Australian Journal of Teacher Education

Volume 46 | Issue 10 Article 6

2021

The Value of Praxis-Based Assessment to Stimulate Practical Engagement and Classroom Readiness in Online Initial Teacher Education

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Abstract: The opportunity to undertake teaching degrees entirely via online learning has proliferated in the last decade. Research shows that students choose to engage with content and application activities when they are directly aligned to assessment. The researchers trialled praxis-based assessment which required completion of practical learning tasks embedded in core learning content over two semesters in two Australian Initial Teacher Education courses. The aim was to enhance online student engagement in practical learning. Insights into the student perspective were gained through a survey, interviews, and learning analytics. The results from this study showed praxis-based assessment increased student confidence, classroom readiness and embodied understanding of theory.

Introduction

Online learning, also known as e-learning or digitally-mediated learning, was originally introduced to support, rather than replace face-to-face learning in higher education (Newhouse, 2016). However, in many institutions globally, online enrolments can outstrip on-campus student numbers (Calhoun et al., 2017), and this has been further escalated by the rapid move to online learning during the COVID-19 pandemic (Thompson & Lodge, 2020). In the field of initial teacher education (ITE), online learning has likewise seen remarkable growth (Dyment & Downing, 2020). While associated benefits are well documented, including increased access to students formerly unable to access tertiary learning, and greater diversity of student cohorts (Sanger, 2020), concerns regarding the effectiveness of online learning also exist. Online learning has been associated with poor student engagement, retention, and course completion, which has been found to result from a sense of disconnection with learning (Bawa, 2016; Stone et al., 2019). Studies further indicate that online student retention is often significantly lower than traditional on-campus ITE courses (AITSL, 2016). Dyment and Downing's (2020) systematic review of literature in this field has highlighted conflicting reports about the effectiveness of online ITE, with some purporting online effectiveness, and others raising concerns about whether relevant teacher standards can genuinely be met. Similarly, Allen et al. (2020) raise concerns regarding the integration of theory, practice and how these contribute to workplace readiness for online graduates.

Opportunities for meaningful learning in ITE through practical application tasks that help students to make connections between theory and practice are considered vital; however practical learning experiences can be particularly challenging to facilitate online (Burke, 2020; Dyment et al., 2018; Ellis & Bliuc, 2017). Given the growth in online delivery of teacher education programs, coupled with the potential for diminished hands-on learning and

knowledge application tasks, insight into strategies that might meaningfully engage online learners in the integration of theory and practice is considered significant.

Research shows that few students choose to engage with content and application activities when they are not directly related to assessment (Harris et al., 2018), and that student motivations are largely driven by assessment (Holmes, 2017). These findings certainly aligned with our own experience as initial teacher educators who facilitate learning in the Arts and Maths teacher education courses. Evidence collected from a former project, which investigated student engagement (Tualaulelei et al., 2021), revealed that the majority of students visibly put effort into assessment-related activities; however, tended to treat other learning tasks as superfluous. Prior to this project, both authors had additionally participated in a course peer-review project to jointly evaluate assessment in each other's courses. Through this process, we identified that on average, only 73% of students (68% in Arts and 78% in Maths) accessed the content of our courses via weekly module materials. This meant 27% of students completed the courses without engaging in practical learning experiences that were embedded in weekly learning. Importantly, both our learning areas are heavily praxis-based learning domains, meaning that theoretical understanding of core content is more robustly cultivated through "hands-on" active engagement. Essentially, "knowing" comes through "doing". Based upon these findings, we aligned with Ayalon and Wilkie (2020), who asserted "the importance of assessing students to inform future teaching and learning, rather than only for assigning a summative grade" (p.1). Our initiative was to develop, trial and evaluate the students' perspective of a praxis-based assessment strategy. We define praxis-based assessment as the assessment of core learning experiences that require students to engage in hands-on activities and subsequent critical reflections to achieve targeted learning outcomes. Specifically, we embedded practical content application activities in weekly course materials and online teaching sessions that students needed to complete and submit for assessment, along with theoretical reflections that helped them to make connections between theory and practice. We wanted to determine if students felt that this approach had a positive impact upon their ongoing learning in each course, and also upon their development of important skills for classroom preparedness through activities that generated application of theoretical knowledge in our respective disciplines.

The research was guided by the following research question:

What are the impacts and effectiveness of praxis-based assessment in specific Initial Teacher Education courses?

The results of this initiative and investigation revealed that students highly valued opportunities to engage in praxis, gaining productive learning outcomes by critically reflecting on practical processes. Most importantly, we found that mandating praxis-based learning through assessment enhanced their attention and depth of reflection on these processes, yielding higher quality learning outcomes. As such, this research has the potential to promote assessment strategies within wider ITE domains where coursework could be enhanced with a stronger focus on praxis-based learning processes, and by extension, pre-service teachers' preparedness for the classroom.

Literature Review

Concerns about Online Learning in the Field of Initial Teacher Education

There is much published research about the benefits of online learning, and this typically focuses on the enhanced accessibility of learning for students which permits more diverse educational opportunity to students who could not formerly access higher education (Australian Institute of Teaching and School Leadership [AITSL], 2016; Bettinger & Loeb,

2017; Dyment et al., 2018). A range of concerns also exists for online learning in ITE. Studies highlight that online students have lower retention rates, and fewer interactions with the institution and peers (Seery et al., 2021). Further, and most significant for this study, attention has also been given to potentially "diminished outcomes" around the integration of theory and practice for online learners in ITE, and concerns have been raised regarding workplace readiness of online graduates (Allen et al., 2014; Downing & Dyment, 2013; 2020).

