions. One respondent summarised the advantages and disadvantages of greater use of an online formative assessment approach, '*online learning journals worked very well. Weekly feedback in Brightspace* [their Virtual Learning Environment] *was time-consuming but helpful for students*'. Another respondent noted that *more formative and interactive assessment with active in-class feedback* was employed to *evaluate real in time learning*.

Did academics make more changes to assessment or teaching practices due to COVID-19?

It is interesting that although the literature (Slade et al. 2021) highlights that academics focus more on teaching than assessment, this survey showed that 56% of respondents spent equal time adapting teaching and assessment and 23% focussed more on adapting assessment strategies (Figure 2). One respondent observed that *with the rapid change in environment it was important to first create an online learning environment and then innovate the best ways to assess in that environment.*

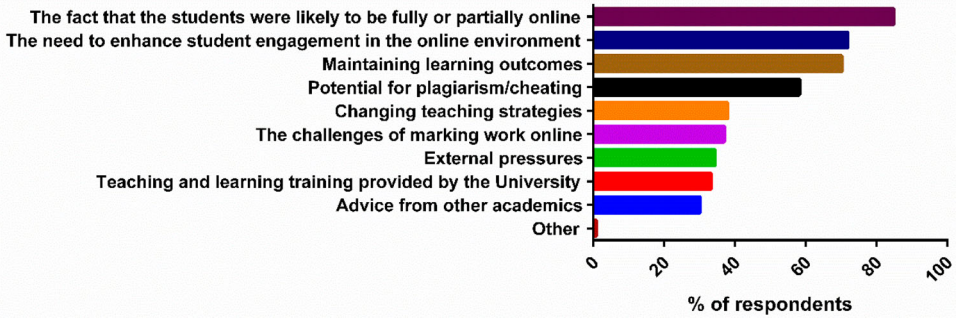


Figure 1. Factors that influenced changes in assessment strategy.

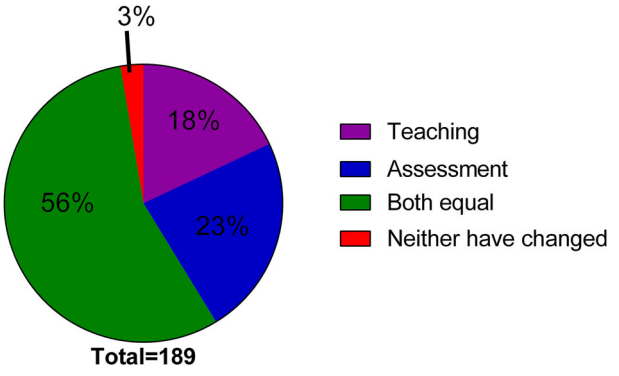


Figure 2. Did academics make more changes to teaching or assessment?

Notably, 58% stated that they maintained teaching as per usual but included additional methods to engage students. As discussed above, often these elements were small assessments such as quizzes and posts to a discussion board. There was a distinct *focus on participation* and a *greater emphasis on student engagement and ownership*. The commentary reflected a general concern among the respondents that their delivery methods encourage student interaction. This shows that assessments were being used as more than simply a tool to generate a grade at the end of the module.

How has assessment feedback been altered?

The key finding as regards assessment feedback is that 44% said that they gave more feedback when they were teaching and assessing virtually (Figure 3). The key difference in terms of methods of feedback was the use of rubrics, with 48% providing feedback by using a rubric in the VLE. For some, they wish to return to *direct feedback to students in class*. Interestingly, one respondent commented that the new methods will be used in conjunction with the original: *One to one and one to many feedback discussions during practical sessions will re-start. These will aim to reinforce and supplement the rubrics*. While it might have been expected that the new ways of providing feedback would lead to less discussion, only 19% of respondents believed this to be the case.

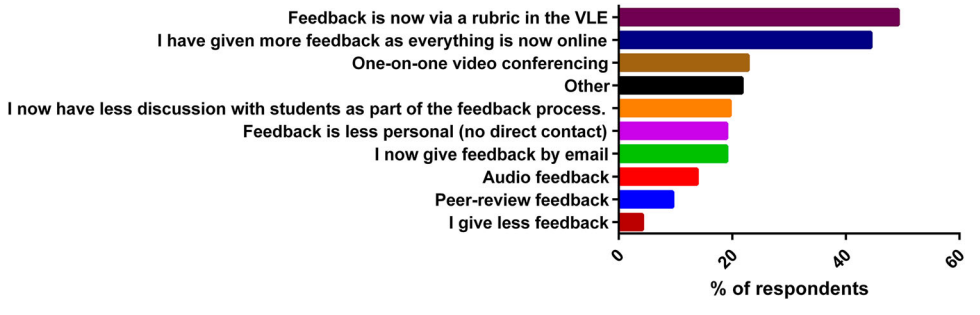


Figure 3. Changes to assessment feedback.

