EDM5010 - Literacy Learning in the Early Years and EPM4100 - Mathematics in Context

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TITLE: Promoting student engagement with embedded technologies

PARTICIPANTS: All students in EPM4100 and EDM5010 participated in this technology demonstrator project. EPM4100 is a fourth year math course in the Bachelor of Education (Primary) with 74 students enrolled in 2021 S1. EDM5010 is a first year literacy course in the Masters of Learning and Teaching (Early Childhood) with 126 students in 2021 S1.

CONTEXT: Video lectures give students the flexibility to study according to their own schedule and at their own pace (Crook & Schofield, 2017; Thomson, Bridgstock & Willems, 2014), yet StudyDesk reports for education courses show that students are more likely to access lecture notes rather than watch lectures. In EDM5010 2020 S1, some lectures were viewed by as few as 50% of students. Similarly, less than 65% of the students in EPM4100 2020 S1 accessed the lecture recordings. These low percentages meant that students were missing opportunities for **cognitive engagement** (Redmond et al., 2018) through receiving information audio-visually and in detail as lecture notes rarely contain all the necessary details for understanding concepts and ideas in depth. Students also missed opportunities for **collaborative engagement** (Redmond et al., 2018) through hearing from faculty directly and being able to relate to them, and for **behavioural engagement** (Redmond et al., 2018) by developing their academic skills through the widely accepted norm of online lectures. In EDM5010, a student suggested that a weekly quiz would "ensure they [students] are getting the required content" (Student evaluation, 2018 S1). This suggested that students would like more interaction with lectures rather than a one-way transfer of information. USQ's School of Education offers teacher education programmes that "model the latest teaching approaches and innovative communication technologies to ensure maximum support for students in face-to-face and blended learning modes" (USQ, 2020). The School prides itself on graduating job-ready teachers skilled in assessment and technology-enhanced teaching among other skills. This year, the School has a priority of enhancing graduates' employability skills and this Tech Dem project contributes to this goal by giving students the opportunity to experience formative assessment with immediate feedback (quizzes) and multiple chances to engage with technologies that they may potentially use in their professional lives (video-embedded quizzes, Padlet and Google docs).

Student engagement is a key factor in effectively completing courses in Initial Teacher Education. However, course analytics and school-level data from our courses show that students are not engaging with key resources. To enhance student engagement, we embedded Padlet into the courses EPM4100 and EDM5010. Ellis (2015) used Padlet to reduce barriers to students contributing to a discussion, and make lessons more interesting and engaging by introducing student-generated content. This study found that using Padlet made lessons more engaging (83%), suggestions posted by other students enhanced students' experience (79%), and students were more likely to contribute to discussion via Padlet than verbally (42%). We also employed Google collaboration tools (Google docs, sheets, slides) to encourage students to contribute to learning in various ways.

Aim of the initiative

Tutorials are the main interactive tool on StudyDesk but few students access these, limiting their opportunities to socially and collaboratively engage with the course. Online educators therefore need to find ways to increase these dimensions of student engagement. This Tech Dem project trialled Padlet, Google collaborative tools (docs, slides, sheets) and Panopto quizzes to gauge

their impact on student engagement. We anticipated that these technologies would enhance students' collaborative and social engagement in online learning and the study experience. We also expected that using these technologies would help students develop technological skills to support their current studies and for their future profession.

Educational Technologies

Padlet, Google collaborative tools and Panopto quizzes.

Online engagement framework

The Online Engagement Framework (Redmond et al, 2018) has informed the complete integration and use of these technologies in our courses. Across all three technologies, we are gauging impacts on all five dimensions of the framework.

The intent of this project was to increase student engagement in EPM4100 and EDM5010 by giving students the opportunity to engage with Padlet, Google collaborative tools and Panopto which they may potentially use in their professional lives, given the courses require students to develop a deep understanding of key discipline concepts, skills in assessment, and knowledge about using ICT to expand curriculum learning opportunities in the early childhood and primary contexts.