The Importance of Praxis

In praxis-based learning, the 'knowing' comes from 'doing' (Connelly & Clandinin, 2000), and is derived from context and 'concrete structures' (Freire, 1996). The value of making explicit links between theory and practice through opportunities to critically reflect on practical processes is considered of particular importance for pre-service teachers and classroom readiness (Arnold & Mundy, 2020). However, praxis is often underrepresented in ITE experience for pre-service teachers (Biggs & Tang, 2007), diminishing opportunities for classroom readiness. Constructivist approaches to learning, such as praxis-based learning, are particularly relevant in online environments to "make up for the lack of social interaction in the classroom" (Robinson et al., 2017, p. 34) and to make learning more meaningful for students as they actively participate (Gogus, 2012). However, facilitating praxis-based learning online presents several challenges.

By its very nature as a computer-mediated mode of learning, online study potentially represents "a disembodied approach to learning, with diminished opportunities to physically enact strategies and collaborative engagement" (Burke, 2020, p. 2). Online delivery has been found problematic for a number of learning domains in ITE, particularly those that necessitate applied learning, physical engagement, some forms of collaborative work, and the use of specialised tools, materials, and processes. Learning areas such as Physical Education (Dyment et al., 2018), the Arts (Baker et al., 2016; Burke, 2021; 2020), Science (Deshmukh et al., 2012) and Mathematics (Kearney & Maher, 2013) are just some examples of knowledge domains where transference to online modes of learning has been demonstrated as challenging, with questions raised around how to meaningfully facilitate practical elements of coursework.

Online educators cannot simply 'transfer' experiential learning to computer screens (Dyment et al., 2018). Instead, they need to develop meaningful activities that "involve students in 'real' experiences and encourage reflection on those experiences in order to facilitate meaningful learning" (p.73). Gogus (2012), Harris et al. (2018) and Biggs (2014) assert that students need to be actively participating in their learning and are less likely to participate in set learning tasks unless they can clearly see how it contributes to their assessment. However, the increasing focus upon collecting student metrics, particularly in online modes, has sometimes led to the development of "superficial, descriptive, tick-the-box exercises that are usually designed to monitor engagement by computer" (Dyment et al., 2020, p. 1440), rather than meaningful praxis-based learning activities that may not be 'measurable'. The challenge then, is that these practical application tasks are not easily "measurable" and may not be completed by all students, meaning that some miss out on valuable learning (Tualaulelei et al., 2021) and the ensuing critical reflection that can facilitate higher-order thinking skills and adaptive performance (Biggs, 2014).

A number of studies have explored how teaching academics in a range of fields have stimulated practical learning experiences through learning activities that apply theoretical and conceptual learning (Burke, 2021; Dyment et al., 2018). However, research, such as Burke's (2020) investigation into Australian online educators facilitating arts learning in online ITE, found that only those who assessed practical learning components felt confident that their students had engaged in necessary learning experiences. Other studies have demonstrated particular success in facilitating paraxial learning through attaching short, on-campus intensives to the online course (Cutcher & Cook, 2016; Dyment et al., 2018). However, on-campus intensives are not always accessible to all students and may not facilitate equitable access to paraxial learning.

As such, one proposed means to engender a consistent, equitable opportunity for online students to engage in active learning is a praxis-based approach to assessment. Praxis-based assessment requires all students to actively engage in practical application tasks that are embedded in core course materials for assessment, alongside reflections that support them to make connections between course theory and the active learning (Bennett, et.al., 2016). Feedback from the assessment also provides students opportunities to reflect on their learning and how this would apply within the context of the classroom (Rowley & Munday, 2018).

The literature demonstrates that concerns exist regarding the classroom readiness of online ITE students, and that there are a range of challenges associated with online learning for application activities that can develop connections between theory and practice that are vital for a range of thinking skills and classroom application. Further, the literature highlights a need to consider more effective ways to prepare online ITE students for the classroom. Finally, there are specific pedagogical requirements and needs for more flexible online delivery as compared to on-campus. As such, we believe that the benefits of adopting a praxis-based approach to assessment can stimulate more meaningful, applied learning that requires online students to participate in hands-on experiences. We therefore developed and refined the following initiative in order to test this hypothesis.

Methodology and Methods

Our study was conducted in 2020, in a regional Australian university over two consecutive semesters. The University is well known for excellence in online delivery and services a diverse range of students, 75% of whom enrol online and who are geographically located throughout Australia. Ethical approval was gained with the university ethics body prior to the study commencing.

As explored in the introduction, we engaged in this study to understand the impact of praxis-based assessment within online cohorts from first year core curriculum and pedagogy courses in Arts and Mathematics. Using the *Scholarship of Teaching and Learning Cycle* (Kinash, 2019; see Figure 1) we began with the observation that many of our students were not engaging with the practical learning (Tualaulelei et al., 2021; Burke et al., 2021), and the hypothesis was raised that mandating the practical learning through assessment may enhance student engagement in these tasks. We held a conviction that theory is best understood through practical application (Gogus, 2012), and thus in trying to prepare future teachers for the classroom, we recognised an opportunity to align our content to the student needs. We therefore sought to understand what might be the impacts if weekly practical application tasks became a core component of assessment? Our hypothesis was that a praxis-based

assessment would enhance student engagement with the practical tasks that would prepare them to teach our respective disciplines within a classroom.