A key change in terms of the practice of assessment and feedback was the forced move away from paper-based assessment and feedback to work being both submitted and marked electronically, and 10% of respondents commented that they would not go back to paper-based assessments. One respondent summarised this sentiment that paper submissions are *a waste of paper and it's much more streamlined to submit online and receive feedback online*.

It is notable the impact that changes in assessment practices had on academics with 54% of respondents finding marking more stressful, 78% reported that dealing with assessments was more time consuming and 75% received more queries from students regarding their assessments. The reported experience of respondents was tested against subject area (STEM vs. Non-STEM) ($X^2(1) = 0.244$, $p = 0.621$), and Career Stage ($X^2(2) = 6.205$, $p = 0.045$). This indicated that Career Stage had an impact on the indicated experience of staff, with lecturers typically reporting a greater increase in workload/time commitment and higher stress level than either Assistant Lecturers or Senior Lecturers. However, there was no significant relationship between subject area and impact on experience.

Were new technologies adopted to support online assessment?

In order to enhance their online teaching/assessment/feedback, 55% of respondents adopted some new technology. Most staff familiarised themselves with some form of video conferencing software (e.g. MS Teams, Zoom, etc.) and many found it necessary to learn more about the features of their VLE. It is interesting that 66% of respondents felt that they had enough skills and knowledge to deal with the changes required.

Half of respondents (50.5%) used commercially available software (e.g. Kahoot, Socrative, Menti) and/or hardware (styluses, headsets, visualisers) to augment their teaching or assessment. Of those who responded to this question, 90% said that they intend to continue to implement at least some of these innovative technologies, in a stand-alone or blended learning context, in the future.

How will future assessment strategies be affected by the changes implemented as a result of COVID-19?

Respondents were asked to identify the practices they had started during the pandemic that they would amplify or cease. They were also asked to discuss what practices that had ceased, that they would restart, or that they would let go for good. Unsurprisingly, there are a range of views, for example, in terms of exams, 14% want to return to invigilated closed book exams while only a small minority (1%) are contemplating a shift to 100% continuous assessment. Of those that expressed a desire to return to invigilated closed book exams, 29% explicitly cited concerns about academic integrity. The high number of respondents who intend to amplify the use of quizzes or MCQs (40%) is notable. As would be expected, the focus on activities that would restart centred around in-person and group activities: in-class presentations, group work and practical assessments in laboratories. Ten percent of respondents are reluctant to return to paper-based submission of assignments.

Discussion

Assessment strategies

As the literature identified, COVID-19 had a significant impact on assessment and feedback. Watermeyer et al. (2021) noted many forms of assessment were simply suspended due to the online environment and while the focus in the literature has often been on the issue of exams, this research shows that the impact was more pronounced than just for those who had examinations as part of their assessment strategy; 95% of respondents changed their assessments. Exploration of this data in greater depth identifies several key issues.

Firstly, there was a shift from exams to open-book exams. This strategy shows a pragmatic response to the changed environment, although four respondents noted the difficulty of re-designing the style of questions for this approach. Secondly, there was a shift away from exams, with 32% replacing exams with continuous assessments and a further 31% moving to 100% continuous assessments. Both changes reflect the call in the literature (Nicol and MacFarland 2006; Boud and Falchikov 2006; Jessop, Hakim, and Gibbs 2014) to move away from rote learning and an over-reliance on exams as an assessment tool. Thirdly, the results show that 38% of respondents increased their use of low stake assessments, and for many the purpose of this was to use assessments as a tool to enhance student engagement in the online environment. This reflects a shift to formative assessment which authors such as Yorke (2003, 2005) and Winstone and Boud (2020) have called for over recent times. Some commonly cited reasons for changes to assessment strategy were pragmatic, for example, the need to prevent plagiarism was a concern for 58% of respondents. Thirty eight percent of respondents cited changing teaching strategies, while 33% credited training provided by the university as a motivation for change.

