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‘Optimised Blackboard’; How first year students created their own pseudo-LMS

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ABSTRACT

CONTEXT

Learning Management Systems (LMS) provide a mechanism for academic teaching staff to interact with students and upload learning content. In 2020, a group of first-year undergraduate engineering students at an Australian regional university constructed ‘Optimised Blackboard’ – a student-managed psuedo-LMS hosted on the popular gaming chat app Discord. ‘Optimised Blackboard’ provided a forum for student discussion, as well as a refined and consistent library of essential course content. At its peak, Optimised Blackboard had nearly 500 first-year students enrolled.

PURPOSE OR GOAL

In this paper, we investigate and discuss the motivations of the developers of ‘Optimised Blackboard’ and reasons for the relative success of this tool. We were particularly interested in; how and why the site came to exist, how it was managed, concerns about academic integrity/assignment posting/copyright and why it was ultimately discontinued, what lessons from this could be learned to improve the ‘officially sanctioned’ LMS, if any, and the lasting legacy of this tool and subsequent uptake of Discord for teaching in first year courses at this University.

APPROACH OR METHODOLOGY/METHODS

In this work we will refer to qualitative interview and survey data from the developers and users of the site to address our research questions.

ACTUAL OR ANTICIPATED OUTCOMES

Meeting students ‘where they are’ and enabling autonomy over their own learning are important factors in engagement with a content-delivery platform. These, as well as the ease-of-use of the Discord-based solution compared to the ‘official’ LMS deployed by the institution, were motivators for the developers for Optimised Blackboard.

CONCLUSIONS/RECOMMENDATIONS/SUMMARY

‘Optimised Blackboard’ was discontinued due to perceived potential liability of the developers to its users posting copyright-infringing or plagiarised work. Given the relative success of this tool in engaging hundreds of voluntarily-enrolled students, there is substantial motivation to gain insight from these issues with the potential to support future student-run platforms and/or supplement the officially-sanctioned LMS.

REFERENCES (OPTIONAL)

KEYWORDS

LMS; Learning Management System; Student Autonomy

Introduction

This paper discusses the emergence and development of a student-led initiative to improve teacher-to-student and student-to-student communication within a first year engineering course (ENGG1500) at the University of Newcastle (UON) in 2020. This course was part of a suite of courses running vertically through the engineering degree programs, these courses were framed as based around the premise of 'professional practice' and were implemented as new courses in 2017. ENGG1500 is positioned as an introduction to professional engineering as well as to their undergraduate program.

As a direct result of the spread of Covid-19, UON directed all courses to migrate to online delivery to allow all students to complete their studies without attending the campus. For ENGG1500, this took effect in Week 4 of the semester, resulting in an immediate and controlled migration from face-to-face delivery to 100% online. This course had a large cohort (700+ students) which placed pressure on any potential online software options to ensure sufficient capacity and the ability for rapid implementation. The expected transition time for the course to migrate to 100% online was 2 weeks, in reality the transition occurred over 4 days, from Thursday to Monday.

The Course Coordinator (CC) had previously identified the need to improve channels of communication among students. It was their understanding that the existing UON LMS, Blackboard, had limited functionality with respect to interactive communication, leading them to consider options that sat outside of the official channels provided by the LMS. To involve and engage the students, the CC offered the students of the course the opportunity to propose ideas and concepts on how to improve the online communication methods within their own course.

Tutors of the course, proposed a prototype using Discord as a potential core platform. Discord is a proprietary, instant- messaging application frequently used by the online gaming community. The working prototype, developed by the students and tutors, established itself as the dominant communication channel for the remainder of the course. This raised prospects of intentionally supporting aspects of 'connectivism' as a learning framework within the course. As we expand below, the self-directing actions of the students suggested characteristics associated with synergogy and established themselves as the primary learning framework within the course.

The integration of this prototype offers a range of insights to the learning expectations of the students and the possibility of utilising similar platforms as effective pedagogical devices for engineering education

Responding to a changing learning environment

Significant pressure was placed on this course by UON as it was framed as the 'flagship' course within the professional practice stream. It represents the first course in the students first year of their engineering programs, so facilitating communication among the students was crucial. All students were new to the UON system and needed to be 'on-boarded' into the institution as well as this course.