Figure 1: Application of the Scholarship of Teaching and Learning Cycle (Kinash, 2019). Used with permission.

At the start of 2020, we redeveloped assessment for our courses, changing previously theoretical assessment pieces to a series of praxis-based assessment tasks that required students to apply theoretical knowledge in practical application tasks. In the Arts, students were required to submit evidence of their completion of specific arts "challenges" in each of the five curriculum areas (Dance, Drama, Media Arts, Music and Visual Art). These were designed to help students to experience creative and artistic processes across the different art forms, thus developing their artistry as future teachers, and their planning and curriculum considerations for the classroom. In Maths, students were required (and supported) to create hands-on learning activities suitable for the classroom aligned to the three strands in the Australian Curriculum: Number and Algebra, Measurement and Geometry, Statistics and Probability. In both courses, alongside participation in the practical application tasks, students were required to submit critical reflections on their practice and classroom application that evidenced their awareness of the theoretical principles and curriculum enactment for the classroom.

After implementing the praxis-based assessment within our courses, we collected data of the student perspectives and evidence of their course engagement through learning analytics to gain insight into the impacts and effectiveness of our approach to assessment in

stimulating and enhancing course engagement, particularly in developing skills that could be applied in their future classrooms.

Participants

Participants in the study were the 305 initial teacher education students across our online student cohorts in the Arts and Mathematics courses. Data were obtained from an anonymous voluntary student questionnaire that was comprised of multiple-choice questions using the Likert scale, and open responses (n=64 complete responses; 35 Arts and 29 Maths students); semi-structured interviews (n=3), and course learning analytics. The survey response rate of 0.21, according to McNeish (2017), is a common response rate in education research and was thus deemed acceptable. The low number of interviews may have resulted from the additional pressures higher education students faced during the 2020 COVID-19 pandemic (Allen et al., 2020; Phillips et al., 2021).

While some of our course offerings were available both online and on campus, data were obtained only from online students. The demographic data from the voluntary survey was initially compared with the student population data in both courses and found to be a close representational sample of the spread of student demographics. Survey results showed 50% of the students were studying full time, 48% were in their first year, and 55% were first in family at university. The survey also revealed that at least 80% of survey participants were in employment: 50% full time, 30% part time and the remaining not disclosed. 44% of the participants were supporting a family, presumably as well as studying and working.

Data Analysis

Statistics from the Likert scale responses were descriptively coded. Qualitative comments to explain multiple choice responses, as well as two open questions were coded in Atlast.Ti (https://atlasti.com/) and the coded results exported to Excel to enable basic counts and listing of codes. The comment responses were also linked to each respondent's survey ID so that individuals' responses to any question could be cross compared to all other questions in the survey. Once data were coded by assigning a descriptive label or code to a comment, we engaged in a process of thematically grouping descriptive codes to determine key themes emerging for the survey as a whole. Additional data sources, including interview transcripts and learning analytics were then consulted as a means to either verify or ask further questions of the survey data, to ensure that key findings were supported, and to ensure that no anomalies or conflicting findings were identified. The key findings will now be explored.

Findings

Thematic analysis of the data revealed four key themes:

- Improved knowledge, understanding and confidence in discipline area;
- Practical learning enjoyable and achievable;
- Critical reflection enhanced praxis; and
- Assessment of practical learning increased engagement.

Improved Knowledge, Understanding and Confidence in Discipline Area

Following completion of the course, students were asked to rate their understanding regarding the role of their discipline in the curriculum. In this question, 93% of respondents rated their understanding of the role of the discipline in the curriculum as Very Good (53%) or Good (40%), with no students rating their understanding in this regard as unsatisfactory. (see Table 1).

Survey Question	Very Unsatisfactory	Unsatisfactory	Satisfactory	Good	Very Good	Total
Now that I am finished this course, I rate my understanding regarding the role of [discipline] in the curriculum as	0%	0%	7%	40%	53%	n=64

Table 1: Perception of discipline-specific knowledge after course

The data thus demonstrates widespread confidence for students following their studies. An important dimension of this research was investigating the role that praxis-based assessment played in enhancing this perception of confidence. Table 2 shows that 96% of respondents said the assessment tasks were very important (75%) or important (19%) in improving their skills and understanding of the discipline in teaching and learning, and 95% found the tasks very helpful (68%) or helpful (27%) in preparing them to teach their specific discipline in the classroom.

Survey question	Very unimportant	Not important	Neutral	Important	Very Important	Total
How important would you say the assessment tasks were in improving your skills and understanding of [discipline] learning and teaching?	0%	2%	4%	19%	75%	n=64
	Very Unhelpful	**Not helpful**	**Neutral**	**Helpful**	**Very Helpful**	**Total**
How helpful would you say the assessment tasks were in preparing you for teaching your discipline in your future classroom?	0%	0%	5%	27%	68%	n=64

Table 2: Student perspectives on the value of course assessment in developing discipline-specific knowledge and skills that prepares them for classroom teaching

A qualitative comment field attached to both questions provided further explanation regarding students' perspectives on the role of assessment in improving skills and understanding and in preparing them to teach in these disciplines. Both questions received 60 valid responses. These again affirmed the ways that students valued the learning that occurred through assessment, with a majority of comments from Arts students (A) and Maths students (M), explaining how the assessment tasks provided an experiential understanding of appropriate learning experiences and planning insights for the future classroom:

