Open to learning

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The Open Learning Environment (OLE) is a novel feature of the new curriculum at The University of Sydney, aimed at encouraging students to personalise their learning through a suite of short modules and fully interdisciplinary units.These units are designed to present students with opportunities to broaden their education, develop graduate qualities and upskill. Comprising an open market for students, the OLE provides fully flexible, online and fee-free units incorporating auto-marked assessments and credentialing using badges and blended for-credit units to develop skills or try new disciplines and areas of interest. Launched in 2018, overall enrolments are strong but vary hugely across available units. Satisfaction and performance similarly varies considerably with both higher failure rates and higher numbers of students receiving higher grades than in other units.

Keywords: open learning, microcredentials, online, graduate qualities, interdisciplinary

Introduction

In 2018, The University of Sydney launched a new undergraduate curriculum designed to revitalise its liberal studies degrees and ensure that they are flexible and relevant for contemporary society and future careers (Horizon Report, 2018). The Bachelors of Arts (BA), Commerce (BCom) and Science (BSc) were completely restructured with shared curriculum rules to ensure flexibility for students to take majors from across the institution and the ability to innovate at the component level. Alongside the re-configuration of the course structure, novel curriculum features were introduced including:

- Experiential, real world, interdisciplinary project units involving industry and community partners
- Exchange and overseas study opportunities
- Shared majors
- "Dalyell stream" for high achieving students
- The Open Learning Environment (OLE)

The OLE comprises a collection of units that aim to offer opportunities for skill and knowledge extension through a diverse range of topics, typically from outside their discipline. Students in the BA, BCom and BSc and some smaller degrees are required to take credit-bearing units from the OLE. All students and staff can 0 credit OLE units for free, either as taster courses or as short modules in their own right. This paper describes its structure, development, implementation and evaluation. Alongside a description the function at the curriculum level, it includes an overview of how OLE units operate in the learning management system (LMS).

Overview of The University of Sydney and the need for the OLE

The University of Sydney is Australia's oldest and is a public institution offering an extremely comprehensive range of disciplines. Like other Australian universities, it has rapidly expanded both through the widening participation agenda of the federal government and substantial growth in international student numbers. In 2019, there are around 70,000 students and 7500 staff. Given the diversity in the student body and the increased interdisciplinary nature of the curriculum, there is a strong need for students to be able to pick up skills at all stages of their degrees, as and when they need them. The comprehensive nature of the curriculum means that students potentially have the opportunity to study a wide range of topics. However, such a huge variety can be daunting. Many students will not want to explore outside their broad disciplinary interests and strengths or commit valuable credit points and time. The OLE was conceived to meet these needs by:

- Encouraging breadth of learning and exploring individual interests outside their main discipline(s)
- Assisting students in building novel skill combinations for their studies and careers

Students taking liberal studies degrees must complete 144 credit points. Commonly, they do this through completing four 6 credit point units in each semester, over three years. Students must now include 12 credit points from units in the OLE. Although most units are worth 6 credit points, credit-bearing OLE units may be 2 or 6

credit points. The smaller value reflects the desire for shorter modules to develop skills, as tasters and to allow students to choose a wide range of units. Students take between 2 and 6 OLE units to complete the requirements of these which contribute to the overall mark with the same way as other units.

One of the most novel aspects of the OLE is the pairing of each credit-bearing unit with a 0 credit point version. As detailed below, the latter are devised to be a subset of the former and to be self-contained courses in their own right. The 0 credit point OLE units are free for all students and staff, both of whom can take as many of them as they want. Whilst the credit-bearing units are timetabled in particular sessions, the 0 credit point units are intended to be available throughout the year with students completing them at their own speed. Although every credit-bearing unit must be paired with a 0 credit point unit, standalone 0 credit point units are also allowed. The full range of marks and merit grades are available in the credit-bearing units but the 0 credit point units can only be passed. Presently, completion is not recognized on the transcript. Instead, students receive a digital badge as a microcredential, to display on social media.