The CC offered the tutors and students of the course the opportunity to propose ideas and concepts on how to respond to the shifting learning environment. Student feedback on existing UON online courses were experiencing a rising level of digital fatigue, where students expressed their concerns that their learning environment was drifting towards a 'degree by Zoom'. This reinforced the need for ENGG1500 to now reach for higher levels of real-time interactivity and connection between students, lecturers and tutors.

The existing LMS used a 'live' platform called Collaborate, however the CC wanted to maintain their face-to-face teaching style into the online environment and their experiences

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with Collaborate lead them to seek alternatives. In particular, the CC was seeking technologies that were less prescriptive and encouraged the students to take the lead.

Course tutors proposed reviewing Discord as a potential (partial) solution. It was an established platform with more than 250 million registered users worldwide in 2020 and was capable of high speed messaging between large numbers of simultaneous users. It was also demonstrably running on a broad range of platforms including; Windows, macOS, Android, iOS and Linux. The task presented to the CC was to review the applicability of Discord and to determine if it would be suitable as a method of supporting the existing learning platforms.

ENGG1500 was a problem-based learning (PBL) course that used a high degree of flipped methods for learning. This new platform would need to support both PBL activities and the capacity for the students to manage their own learning.

Development of a working prototype

Microsoft Teams, Zoom and Slack offered a broad suite of functionality to promote inter-student communication. However, in the understanding of the authors, a Discord prototype was more strongly aligned with the demands of this course based on the openness of the architecture and the multiple levels of administrative controls.

Preference would be given to platforms with low latency issues, with respect to audio and video feeds from students. Discord at the time was running at 10 millisecond or less in delay times, which was ideal for voice/video. The course co-ordinator knew from previous experience that when latency exceeded 100 milliseconds student interactions became staggered and cumbersome.

Table 1 below is a summary of major performance differences between the standard UON platforms and the tutor's first working prototype.

Table 1: Function comparisons for 'working prototype'.

Functionality	Existing UON softwares	Working 'prototype'
Multi-modal communications (text, video, voice & graphics)	No	Yes
Student customisable communication 'channels'	No	Yes
Lecturer/tutor control over global chat volumes (for directing attention, updating information etc)	No	Yes
Posting student-generated & Internet sourced video	No	Yes
Sharing of individual student screen, camera	Yes	Yes
Perpetual student 'breakout' groups	No	Yes
Student ownership / modification of platform	No	Yes
Students-led movement between breakout groups	No	Yes
Live chat between breakout groups	No	Yes
Keeps percentage engagement / contribution of all students for Lecturer to review	No	Yes

Compounding the demands on the prototype were the needs for enabling multiple levels of users interacting within the course. These system users included; course coordinators, lecturers, tutors, workshop staff, markers, technical support staff, faculty administrators,

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student teams and the individual students. The testing phase of the Discord prototype, confirmed its capacity enable a broad range of administrative hierarchies and controls for organising communications across the course.

The working prototype was outlined by a team of three tutors over less than one working day. The 2020 version of Discord was more manually driven than subsequent releases which added to the time taken to develop the prototype. More recent releases include higher automation of repetitive administrative tasks, such as building 'templates' and swapping between different user views.

Discord uses the concept of 'servers' to manage its digital communities. These 'servers' are entirely digital and act as platforms for collating and organising interactions between users and can be set up as 'public' or by 'invitation only', depending on need. Within each server is the concept of 'channels', which act as administered platforms for sharing visual, verbal, video and text-based content. There were two types of Discord channels in 2020; text-channels which facilitated posting messages, uploading files and sharing images, and voice-channels which facilitated voice or video in real time, including screen sharing from any user.

To support the 'student-led' aspects of the prototype, the CC promoted the undergraduate engineering students to propose the initial setup of 'servers' and 'channels' used for the course. The intent of this new prototype was to retain the social networks of a face-to-face classroom as much as possible, including the capacity for inter-student and inter-group chat.