Three key interventions were trialled to enhance student engagement based on Redmond et al's (2018) Online Engagement Framework elements and indicators:

Intervention 1: Padlet for Cognitive and Collaborative Engagement
We used Padlet to encourage students to think critically as they were provided with real world examples of children's language and literacy development and asked to respond to math tutorial activities. It was believed that students can develop deep discipline understandings when they learn from examples provided by their peers.
https://techdem.padlet.org/EdTechUSQ/lt08crzgfbsea5xv

Intervention 2: Panopto Quizzes for Cognitive and Behavioural Engagement
A series of quizzes were integrated into Panopto video lectures (of 10-15 minute chunks) to increase opportunities for cognitive engagement to help students develop deeper discipline understandings and critical thinking skills, as well as behavioural engagement through instilling in students agency and independence with their learning. The quizzes further helped the interactivity of lectures by incorporating opportunities for formative self-assessment and for students to receive immediate feedback on their learning.

Intervention 3: Google Collaborative Docs for Cognitive, Collaborative and Social Engagement
Tutorial activities using Google collaborative tools were used to increase cognitive, collaborative and social engagement within each course. These activities involved students working in small groups to complete tasks such as exercises on Google Sheets, presentations on Google Slides, or group work on Google docs. The Google activities were uploaded alongside the tutorial recordings (a blank and worked version) so that students who did not participate in the tutorial could refer to and contribute to these artefacts asynchronously.

Project approach

Each technology was integrated seamlessly into StudyDesk activities from tutorials to Moodle lessons to weekly learning activities.

Padlet was used in EDM5010 on the course activity page to collect student artefacts related to children's literacy and within a Moodle lesson to collect student reflections on their knowledge of First Nations languages, cultures and histories. Artefacts and ideas were subsequently discussed

in weekly tutorials so the Padlet became a learning artefact and not just a repository. In EPM4100, Padlet was used to gather student feedback anonymously throughout the course and as a forum for students to ask questions or comment on what they were learning. It facilitated communication between online students and on-campus students and students could contribute whenever it suited them, as shown in the screenshot below:
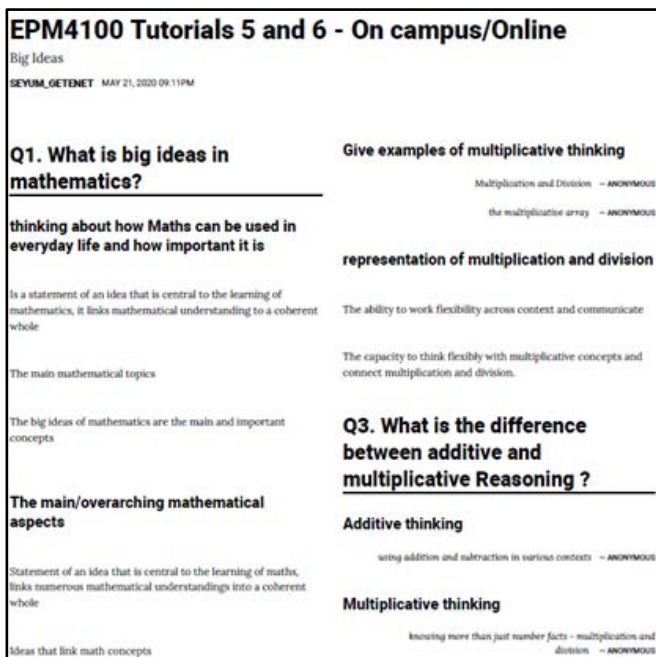