The OLE is conceived as an internal collection of MOOCs. The 0 credit point units are free, available throughout the year with usually no teacher presence week-to-week. This has led to considerable design challenges, particularly as the institution is very inexperienced in fully online teaching in the undergraduate space. However, a strategic benefit of this is an enhancement of the wider curriculum and teaching approaches.

Structure and design of OLE units

In 0 credit units, content is delivered through short videos, podcasts and readings and assessment is through multiple choice question (MCQ) quizzes. Students must be allowed to complete quizzes multiple times. This requires the quizzes to be built from question banks. In the better units, feedback is both given and designed to assist the student with their misconception or error rather than to simply give the correct answer away (Butler, 2018). Professional learning support in writing good MCQs and feedback is vital.

The remaining teaching in the credit-bearing units can follow any form from fully online to fully face-to-face. Similarly, the full range of normal assessment types are possible, with rigorous academic integrity. Given the experimental nature of the OLE and its increased focus on personal and skill development, interdisciplinarity and online learning, a strategic aim was to use it to develop more interactive pedagogical approaches and more authentic and multimodal assessments (Villaroel et al, 2018), (Kress, 2005).

Within these constraints, two modular approaches were used to design the learning outcomes, activities and assessments depending on the intent of the course:

1. Taster. In this approach, all students complete the first few modules and those enrolled in the 2 or 6 credit point version complete the remainder. The course completed by the 0 credit point students is a meaningful introduction or ‘taste’ of the overall topic. The learning outcomes for the 0 credit point unit form a subset of those for the credit-bearing version. This approach is illustrated in Figure 1(a).
2. Spiral. This approach is akin to Bruner’s spiral learning model (1985). The 0 credit point students covers all material at a basic level and the credit-bearing version covers the same topics at a deeper, more complex level. The learning outcomes for the two units thus cover the same topics but the initial active verb is different. This approach is illustrated in Figure 1(b).

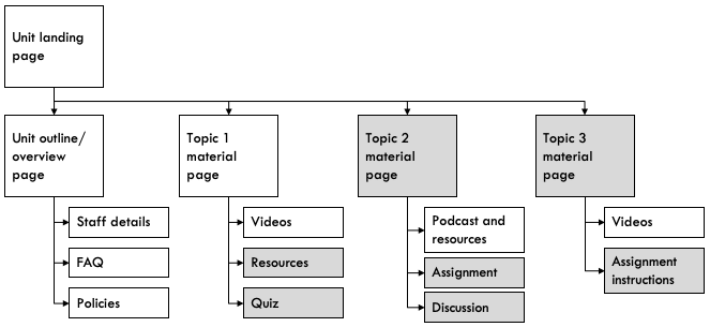
There are several reasons for fully embedding the 0 credit point unit in its credit-bearing partner. Pedagogically, it allows for both the taster model, aimed at developing initial skills in a subject, and the spiral model, for expanding knowledge. Each coordinator can choose the appropriate model or a mixture of both. Strategically, it encourages coordinators to actively produce engaging tasks and assessments in a fully online environment. If these were not embedded within the credit-bearing unit, resources might not be made available for their development or improvement. Practically, because they do not attract fees, a ‘set and forget’ approach might lead to them being neglected. To avoid this, the marks from the 0 credit point unit must contribute to those of the credit-bearing unit and this is only practical if they are housed in the same website.

Unit website design and operation

Both the 0 credit point and its credit bearing partner unit are in the same website in the learning management system (Canvas). The educational design follows that illustrated in Figure 1 with the topics utilising Canvas modules. The two cohorts of students belong to different Canvas sections to control access to assessments. There are no fees associated with the 0 credit point units: no staff workload can be assumed for the assessments. All of

their assessments must use automarking tools inside Canvas or available LTI tools. Most coordinators have chosen to use MCQ quizzes, drawing questions from pools so that students can meaningful repeat them. Two particular issues arose as the operation of the OLE was considered:

(a)



(b)