On a smaller course, this may not have taken on such importance, however ENGG1500 has particular demands due to its relative size and complexity. The course utilises 150 student teams from 13 different engineering disciplines. These groups are aligned to 10 different assessment projects running simultaneously. Each student project requires the development of physical prototype solutions by accessing 5 different workshops within the engineering precinct alone.

The initial student experience: 'on-boarding' to the new platform

Once the working prototype had been 'bench tested' for its functionality, the CC made the decision to go 'live' and the platform was made available to the students of ENGG1500 in Week 4 of the semester. The process of 'on-boarding' students into the digital community proved simple and stable. New and late-enrolling students were sent an electronic link to join the online community via their student email account. By selecting this one hyperlink they were effectively connected directly to the course community.

To assist with the on-boarding process an instructional 4 minute video, generated by the CC, was imbedded into the process. This video included explanations of the various channels, some of which were mandatory for engagement with the lecturers and course content. Other channels, relating to preferences for extra-curricular chat lines, were on a voluntary 'opt-in' basis.

The electronic invitation presented each student with a list of the relevant engineering disciplines and they were directed to select their own discipline from the list. This automatically connected them into the general communication channels for the course as well as the discipline-specific channels. At this point, students could also then nominate their preferred tutorial/assessment groups from the filtered lists presented to them. Once connected into the various course communities, students were able to further customise their account profiles using visual avatars and connection to any of the auxiliary channels of their choice.

Students with limited or no engagement with the prototype did not express any perceptions of being isolated, excluded or anticipated impacts on their learning outcomes. Formal broadcasts and course content were still conveyed on the official LMS and student focus

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groups and forums did not reveal any issues relating to negative impacts on the student experiences.

The staff experience: expanding levels of interaction

As the number of student participants expanded, a number of Discords functionalities revealed their importance to the course. The application facilitated lecturers and tutors to 'hover' over the top of all student groups or to 'drop in and out' of the different groups as required. Student allocation into tutorial discussion breakout groups were perpetual (MS Teams and Zoom are temporary) and the method of subsequently calling all groups back the central session was powerful and intuitive. Discord included the capacity for individuals or groups of students to electronically 'raise their hand' or click on the audio to speak directly to the lecturer / tutor. This capacity is not unique to Discord, however the speed and ease of use (essentially a 'single action') distinguished this application from available alternatives within the UON system.

For those students generating their own code, they were now able to post their 'code' in its correct format, enabling tutors to help them source errors and then for all students to watch the results being applied and tested in real-time.

Implementing the prototype brought with it the opportunity to reposition large portions of the course pedagogy. Discord lent itself to exploring the potential benefits of 'connectivism' across the first year engineering students. Connectivism is a relatively recent learning framework and is reliant on the levels of technology access and usage available in the digital age. Online forums are fundamental to supporting connectivism, as they introduced a range of technologies specifically aligned to compliment and reinforce inter-student learning. Students were encouraged to form their own knowledge and opinions based on their experiences with the course content, the online forums and constantly evolving discussions.

Because this course is a 'first university experience' for the majority of the cohort, the CC was not considering the potential influences of cybergogy in the learning framework. While cybergogy also has its foundations in digital and online communities, it reaches for higher levels of learner-centred autonomy than those that were appropriate for ENGG1500. So while the student engagement with technology was directly impacting their learning outcomes, the students would not have the complete control of their learning processes necessary for an authentic cybergogic approach.

Students personalising their course interfaces

Students feeling overwhelmed by the information volume were empowered to self-regulate their exposure by adjusting the channels feeding into their accounts. This was done by selecting/authorising essential feeds and de-selecting channels of information that were distracting or non-essential. Those students who were seeking higher levels of engagement and information exposure were able to set up 'advanced channels' to distinguish and participate in the auxiliary discussions.

It was the understanding of the CC, lecturers and tutors that the capacity for the students to self-regulate; their identity, their connectivity and their levels of exposure within this courses digital community, may provide a critical component to supporting future student experience. While some discussion forums were allowed to self-organise and expand, those course activities that required more curricular control were built around smaller, more closed forums to give the lecturers and tutors greater influence over the content and to guide the focus points across specific topics.