Panopto quizzes were used in six lectures in each course, with two at the beginning of the lecture recording, two in the middle and two at the end. The quizzes were made up of three or less questions formatted as true/false, multiple choice, multiple select or fill in the blank. These were enmeshed as part of the lecture viewing experience (the video could not proceed without attempting the quiz) and they offered short, sharp activities that did not distract students too much from the lecture recording.
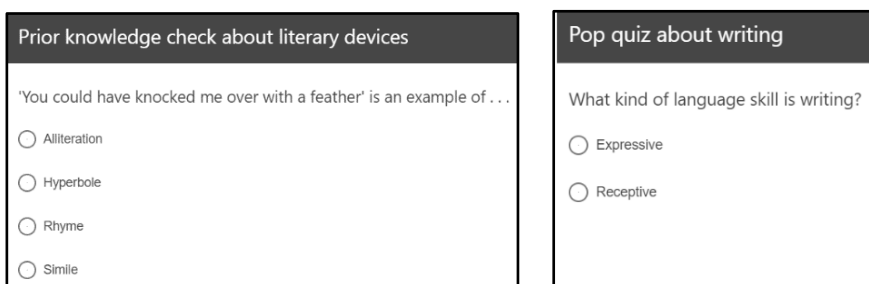
Google docs were used primarily in tutorials but also in Moodle lessons. In EPM4100, for example, tutorial activities were centred around students' group work in Zoom breakout rooms. Activities included math problem-solving and discussions of pedagogy and curriculum. Google docs were similarly used in EDM5010 for group work, but they were also incorporated within Moodle lesson activities for mind-mapping activities as shown in the images below:
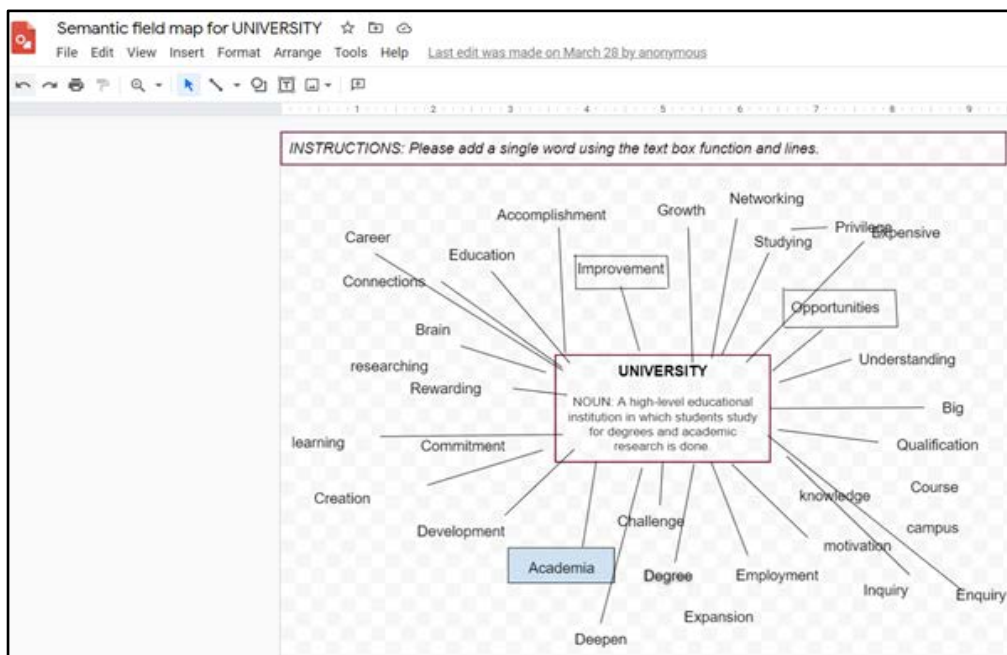
Using google docs for asynchronous activity
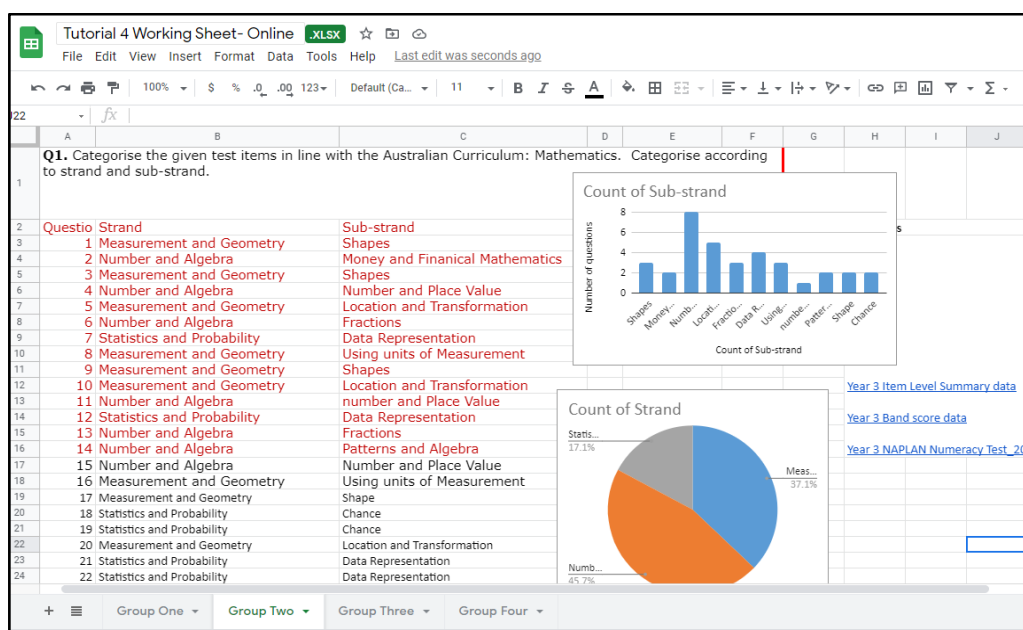
Using google docs for group activities