> *I feel that the assessment tasks helped to prepare for teaching the arts in the classroom context. The assessments required you to have and implement knowledge of essential classroom supports, including providing students with content that supports authentic arts learning and an inclusive learning environment, which is relevant to all classrooms. (23A)*
> *I found the practical activities very helpful, not only did it give me ideas that could be used in the classroom, but it also gave me a greater insight into my understanding of teaching a particular component but also ways of making it engaging and relatable to students. (5M)*

Some comments focused on the integration of theory and practice: "I now feel confident that I have the theory together with the practical elements of the arts knowledge" (20A); and:

> *The activities allowed me to see the theory behind the practice and provided me with the skills to create lessons that use meaningful manipulatives that are engaging and relevant to the students. The activities also allowed me to make connections to other curriculum areas and I now understand the importance of those opportunities to connect the contents. (9M)*

Some students referred positively to the development of a deeper understanding of discipline and/or skills and practical teaching strategies in areas where they initially felt a lack of confidence:

> *This course has given me a lot more confidence and a deeper understanding of not only mathematical content but also how to teach this to children. I feel as though I have never been great at maths and so my confidence is low even when teaching younger year levels. I loved that this course was practical as I feel I learn best with hands on learning. (3M)*

The completion of the practical activity also helped Interview Participant 3 to understand the complexities of planning in the classroom:

> *I didn't realise how much… thought goes into… meeting… every child's need in the room because everyone learns different obviously. So trying to incorporate all those tactile and visual and audiological [sic] things that children need to learn into a lesson, rather than just normally I'd be given a sheet and getting told, "Here you go, take them, do this". (Interview Participant 3M)*

Similarly, Interview Participant 1A related the practical learning to the cultivation of confidence: "If I didn't have to do what I was having to reflect on, and do what I was learning, there is no way I would be as confident to teach any of the arts".

Only one student responded negatively regarding their perceptions of the value of their praxis-based assessment, with time constraints evidently impacting their experience:

> *I feel that the course content was quite heavy, and the assessment requirements were a lot. I work 4 days a week to support myself and study full time (after work, my day off and over weekends) and I found assessment difficult to complete because of the length and effort required. (36A)*

This comment raises interesting reflections regarding whether time-poor students would engage in practical application tasks and potentially miss an opportunity to develop theoretical application through practical experience if not mandated through assessment. This is explored later in more detail.

Practical Learning Enjoyable and Achievable

The survey asked participants to rate the practical activity-making experiences provided in the courses in terms their enjoyment of the tasks and how achievable they were within the course, as shown in Table 3.

Survey questions	Very unenjoyable	Not enjoyable	Neutral	Somewhat enjoyable	Very enjoyable	Total
How enjoyable did you find the practical [discipline] activity making experiences in this course?	0%	2%	8%	23%	67%	n=64
	Very unachievable	**Not achievable**	**Neutral**	**Somewhat achievable**	**Very achievable**	**Total**
How achievable did you find the practical [discipline] activity making experiences in this course?	0%	0%	6%	23%	70%	n=64

Table 3: Perception of practical activity-making experiences

Positively, these data confirmed that the majority of students found practical learning enjoyable and achievable. Given that we saw a significant improvement in student perception of their discipline skills through undertaking the course, the qualitative data in general affirmed that "undertaking the practical experiences were (*sic*) an important element to fully understanding the content and context" (43A). Respondent 21A reported "the practical arts-making experiences put me in the centre of my learning and I was actively challenged in a fun and engaging way. Thank you for using this authentic approach".

Qualitative responses indicated that those who did not enjoy the tasks referred typically to the level of difficulty: "I found the dance practical component difficult due to injury and my age (mature)" (9A), or simply to elements they did not personally enjoy, such as, "I did not enjoy the music Dance or drama (*sic*)" (37A). Similarly, a small number of students commented on the time such tasks required: "It was time consuming thinking of an activity" (30M). However, most students said they felt the tasks were achievable (24%) or very achievable (70%), with a number referring to the positive dimensions of being challenged:

> *Engagement with the practical elements of creative arts allowed me to fully understand the processes. Through hands-on experimenting with the Arts Curriculum, I felt all the emotions the students would feel: the anxiety, nervous[ness], apprehension, unwillingness to participate. Stepping out of my comfort zone and actually having to contribute actually had a positive outcome, I achieved something I thought I just can't do. This course was so enjoyably engaging it surprised me how much I learnt and by the end, I actually felt confident in teaching creative arts. A fabulous way to teach especially as I am an online student. (45A)*

Some students were also able to apply their learning in professional experience or in part time teacher positions for current employment: "I thoroughly enjoyed designing activities to use in the classroom. I actually used some of these ideas whilst on prac" (Respondent 4M), and "This unit has given me so much knowledge on how to teach the content in a classroom. Without this information, I would struggle to put together a plan or know what pedagogical approach to use. I have already used one of the activities" (27M). Similarly, "I'm teaching the kids in grade three and I feel having done the course and now having done visual art while teaching I feel a lot more confident" (Interview Participant 1A).

Importantly, repeated student comments regarding the support they received in completing their application tasks and assessment highlighted the significance of a supportive learning environment. One arts student commented:

> *I think that the Assessment Tasks for this course/unit were a good way of assessing learning as they required and were supported by the course learning. The weekly modules did well to break down individual topics and reinforce our knowledge and understanding to support future weeks' content. (23A)*

Again, in the Maths course, feedback on the learning activities was repeatedly raised as valuable:

> *I loved creating the maths activities. It was fun and I was able to use my creative side. Being able to submit the activities for feedback was an amazing resource to be able to determine if you were on track. (19M)*

The data thus confirmed that the application learning tasks helped with developing confidence, were enjoyable and engaging, and helped students experience important processes in action, particularly when support was provided from the lecturer.