Discord includes the potential for individual users to purchase a 'boost' to increase their benefits within the software. These 'boosts', which were approximately $4.00 USD each, may take the form of higher capacity for uploads/downloads or increased upload/download speeds. These 'boosts' were applied at the 'server' level, regardless of which student had

paid for them, so the increased benefits from the boost were shared by all students using that server. Students voluntarily paid to boost servers because they wanted to see the prototype succeed in their course. The percentage of course students who paid for boosts represented less than 2% of the cohort and offered the boosts as the user demands steadily increased

Prototype outcomes; the anticipated aspects

For many of the first-year students the actions of their online 'personality' is different to their actions in face-to-face forums. Students are often reluctant to put up their hand or interact in front of 25 other students in face to face environments, however they will happily do so in the live online discussions. This proved of particular relevance to international students and those who may be reluctant to interrupt the flow of lectures/ tutorials by asking questions as they arise. By facilitating the capacity for these students to ask questions without drawing attention to themselves or interrupting the lecture, the Discord platform effectively removed the often time-consuming process of attempting to address these questions after lectures / tutorials had finished.

The Discord-based prototype reduced the email traffic by an order of magnitude (previously more than 50 emails/day). Email was still the preferred exchange for official issues and information not related to teaching content. Discord was perceived by the students as being less 'official', more accessible and more strongly aligned with the intuitive and interactive forms of communication they were experiencing with social media platforms. Part of this perception may also have its foundation in the expectations of the dominant demographic of students in this course (in excess of 95% of the students were less than 26 years old).

Emails between lecturers and students historically exhibited peak traffic periods just prior to the due dates for student submissions. The Discord platform proved to be effective at mitigating these peaks by offering students the capacity to quickly get reassurance or guidance from course staff without needing to structure formal enquiries via email. Students were also supported in developing their capacity to identify solutions to their own questions by monitoring the outcomes of similar topic discussions occurring online.

Prototype outcomes; the emergent qualities

While the administrative time-sinks historically associated with this course were reduced, the number of student interactions increased dramatically. Students were now using the discussion platforms to replace the previous (and more ungainly) processes around using emails. Communication and course participation was now occurring within the same program and generated hundreds of questions from the students.

The online forums were remarkably self-policing as students collaborated to build a set of expected communal values and behaviours when participating in course discussions. As the prototype began to attract higher levels of engagement within the student body, it became evident to the CC that many of these etiquettes were being intuitively translated from social media platforms.

Discord included the ability to use emojiis as a form of communication. Less verbally communicative students were now empowered to use emojiis to acknowledge receipt of course information and to provide immediate feedback to the staff regarding the clarity and relevance of information. Simple 'thumbs up / down', 'like' and 'OK' symbols became empowering devices to promote inclusion and engagement. These emojiis quickly developed into a sophisticated and semiotically broad medium of bi-directional communication that allowed the course staff to quickly determine student uptake, response and engagement.

It was also observed by the course staff that students responding to each other's questions were respecting the course content, rather than containing student speculation. These often

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included ‘links’ to the relevant sections of course content to enable the individual asking the question to locate and comprehend the answer for themselves.

The ‘lifecycle’ of the working prototype

Just as this working prototype had its beginning in Week 4 (of 12) in the semester, it also had an end point – the end of the course. The original prototype was developed and maintained by the students until the completion of the course content. The initial concept had matured considerably across 8 weeks and acted as the launching pad for a series of sequel prototypes that were developed for use across multiple first year engineering courses in subsequent semesters.

Initial concerns were raised by students and staff relating to the potential for issues around liability for the developers, rises in plagiarism due to student sharing of draft submissions and of copyright infringement. To manage these concerns UON Student Academic Conduct Officers (SACO’s) were invited to review the role out of the prototype and to monitor for potential issues relating to student plagiarism. Course material that contained intellectual property for UON was distributed to students via the (password protected) LMS and students quickly acclimatised to using the prototype platform for sharing ‘safe’ content. The continued presence of course staff in online discussions acted to support the emerging environment of students using the platform for open discussion and collaboration, rather than confidential or official content.