It is interesting to note that the pandemic and pivot to online learning has resulted in changes in assessment reflecting key areas that have been highlighted in the literature over many years but were not evident extensively across higher education. This change supports Fuller et al.'s (2020) suggestion that the pandemic may have created this TINA (there is no alternative) moment for assessment whereby academics were pushed to having to make changes to assessment strategies due to the pivot online. The key question is whether this is simply a moment in time, in response to the environment at the time, or whether there will be lasting change and that practice on the ground will become more aligned with the strategies that have been highlighted in the literature.

Assessment feedback

The key change in terms of assessment feedback, as a result of COVID-19, was the shift towards using rubrics in the VLE (48% used rubrics) and the fact that 44% gave more feedback when they were assessing virtually. As outlined above, key examples of good practice that have been discussed in the literature (Carless 2017, 2016) involved rubrics, using technology, audio feedback and formative feedback and all of these were evident in this research, some of these were also noted by Montenegro-Rueda et al. (2021) as responses to COVID-19. Another key focus of the literature is the call to move to a more dialogic approach to assessment feedback; there is no evidence that

the online environment created more dialogue, but it is interesting to note that only 19% felt that there was less discussion in relation to feedback. This reflects the fact that the approach is most often monologue in usual circumstances and that did not have to change in the new environment. In the context of Chong's (2021) research, the educational ecosystem shifted considerably, and, within this new environment, academics used tools that had been previously available to them, but they had chosen not to use. This is an example of pragmatic use of tools in the unusual circumstances of the pandemic. So, the unexpected change in the educational ecosystem resulted in academics being forced to try new approaches and technologies and this experience prompted them to change their practice in the long-term.

Increased relative importance of assessment

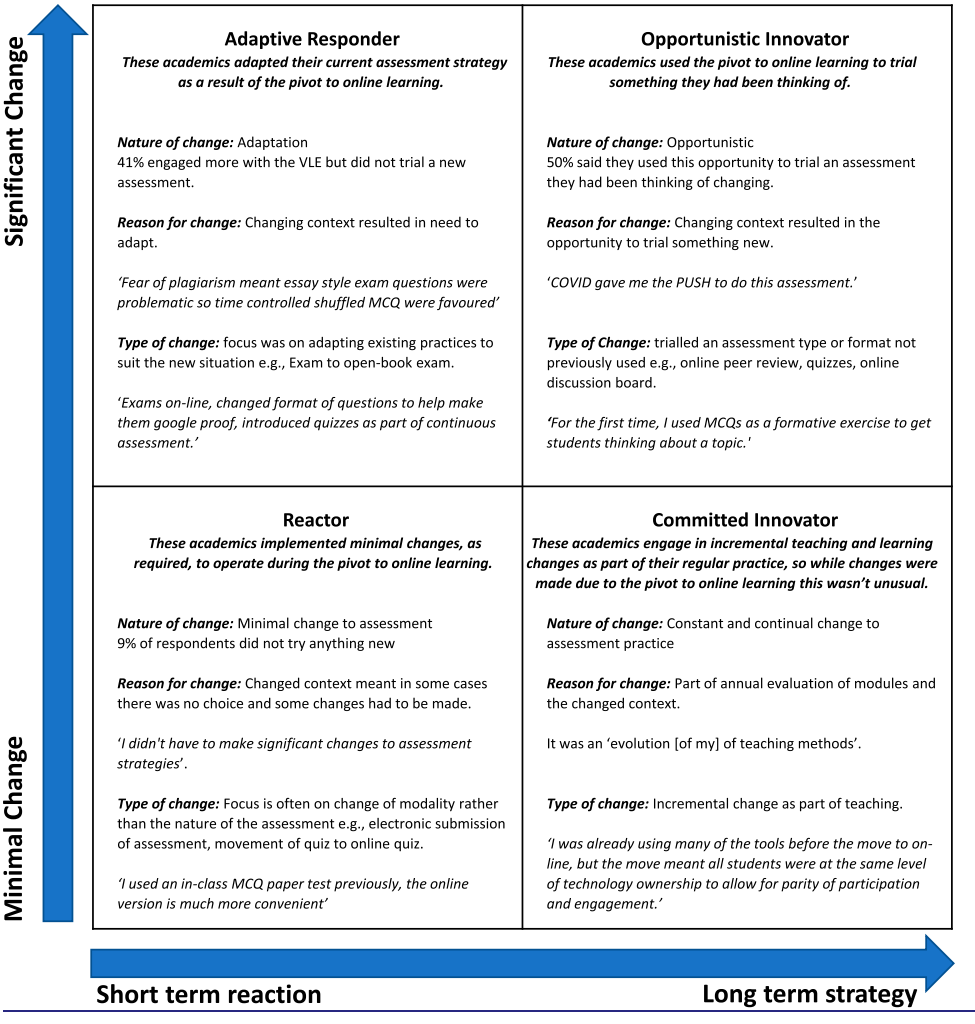
Slade et al. (2021) argue that assessments were an afterthought to pedagogical considerations during COVID-19 and certainly the focus in the literature has been on the pivot in terms of teaching which supports Slade et al.'s stance. However, in this survey it is interesting to note that 56% of respondents said that they changed assessment and teaching strategies equally, furthermore 24% said that they spent more time changing assessment. In addition, the increased use of formative assessment, to enhance engagement, is another way the pivot served to highlight to many academics the vital role that assessments can play in teaching and learning.