None of the technologies were used for compulsory learning tasks or assessment; however, activities were used during tutorials (which are optional for education students). All technologies were also made available for asynchronous participation for students who did not attend the tutorials live.

Our approach was designed to help students view technology as a natural part of their online learning experience. We enmeshed the technologies within teaching and learning. We also promoted and modelled the technologies and assisted students with any access or use issues as they arose. Our approach emphasised the social, emotional and collaborative aspects of the technologies with the idea that cognitive and behavioural engagement would increase as students became more familiar with each other and the technologies.

The following were the suggested learning activities using each technology:

- **Padlet**: Collect student ideas via images and multimedia, and collect student feedback anonymously.
- **Panopto quizzes:** Use at the beginning of lecture recordings to check students' prior knowledge; use in the middle of lecture recordings to provide students with formative feedback; and use at the end of lecture recordings as knowledge checks.
- **Google docs**: Use in tutorials for group work in breakout rooms, and use for mind-mapping or other asynchronous collaborative activities.

Evaluation method

Students were invited to complete two short questionnaires in Semester 1, 2021 (at the beginning and end of each course). The survey asked students about their views of using Google docs, Panopto quizzes and Padlet in online learning. Students rated each technology using 12 statements about the five dimensions of online learning engagement.

We also collected learning analytics data from StudyDesk and Panopto quiz data.

We had assumed that Google analytics would be available for native Google applications; however, we discovered that Google analytics is only available for external websites.

During our course, we used Padlet, Google docs and Video quizzes. Did these technologies help you learn or did they just get in the way? If you get a chance, please answer our brief survey about *Using interactive technologies*. Your responses will help us improve how we integrate technology into courses here at USQ. https://forms.gle /Fv4J1CRjdkRRdW2q9

Project impact

Use of educational technologies: The three technologies presented some challenges regarding scalability across devices or operating systems. While students who participated in tutorials on their mobile phones were able to access and use Google docs, in the post-survey a student commented that, "Padlet was difficult to access during tutorials. I had to use my old computer to access Panopto without having to create an account and search through to find course work relevant. With my new Mac it was a long process". Another student also highlighted that it was, "Important to allow for some instruction/working out how to use the technology time whenever you use a new technology for people who haven't used them before".