Critical Reflection Enhanced Praxis

Following the process of engaging in practical application experiences in their discipline, students were asked to critically reflect on their activity, how it aligned to the curriculum, and how it would afford learning for students in the classroom. Respondents were asked to rate the reflection in terms of how helpful this process of critical reflection was in preparing them for the classroom and demonstrated a majority (91%) found it helpful, as seen in Table 4.

Survey Question	*Very unhelpful*	*Not helpful*	*Neutral*	*Somewhat helpful*	*Very helpful*	*Total*
You were required to critically reflect on your practical [discipline] activity experiences, making connections between your experience and theoretical learning. How helpful in preparing you with pedagogical knowledge for the classroom were these reflective tasks?	0%	0%	9%	22%	69%	n=64

Table 4: Perception of critical reflection in developing classroom readiness.

Given that praxis occurs at the intersection of practice and theory, this was a positive result, demonstrating that most students found the combination of practical learning and reflective theorising helpful for preparing them for classroom teaching.

Qualitative explanation revealed a range of benefits. Survey respondent 29M explained that the reflection enabled them to "align how what I was planning is underpinned in theory and not just a tokenistic activity". This authentic experience helped others to "bring the theory and practical art experience together to make sense" (20A).

A number of students (n=5) also referred to the nature of the practical tasks and reflection to assist them in seeing "how a student may feel in a practical experience" (52A), including evidence of different points of view (20M), engaging within the learning environment (12M), understanding vocabulary and terminology in context (14A) and thinking differently to solve tasks (31M).

The completion and reflection on their practical activity also helped Interview Participant 3M to understand the complexities of planning in the classroom, with a new recognition regarding the: "depth I'd have to go into planning a lesson and how much content and thought goes into that". When asked to reflect about the impact of the praxis-based assessment, Interview Participant 2A shared:

> *It just made so much more sense in the way that it was put across. This is why we need to do it... It just, it made so much more sense. So I feel now that I could definitely go into a classroom and confidently teach the arts in a genuine and authentic setting.*

Collectively, the data reinforced that theoretical understanding was made more evident and useful when students were required to engage in critical reflection on their practical application tasks.

Assessment of Practical Learning Increased Engagement

We asked participants if the practical experiences and reflections were optional, (not assessed), would they have still completed them? Responses are shown in Table 5.

Survey question	*Very unlikely*	*Not likely*	*Neutral*	*Somewhat likely*	*Very likely*	*Total*
If the practical [discipline] activity experiences and reflections were optional (not assessed) do you think you would have chosen to complete them	5%	22%	19%	32%	22%	n=64

Table 5: Willingness to complete practical tasks if not assessed

Given previous research (Dyment et al., 2020) and the course learning analytics for semesters prior to commencing this research, we had expected to see a larger proportion of students acknowledge that they would only do the practical learning tasks if assessed. It was pleasantly surprising to see that just over half of the surveyed students said they would complete the tasks. When teasing apart survey responses to this question, it was found that 53% of the Arts students and 56% of Maths students said they were likely or very likely to complete practical tasks even when not assessed, demonstrating that discipline areas did not impact this response.

Qualitative explanations of their responses helped to illuminate this picture more fully, indicating the student appreciation of the practical learning and their recognition of its benefits may have helped to increase desire to complete the activities: "It made me aware of delivering AUTHENTIC learning experiences and further highlighted how naturally inclusive the arts are in school" (27A), and

> *I found the practical activities very helpful, not only did it give me ideas that could be used in the classroom, but it also gave me greater insight into my understanding of teaching a particular component but also ways of making it engaging and relatable to students. (5M)*

Some comments revealed that, if not assessed, students may only complete tasks they found enjoyable, or which were in areas of existing strength. Interview participant 1A expressed how activity completion would have been discretionary and based upon enjoyment,

But I definitely would not have done the drama or the visual art .... I would have done the music one because I enjoy the music yeah, so I would have done the music, but I definitely would not have done drama.

Other participants acknowledged that the practical application tasks would have been completed with less effort and consideration, thus potentially diminishing the quality of their engagement or the benefits they elicited from completing the work: "I believe that if they were optional I may not of found the time to complete, or not considered it important, (14A), and:

Creating the activities took a lot of time but was very rewarding and the feedback given in the forums and on the assessment very constructive. Had it not been assessed I may not have put as much effort into it and then would have missed the connections that I have made (9M).

Some acknowledged that, feeling time poor, they may not have completed non-mandated activities: "I do not think I would have prioritised these activities within my time restraints. Because of this, I am very glad they were assessed" (21A). Similarly, "I feel that as my studies need to fit around so many other aspects of my life, I wouldn't take the time to complete optional activities" (20M).

Interestingly, Respondent 29M, who previously noted the benefits to integration of theory and practice acknowledged, "I would have concentrated on assessment items; this is due to a full-time load & other commitments meaning I'm time poor". This demonstrates that significant benefits to this student were encouraged by the mandating of the praxis-based assessment.