Types of academic responses in terms of assessment strategy

As noted in the literature review, much of the early research on the pandemic-induced pivot to online learning and assessment focussed on the provision of advice and/or the sharing of experiences (Wong and Zhang 2020; Evans and Pawlina 2021; Ng and Harrison 2021). This pragmatic approach was necessary during the early days of this rapid change. However, it is also vital at this point, two years into the pandemic, to take a step back and assess the types of strategies and approaches undertaken by academics.

Building on the approach of the RSA framework, and so identifying and analysing the activities that academics will amplify, end, let go or restart has led to the inductive development of the Typology of Assessment Responses to COVID-19 (TARC) framework (Table 2), which identifies four different types of assessment responses which have emerged from the data after post-hoc analysis. The *Reactors* are those who took a minimalist approach and only changed what was essential to adapt to the new environment – 9% of respondents did not try anything new. Often these changes were more to do with the modality of the assessment, for example, shifting from MCQ in the class to MCQ online, rather than a significant change in the assessment itself. It is likely that those in this quadrant will return to their traditional teaching and assessment methods once the environment returns to 'normal'. The second group were *Adaptive Responders* who had to adapt their assessments to suit the new environment. So, for example, the shift from an invigilated exam to an open-book exam (49% did this) necessitated changing the style of exam questions, so while the change to assessment strategy may not have been fundamental, adaptations were required. 41% engaged more with the VLE but did not change their assessment.

Table 2. Typology of academic assessment responses to COVID-19 (TARC).



The third group *Opportunistic Innovators* used the change in the educational environment to allow them to trial things that they had been thinking of doing before, but these changes were now easier to implement with less bureaucracy and less risk. It is notable that 50% of respondents in this research said that they took the opportunity to trial new things. The changes that have been successful will continue. The final group are the *Committed Innovators*; these are academics who make continual changes to their assessment and learning strategies and have ongoing engagement with teaching and learning supports and training. While committed innovators responded to the changed environment, they had been trialling many tools before COVID-19, had perhaps been aware of issues, strategies and tools from the learning and teaching literature and sharing experiences with colleagues. It is notable that their activities are in the low level of change, this is not because they did not change many of their approaches to assessment and feedback, but because change and piloting new tools are part of their normal activity, so it was not a

significant divergence from previous years for them. As one said, *it was an evolution of my teaching methods.*

The long-term impact of COVID-19 will be different for those in the different quadrants. For the Reactor and the Adaptive Responder, if the educational context returns to a complete face-to-face format, then many will revert to their original teaching and assessment strategies. Though it is notable some may feel that the changes they made had a positive impact, and they will retain some or all of them. For the committed innovators, who during COVID-19 found many more peer colleagues shared their interest in teaching and learning, they are likely to continue trialling new ideas and assessing what assessment strategies worked during COVID-19 and what they will retain or change. Finally, the opportunistic innovators used the opportunity afforded by COVID-19 to focus on teaching and learning and took the risk of undertaking new assessment methods. As the crisis abates, those in this quadrant will revert to their previous focus, perhaps research, but for others the experience of being involved in teaching and learning innovations may move them to become more committed teaching and learning innovators.