Average StudyDesk clicks per student by semester
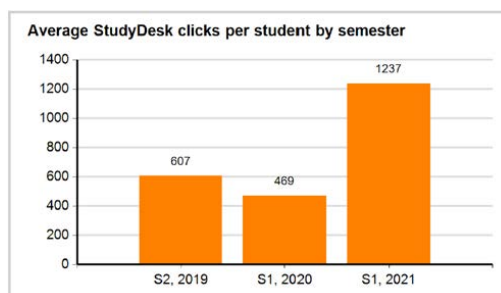
Use of analytics:

- **Padlet** analytics showed that 31 EDM5010 students (18.5%) contributed to Padlet 1 which was on the course activity page, and 16 students (9.5%) contributed to Padlet 2 which was embedded in a Moodle lesson. In EPM4100, 13 students (17.6%) contributed to a Padlet used in tutorials The low numbers suggest that Padlet, when used as an optional activity, will not necessarily impact behavioural engagement. From USQ's StudyDesk, there was no way to tell how many students had accessed the Padlet.
- **Panopto** quiz results provide a results summary with student-specific and results per question available for download. Like Padlet, we were not able to tell how many students had accessed the quizzes from USQ's StudyDesk. The Panopto analytics shows an indication that students tend to attempt the quizzes when they are located at either the beginning or middle of the video. Table 1 shows an example for this in EPM4100.

Table 1. Quiz location and number of students engaged

Quiz Location	Location the quiz in the video	Number of students who accessed the quiz
Beginning	00:23	24 (32.4%)
Beginning	00:12	37 (50%)
Middle	05:01	29 (39.2%)
Middle	07:38	22 (29.7%)
End	06:30	20 (27%)
End	05:37	0

**Teaching approaches to enhance interaction**:

- **Padlet** appears to work better for real-time activities when it is front and centre in students' minds, as shown in EPM4100. It also assists students who do not wish to talk but wish to contribute anonymously. Data from EDM5010 indicate that when used optionally and asynchronously, using Padlet has limited impact on student engagement.
- **Google docs** in combination with Zoom breakout rooms work well for focused small-group activities in recorded tutorials. Clear directions must be provided before the activity, guiding students with how the activity will operate, what they must do and how long the activity will take. Students should also be briefed about what to do if they need assistance given that the lecturer can only be in one Zoom breakout room at any one time.
- **Panopto** quizzes provide quick feedback for students. In one student's words, "I think they were great! Quizzes in particular really helped when going through the coursework." The quizzes also provided good discussion points for students on the forums and in tutorials. Having the quizzes embedded within lectures provided a seamless and low-stakes teaching approach for providing formative feedback.

Learning outcomes: USQ analytics show that students who clicked into StudyDesk more often (behavioural engagement) were more likely to succeed in the course. As shown in the images below, there was a clear correlation in both courses between average StudyDesk clicks and grades.