Our learning analytics permitted further insight into these findings. In the Maths course, all weekly topics contained mathematical content to assist with their practical application tasks. Every topic had an assessment task embedded in the weekly learning, which were collated and submitted in two assignment submissions. This is reflected in an average 96% of students completing the Weekly topics (see Figure 2) and was an increase of 18% from the learning analytics of the year prior to implementing praxis-based assessment, which averaged only a 78% completion rate across all weekly topics.

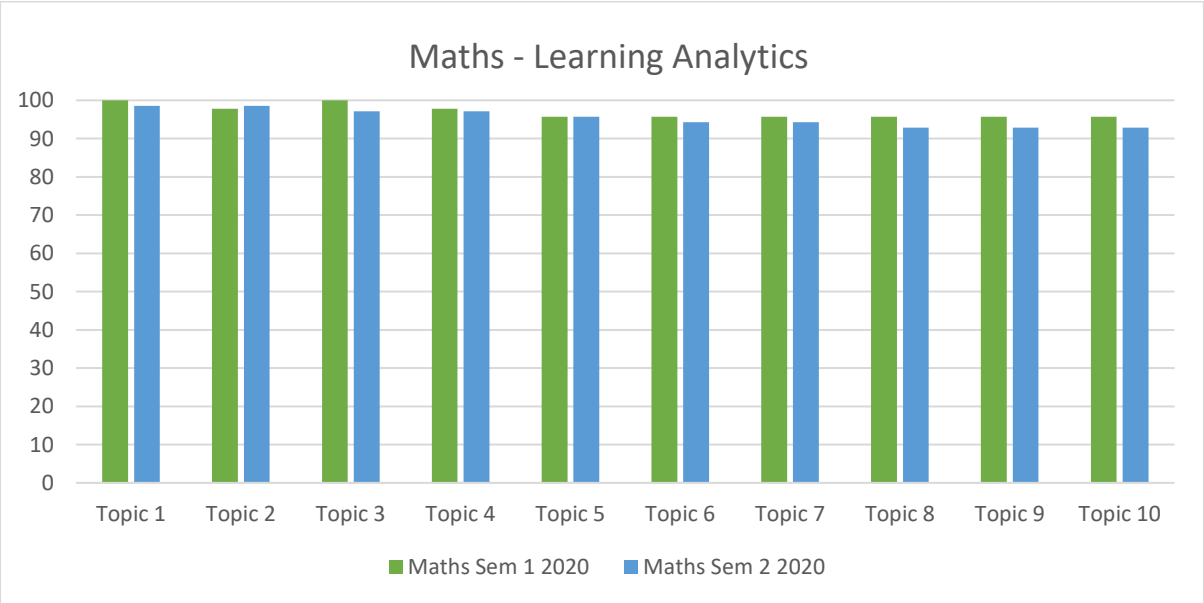

Figure 2: Maths course learning analytics, semester 1 and semester 2

In the Arts course, six of the ten weekly topics focused explicitly on activities that students had to engage in for assessment. Figure 3 shows an average of 92% access rate for

course weeks where the topic focused on activities related to assessment (indicated within the boxed section of the chart), compared with 60% access rate for topics that were more theoretical in focus. These theoretical-focused weeks showed a similar average access rate to the previous year's learning analytics (68%), prior to the implementation of praxis-based assessment. While all weekly topics contained assessment-related theory, the learning analytics evidence a much higher access to the topics related to the practical elements of assessment that were more overtly assessed. Learning analytics, therefore, provided a picture that suggested that embedding practical, assessable, tasks within weekly learning influenced student engagement with course materials.

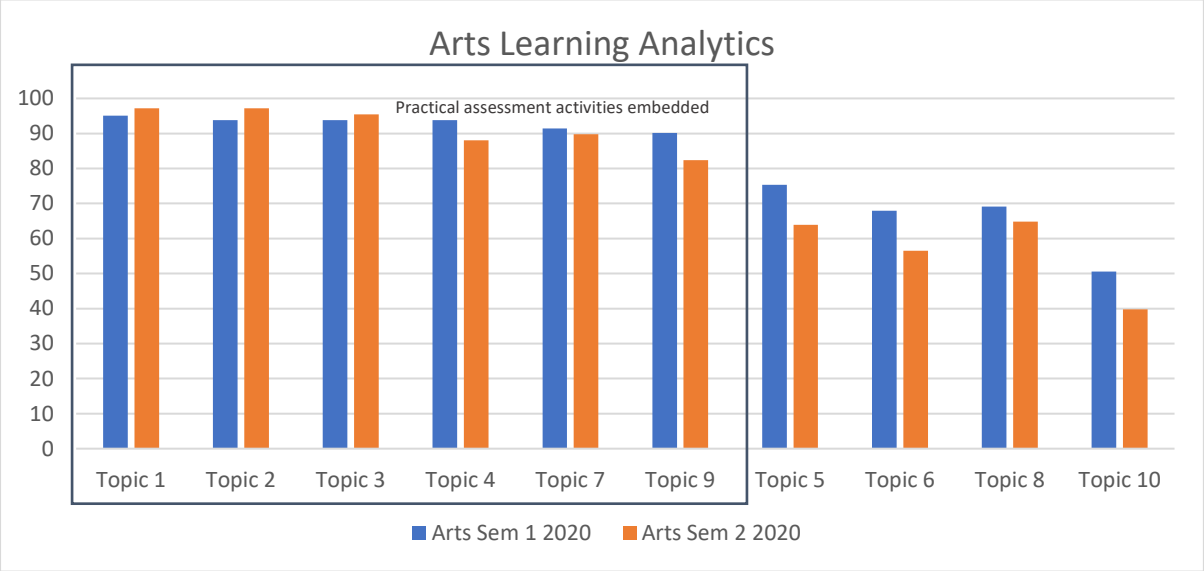

Figure 3: Arts course learning analytics, with practical assessment activities indicated, semesters 1 and 2

These findings prompted a cross examination of student demographic data with responses to the question regarding whether students would complete practical application tasks if not assessed. It was noted that students in full time employment reported they were much less likely to engage in practical learning tasks if they were not assessed: 46% were unlikely to have engaged at all, with only 38% reporting that they were likely or very likely to have completed the activities. These data suggest again that time constraints may see students making strategic decisions about what to complete and focus their attention upon, and that assessment tasks tend to drive their attention.