The discussion above focuses on the approaches taken by academics and for the most part, these were internal, individual decisions. However, the key finding of this research is that the changed external context was the factor that pushed this rapid pivot in terms of assessment approaches. This reflects Guppy et al.'s (2022, 11) observation that 'COVID-19 can spur useful change if it prompts instructors to reflect on '"why" they teach as they do' and Daniel's (2020, 91) comment that COVID-19 is the 'greatest challenge' ever experience across education. As the TARC model, Figure 4 below, illustrates the changed external environment was the impetus for the changes to the teaching and

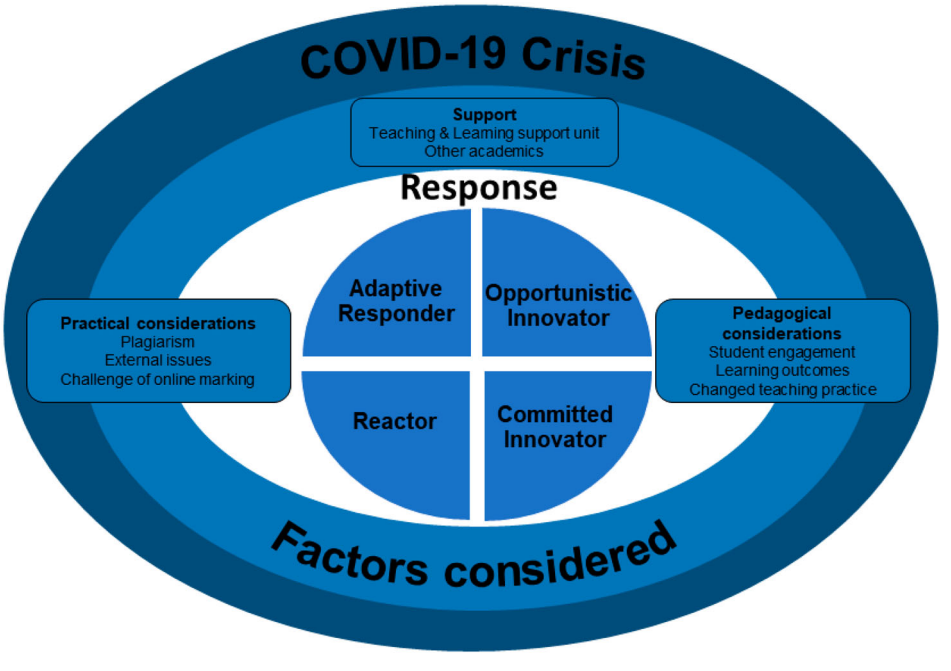


Figure 4. The typology of assessment responses to COVID-19 (TARC) model.

learning environment and a key factor was the lack of time for preparation (Montenegro-Rueda et al. 2021). In response to this, academics considered how to change their assessment strategy, and in doing so they considered a variety of factors. These factors can be grouped into three categories (from the data displayed in Figure 1). Firstly, practical considerations for example plagiarism, other academic responsibilities, and the challenges of online marking. This is reflected by the 58% who said that minimising the potential for plagiarism was a key issue in deciding their assessment strategies. Secondly, support from peers and the teaching and learning support unit were identified as key factors in changing assessment strategy by 30% and 33% respectively. Thirdly, pedagogical concerns such as student engagement, achieving learning outcomes, and changes to teaching practice were important with 69% of respondents being influenced by the need to ensure learning outcomes would be met.

It is notable that the role of management, institutional factors or organisational culture are really not apparent in this research and yet Montenegro-Rueda et al. (2021, 11) call for university institutions to 'accelerate change in education'. In some ways, the immediacy of the situation meant that the usual quality systems were significantly altered (and, in fact, this encouraged some academics to introduce changes that they otherwise may not have) and the reality is that this pivot took place on the ground driven by individual academics within individual modules. However, in terms of affecting significant change within higher education institutions (HEIs), Sá and Serpa (2020, 13) note 'this process, while requiring a predisposition of the actors involved to be successful, will take place within a framework defined by the leadership, by the top of the pyramid, both in HEIs and in governments'. The important role of individual action, as identified in this research, contributes to the debate regarding long-term change in the sector. It is notable that as the emergency situation abates, the usual management systems and procedures have re-emerged, and this has the potential to have a significant impact on how academics proceed in terms of assessment strategy. For example, one respondent lamented *I assume we will be forced back to in-person exams*, but there may also be ways in which structures can be re-established to reinforce the positive shifts in practice that have been identified.