EDM5010
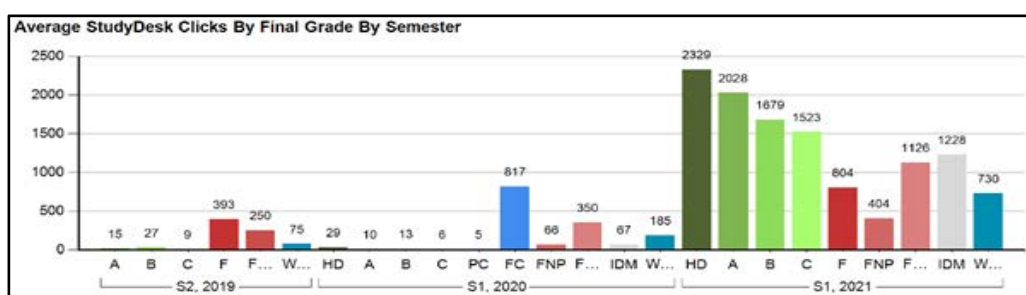
EPM4100
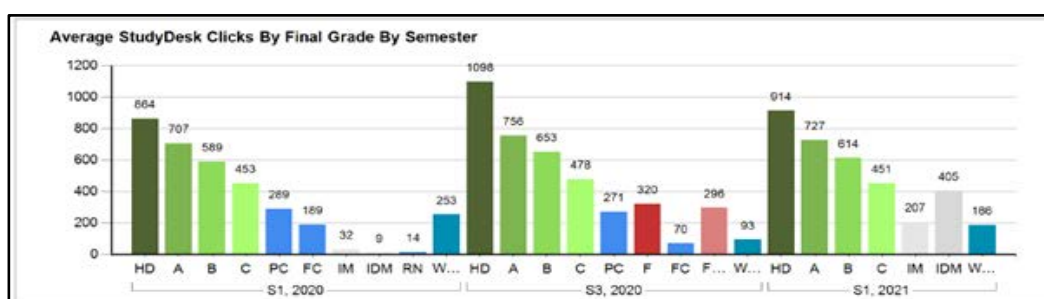
Across both surveys, students highlighted the value of Google docs for cognitive engagement (thinking critically, developing deep discipline understandings, using expertise from other courses and developing academic skills). As one student noted, "Lectures were engaging and breakout room exercises were great to enhance my understanding of content". In the pre-survey, the self-reported impacts were less pronounced for social and collaborative engagement. However, anecdotal evidence from our involvement in tutorials showed that using Google docs provided strong support for social and collaborative engagement, as students became more familiar with their online peers and they worked together for the common purpose of problem-solving or discussion.

Skill development (e.g. technology use, learning design)

This Tech Dem project has built our capacities as educators to design curriculum that is 'Digital first'. It helped us experiment with different approaches to using the three technologies and we upskilled to assist students.

Application of the online engagement framework

The project has given us a deeper understanding of Redmond's Online Engagement Framework, particularly the dimensions beyond cognitive and behavioural. While we found little evidence for emotional engagement, technology certainly appeared to have value for social and collaborative engagement.

The effectiveness the technologies

While all three technologies have the potential to enhance student engagement, in our course, Google docs appeared to have the most value for the diverse cohort of learners who study online. The artefacts were accessible to students through direct links on StudyDesk, they were easily manipulated due to their similarity to the Microsoft Office Suite which most students are familiar with, and asynchronous students are able to follow along with tutorials using unworked documents posted alongside the tutorial recording.

Student outcomes

In terms of learning outcomes, no students failed EPM4100 this year compared with the small proportion that failed in 2019 and 2020. Student outcomes for EDM5010 were not comparable to previous years due to the significant increase in the cohort numbers (2021 had 168 students which is 5-10 times more than this course has had over the last 6 years).

Recommendations

In the next iteration of this project:

- Google analytics is not available for Google docs, so observation data will be captured. Clear instructions for Google docs will be provided to promote group work.
- The use of Padlet will be adjusted to promote engagement.
- Panopto quizzes will be further explored in terms of how many questions are most effective, where to position the quizzes, and setting up strategies to access more analytics data.

Padlet: Embed in your StudyDesk. It breaks up the standard moodle layout and gives a quick way for students to contribute a variety of multimedia (Moodle does not have such a resource apart from Forums).

Google collaborative tools: Give students clear directions and provide worked and unworked examples for all students. Use a variety of activities to engage students.

Panopto quizzes: Embed these in lectures so that students are actively learning and not

passively watching (it also slows down the students that are watching the video at faster speeds).

References

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