5 of the 8 first year engineering courses at UON now use Discord platforms to support the student experience. The version that succeeded this first prototype was facetiously called ‘Optimised Blackboard (OB) by the students – in reference to the incumbent UON LMS. OB was a direct beneficiary of the student’s experiences with the ENGG1500 prototype and shifted away from the Zoom-based classroom replacement of their first prototype and towards ‘helpdesk’ oriented forums.

OB was owned by the students who acted as its administrators and moderators. The students were now confident in being responsible for providing structure for their own learning environment and were exploring using the same ‘tool’ (Discord), in a similar manner yet towards different goals. The students perceived so much value in the platform, they took on its development and maintenance themselves. OB now includes more than 500 channels responding to multiple levels of interest, intent and accessibility. It spans 30 subjects within UON involving in excess of 1200 students.

Data Collection

Anecdotally, student uptake on the prototype appeared to be broad and consistent, based on the frequency and number of interactions. Informal methods of collating data such as lecturer and tutor feedback supported the observation of high percentage student utilisation.

Empirical data relating to student engagement levels is problematic to gather in online courses. Within the UON Engineering programs, students were encouraged to contribute to the voluntary Student Feedback on Course (SFC) surveys held at the completion of each course. Results from SFC responses use a combination of quantitative and qualitative data to gauge the reception and engagement of students. The quantitative SFC data is filtered to determine overall course satisfaction, quality of learning experience and individual ratings. Individual ratings are for; assessments, learning criteria, student expectations, knowledge gained, resources available, course structure and student workload.

The qualitative responses (free comments) for this course were reviewed to gather any thematic data relating to the communication and support perceived by the students. This dataset is not exhaustive as it is a voluntary system and tends to be utilised by those students compelled to pass comment (either supportive or critical). While data-mining student posts may only evaluate behavioural engagement (ie interacting with the platform),

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cognitive engagement was assessed by the quality of student submissions and the nature of the questions being posted.

In Figure 1 below, the Quality of Learning Experience (QLE) for 2020 reveals a significant increase over the 2019 results. The CC attributes this directly to the use of Discord within the course. SFC comments contained no negatives from students relating to course satisfaction and supportive comments about the online prototype outnumbered neutral or negative by more than 5 to 1.

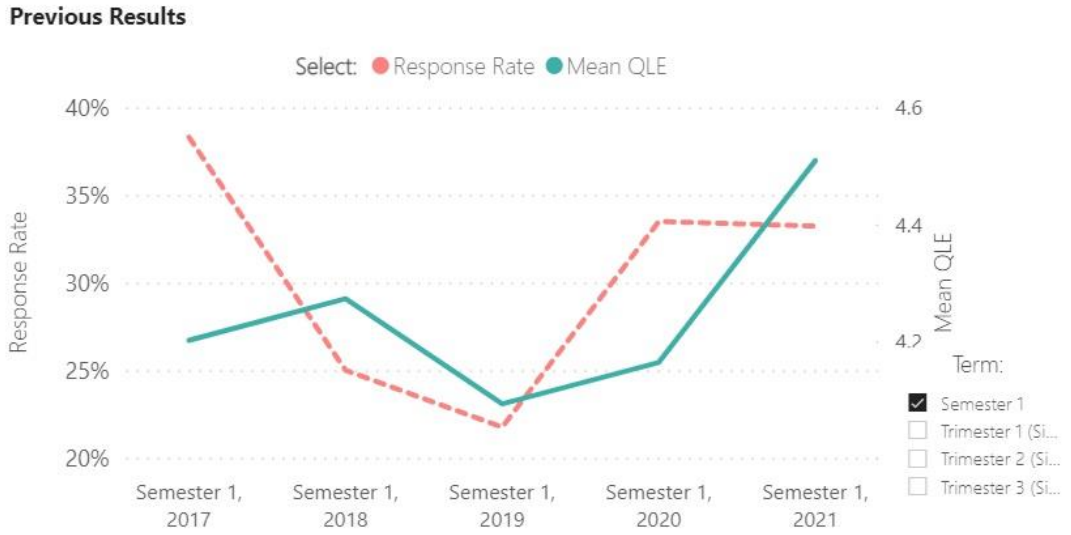

Figure 1: Student feedback demonstrating the impact of Discord from 2019 onwards

(Note; this graph is best viewed in colour for results comparison)