Conclusion

The COVID-19 pandemic during the academic years 2019/20 and 2020/21, and the subsequent pivot to online delivery, rendered teaching, learning and assessment the main focus for academics worldwide. As one respondent indicated, *the move to online teaching and learning really made me think about how I teach and deliver material*. For some, it gave them the opportunity to trial something that they had previously considered, for others, it perhaps validated their long-term interest in teaching and learning innovations. For others, they had to react and identify how they could 'fit' their assessment approach into the new learning environment.

However, it appears that this temporary pivot will have long-term impacts. Firstly, there are several long-term changes in assessment and feedback strategies that may emerge from this rapid transition. Those changes that have proven to be successful are likely to be retained, for example, the shift away from paper-based assessment submission, for some a move away from exams, the more extensive use of marking

rubrics and small formative assessments, such as quizzes and discussion boards. Secondly, the experience of trying new innovative ways of assessing students may encourage some academics to continue this practice and become 'committed innovators'. Thirdly, academics clearly identified formative assessments as a mechanism to increase engagement among students, this reinforces the premise that the role of assessment is more than generating a grade to attach to a students' record as noted by Price et al. (2010).

The contribution of this paper lies in capturing an important point in time in the development of teaching and learning strategies, and in higher education more generally. Furthermore, the positing of the TARC model (Figure 4) provides the basis for further review in terms of implications for effecting change in higher education, teaching and learning, training and self-reflection among individual academics. TARC has emerged from this data, so it is important for future research to test these academic response categories to further validate them and help us identify what proportion of academics are in each category. Furthermore, this model calls for more holistic exploration of the approaches academics take to teaching and learning, rather than the more traditional focus on the different methods that are used.

This paper represents an important moment in teaching and learning, reflecting on a period of rapid change and identifying ways in which the pandemic may influence future thinking and practice in higher education internationally. COVID-19 has forced significant changes which are in keeping with many of the ideas that have been discussed in the literature in recent times. Fuller et al. (2020) said that the pandemic may have been a TINA (there is no alternative) moment for assessment strategy, what this paper has highlighted is that the repercussions may go well beyond this moment, and the pivot may become something much more long lasting and significant as Reactors and Adaptive Responders reflect upon the strategies that they had to introduce due to the pivot to online learning. Opportunistic Innovators are likely to build on what they learned from trialling new approaches and the Committed Innovators will continue to adapt and innovate.

Disclosure statement

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Appendix – Further details of data analysis

This appendix provides an overview of the qualitative and quantitative data analysis process.

After reading through the answers to the open-ended questions several times, data analysis themes were identified by two of the researchers individually. These themes were then agreed by the researchers and each researcher categorised data from the same three open-ended

questions under each of these themes. They then compared this process for consistency before finalising the thematic analysis of all open-ended questions. In addition, MATLAB's Text Analytics toolbox was utilised to examine the frequency of occurrences of specific words within these open responses.

Analysis of Free Form Text using MATLAB

(1) Copy all text into NotePad and save file as.txt (QhestionNUMBER.txt)
(2) Run code below in MATLAB
(3) Review frequency of occurrences of words stored in Occurrence_QNUMBER

```
Q15 = string(fileread(['Question15.txt]')); % Import relevant.txt
punctuationCharacters = ["." "?" "!" "," ":"]; % Identify punctuation
Q15 = replace(Q15,punctuationCharacters," "); % Remover punctuation
words = split(join(Q15)); % Changes all entries to individual words
words(strlength(words)<5) = []; % Removes short words e.g. 'and', 'the'
words = lower(words); % Ensures all letters are lower case
C = categorical(words); % Turns all words into an array
figure
wordcloud(C);
Occurrence_Q15 = wordCloudCounts(words);
```

The Ordinal questions were processed using SPSS Statistics to analyse relationships between participant demographics and their views. This approach follows Watermeyer et al. (2021), who used a univariate and chi-square test to establish where significant differences occur. First, responses to four questions around the impact on staff perception of workload were tested to see if there was a correlation between these responses. These questions related to assessment, emails and marking taking more time than previous academic years and marking of assessments being more stressful. The value for Cronbach's Alpha for these was $\alpha = 0.813$, indicating that responses were internally consistent across these four questions. The responses to these questions could then be combined to give an indication of the experience of the staff member, to indicate if they felt that workload was impacted in a negative way by the COVID-19 pandemic. Responses were then separated into two groups: negative impact reported; or no negative impact reported. Finally, these responses were examined according to respondent demographic (subject area, career stage etc.) using a Pearson Chi-Square test to determine whether or not the impact of the COVID-19 pandemic was reported similarly across these subsets of respondents.