Additional Note

We are both aware that these above findings are overtly positive, and therefore feel it important to note that the positivity of the survey and interview data was triangulated by positive Student Evaluation of Learning and Teaching data, collected by the university. Both offerings of each course ranked within the highest scores of the university for each semester, alluding to overall student satisfaction of the courses, understandably reflected in the above data.

Discussion

The findings from our research confirmed our hypothesis: that praxis-based assessment in our courses was useful in building relationship between theory and practice, university study and future classroom application, and student engagement and confidence. Our findings demonstrate that mandating practical application tasks and critical reflection through assessment can provide a positive means to develop applied learning and classroom readiness, which is crucial for online learners (Dyment & Downing, 2020).

Gogus (2012) and Biggs (2014) assert that students need to be active participants to yield more meaningful learning, and Wass et al. (2020) likewise confirm that "constructively aligned courses contribute to high quality learning outcomes" (p. 191). A key concern over the classroom readiness of online graduates from teacher education courses is often related to the potentially diminished opportunities for "hands on" learning in "real" experiences that contribute to an applied understanding of the teaching profession (Biggs & Tang, 2007). Our findings support an approach to developing greater classroom readiness in online initial teacher education programs through mandating practical application activities through assessment, and consequently, an approach we will continue following this project.

We found that practical application tasks were more effective when mandated as assessable course elements. In particular, a common challenge identified for online learners is time constraints, particularly when so many online students fit study around wider life responsibilities (Bettinger & Loeb, 2017; Stone et al., 2019). Whether our students had jobs, family responsibilities or large study loads, only 54% indicated that they would have been likely to complete the application activities if they were not assessed. Students responded that they prioritised assessment within their time constraints, with some admitting they may not have completed the task to the level of detail if it had not been assessed. Results from our student surveys and the learning analytics thus aligned with current research (Harris et al., 2018) that shows students are more likely to engage in learning tasks when they see a direct contribution to their assessment.

Our findings further confirmed the value of praxis-based assessment in our courses for the meaningful, authentic learning it yielded. Students were given opportunity to construct new understanding through actions undertaken in learning (Biggs, 2014; Prilop, 2021), which engendered domain-specific knowledge, understanding and confidence. Research consistently affirms a correlation between teacher confidence and effectiveness, particularly in specific knowledge domains such as the Arts and Maths, where lack of confidence often correlates with a perceived lack of teaching effectiveness (Alter et al., 2009; Boyd & Ash, 2018; Dossel, 2016). As such, the enhanced confidence reported by our students was considered a potential indicator of enhanced teaching effectiveness, although this could not be verified as correlations between survey participation and task performance were not part of the research. Most significantly, the data demonstrated that students recognised that a significant contributor to their growth in knowledge, skill and confidence was the opportunity to experience their discipline in action and develop practical skills that could be used in a future classroom. This demonstrates that the practical application experiences helped them to feel confident in making extrapolations from these tasks to potential future scenarios (Biggs, 2014).

Another positive finding was that most students expressed their view that the practical application tasks were enjoyable and achievable. In part, the "achievable" nature of tasks was correlated for some students with the level of support they reported in their courses, particularly regarding feedback on assessment which helped them to feel more confident about the tasks and their potential application for the future classroom. While some students experienced challenges when engaging in the practical application tasks, these were generally

acknowledged as beneficial to their learning and in "pushing past" confines of a comfort zone that then yielded important new learning that may not have otherwise occurred. These findings collectively indicate that the nature of practical application tasks as achievable and relevant to future classrooms is likely to engender a stronger, more willing participation from students, even when they find the tasks challenging. Our findings affirm the need to reconsider learning activities and assessment to focus on deep and authentic learning, rather than activities that Dyment et al. (2020) refer to as "busy work", which constitutes "superficial, descriptive, tick-the-box exercises that are usually designed to monitor engagement by computer rather than through human interaction" (p. 1440).

Beyond the benefits of practical application tasks that could be experienced by all students when mandated through assessment, we found that the connection of critical reflection to application tasks was also essential to enhancing student perception of classroom readiness and understanding theory in action. According to Arnold and Mundy (2020), reflecting on specific links between theory and practice is essential for classroom readiness. In these courses, the nature of the praxis-based assessment required students to critically reflect on their discipline activity experiences and how the activity aligned to the curriculum. This then facilitated meaningful praxis: the embodiment of theory. Students expressed that the activities prompted them to think about resources, classroom management and differentiation, and other teaching processes that might not have been considered, had they not planned for classroom contexts. As found in previous research (Gogus, 2012), through constructivist, "hands on" learning, the students reported the learning became more valuable.