The majority of the evaluation of student uptake was informed by the daily/weekly live forums and discussion posts. More than 17,000 posts within Discord from students across the 8 weeks of the course strongly indicated positive student engagement with the platform. During the course, monitoring of student posts were predominantly used as a flag for identifying and addressing student issues, rather than qualitative reporting. It also provided supportive evidence when analysing student participation in group assessments, and an auxiliary method for determining and supporting student grades.

Observations and Directions

The authors recognise the use of Discord within higher education is not novel. However, they are not aware of its use within an engineering course designed for heavily flipped PBL in a face-to-face delivery mode. While many UON staff chose to go back to staff-driven broadcast of course content as a result of Covid-19 isolation, ENGG1500 used Discord to run a flipped course 100% online. Its relative successes are directly attributed to the students leading and developing their own communication platforms. Rather than pulling back to theoretical PBL projects, students were able to continue collaborating to build physical solutions by using the digital platform for sharing real-time testing and reflecting.

The learning framework around this working prototype was engineered to shift the students' knowledge-gain away from the individual expert passing on facts and experience, towards students building their own collectives to facilitate emergent learning. Lecturers and tutors could then highlight any patterns or relationships that arose, and their connections to existing engineering perspectives. Students were no longer recipients of pre-formed messages and were encouraged to become active participants in acquiring knowledge.

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Blackboard was still used for Assessment submissions from students as it had an established level of security for student submissions and acted as an archive that was within the UON IT system. However, the Discord platform also supported the student's preferences for sharing links to active documents, rather than sharing static copies of files. The student's perception of the course contributions as being as active and evolving, was reflected in their approaches to interactive problem solving and 'live' collaborations.

The CC (who had also administered this course in the preceding 3 years) estimated the administration workload saving (across all course staff) to be in excess of 80%. This was mainly attributed to the prototypes capacity for course staff to 'catch' the student issues at the moment of deviation, rather than after students had committed extended periods of time and effort. The prototype enabled the CC to step-in and make a 'one button' video/verbal call to the student/s or immediately generate FAQ style announcements for all students as a result of any issues that arose.

Conclusions

As a direct result of Covid-19 isolations, a functional communication prototype, based around Discord, was successfully integrated into a 'first year – first course' engineering program in the UON. The working prototype was initiated by the tutors and then developed and maintained by the students of the course. This platform facilitated this large cohort, PBL course to migrate quickly from face-to-face to 100% online while preserving its focus on flipped content delivery.

The high-speed, open architecture of Discord enabled the educators to maintain direct, real-time connection with more than 700 students as they collaborated to generate physical solutions to complex problems. The emergent digital community also acted to support the students learning of how to use these constantly expanding online communities for their own development.

This prototype was not framed as a replacement to the existing UON LMS, rather as an auxiliary platform for the students to explore higher levels of self-direction in their learning. While the platform was not embraced by all students, it established itself as the dominant LMS for the duration of the semester. Based on its relative successes with the initial prototype, the Discord-based platforms were expanded and revised to be used in most of the current first-year engineering courses.

Although this prototype generated an 80% drop in administrative workload, it also activated a massive number of lecturer to student interactions, which the course staff are still developing the protocols to manage. The real-time, immersive nature of the digital community generates a 'wall of interaction' between lectures, tutors and students. Expectations of both students and staff will need to be structured to allow deeper connectivity without unnecessary information fatigue and increased workloads.

The levels of self-organisation exhibited by the students, although lightly constrained by the architecture of the existing software application, revealed potential applications for connectivism as a pedagogical framework within this style of course. The exploration of a web-based, open platform for inter-student communication highlighted the need to further consider how engineering education may benefit from community-based, e-learning platforms.

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