Reflection on the key findings and their relationship to each other led to the development of a model, in which we have highlighted the context in which our online initial teacher education courses were operating, the goals we aimed for, and the key elements of praxis-based assessment that we found beneficial in attaining these goals (See Figure 4).

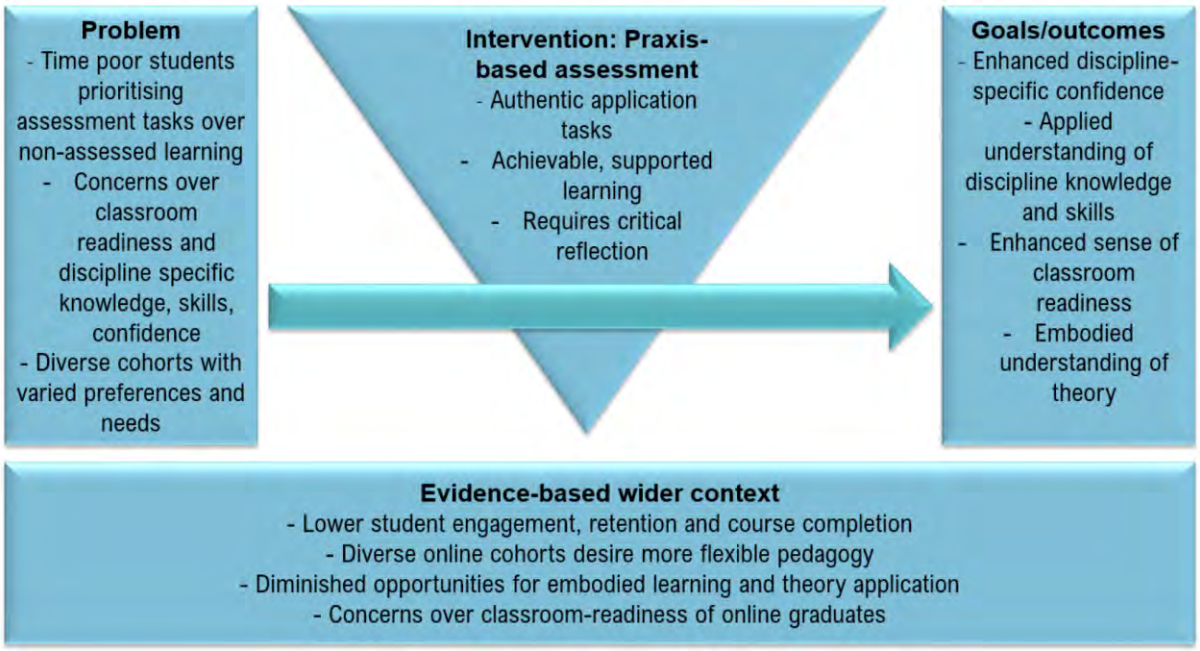

Figure 4: The impacts of praxis-based assessment to enhance initial online teacher education.

The model demonstrates the context of the online learning environment, including the need to recognise the diversity of online learners, the increased time constraints many of them experience, and the significant need to develop classroom readiness through bridging theory and practice, which is confirmed repeatedly in the literature (Biggs & Tang, 2007;

Dyment & Downing, 2020; Robinson et al., 2017). It shows the goals that are required for pre-service teachers to be prepared for the workforce: discipline knowledge, teacher confidence and an understanding of planning and enacting learning in the classroom. The problem and desired goals/outputs sit within a wider contextual awareness of the issues identified in the literature regarding online learning in teacher education. As a result of this research, we are proposing that praxis-based assessment can navigate the contextual challenges to work towards the attainment of these stated goals/preferred outcomes.

Conclusion

By engaging in research using the *Scholarship of Learning and Teaching Cycle* (Kinash, 2019), we initially identified that our students viewed practical application tasks as superfluous, and that assessable tasks were the main (or even sole) focus for some, particularly those who were completing studies alongside complex, busy wider lives. We recognised the need to enhance student engagement in practical application tasks that helped them to see the theoretical concepts being studied "at work" to engender classroom readiness. Given evidence that student learning is often driven by assessment (Harris et al., 2018; Wormald et al., 2009), we implemented a new approach to our course assessment, linking practical application tasks to theoretical reflection. This motivated students to prioritise the practical learning components and reflections, enhancing the quality of their learning through the desire for assessment success. Student surveys (n=64), interviews (n=3) and course learning analytics then helped to confirm that this approach not only increased student engagement in these learning activities but was also widely appreciated for the beneficial learning it facilitated, including enhanced discipline-specific confidence, understanding of theory in action, and classroom readiness.

Delivering teacher education programs via online modes of enrolment presents a number of challenges, and there is a need to facilitate online learning that harnesses meaningful knowledge application through constructivist learning approaches that can prepare graduates for the classroom (Allen et al., 2014; Dyment & Downing, 2020). This necessitates pedagogical innovation for online teacher educators to develop classroom-ready teachers, who have both a solid theoretical and practical foundation upon which to teach. We believe that praxis-based assessment is a useful strategy.

It is acknowledged that the findings resulting from this project represent only a narrow context in a single institution, and we do not make claims that the positive response we experienced will be generalisable to all disciplines within teacher education programs, nor wider university contexts. Further research in wider disciplines within teacher education and in other institutions and countries is needed to better understand if these findings will translate into other contexts. Further longitudinal research that tracks students to determine if the confidence they feel during their studies actually translates into confidence and competence in the classroom is recommended.

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