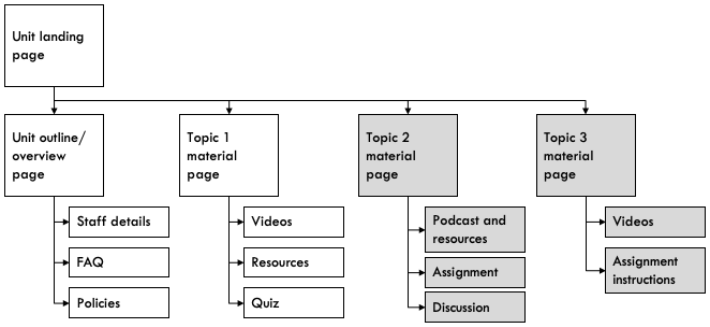


Figure 1: Indicate modular structures for (a) taster and (b) spiral OLE units with tasks undertaken by the students enrolled in the credit-bearing units shown in grey.

1. The student enrolment system (SITS) could not be configured to handle 0 credit point units that run all year. To overcome this, a separate website was developed for students both to learn about the 0 credit point OLE units on offer and to enrol/unenrol from them.
2. Canvas presently has no mechanism for controlling access to content for different cohorts of students. To overcome this issue, a 'fake' assignment is built into each site as a pre-requisite for accessing all modules belonging to the credit-bearing unit. When a student enrols through SITS, a fake grade is entered for this assignment through the enrolment script so that the student can access the required content. If a student unenrols, the mark is removed and the module completions are refreshed via the enrolment script.

Completion of the 0 credit point modules and assessments by a student triggers release of a digital badge using the Badgr LTI. These are downloadable by students and each badge's authenticity can be electronically confirmed. Figure 2 shows a badge obtained for one of the OLE units.

(a)

(b)

Figure 2: Example of (a) an electronic badge and (b) backpack for completion of a 0 credit point unit.

The 2 and 6 credit point units are evaluated by the standard institutional unit of study survey and the results form part of the normal faculty quality assurance processes. Given the interdisciplinary and cross-faculty nature of the OLE, however, the results are also reported to the institutional Board of Interdisciplinary Studies which has an

overall role of monitoring the performance of the OLE. A separate survey is also continuously available on each Canvas site for the students enrolled in the 0 credit point units.

Composition of the OLE and enrolments

The OLE launched with 60 pairs of 0 and 2 or 6 credit point units and 8 standalone 0 credit point units. In 2019, an additional 35 pairs were added together with a further 3 standalone units. 36 pairs and 2 standalone units are currently under development for 2020 including a set of 11 pairs of 0 + 2 credit point units designed for higher degree by research (HDR) students as part of a new PhD curriculum. These units cover a wide range of topics as can be seen from their titles. The OLE is an open market – undergraduate students can choose any combination of units and there are no pre-requisites. Table 1 shows the number of units in broad theme areas and the 2019 enrolment numbers. Unit names and links to handbook descriptions for currently available units are listed in. the Supplementary Information. As shown in Figure 3, enrolment numbers in individual units vary hugely – two units have enrolments over 1000 and several have fewer than 10 students.

Table 1: 2020 OLE units and 2019 enrolments (as measured in April 2019).

Theme	Number of units			Enrolments
	0 only	0 + 2	0 + 6	
Basic skills in programming	0	8	0	634
Data analysis & numerical skills	1	11	0	892
Developing research skills	6	3	0	90
Economics, entrepreneurial & design thinking	0	9	0	1571
Ethics, ethical reasoning, contemporary debates & critical thinking	0	21	0	2833
Foundational & advanced communication skills	2	11	2	2925
Health challenges & medical science	2	19	0	3909
Personal, interpersonal & intercultural skills	1	18	9	3064
STEM literacy	0	6	0	1039
Teamwork, team leadership and project management	1	1	0	132
Ethics (HDR)	0	2	0	0
Qualitative analysis (HDR)	0	2	0	0
Quantitative analysis (HDR)	0	7	0	0
Total	13	118	11	17089

Whilst the 6 credit point units tend to run in the usual 13-week semesters, many of the 2 credit point units run in intensive, month long sessions. Coordinators can also elect to run their units in multiple sessions.

Figure 4 shows the 2019 enrolments and the number of units available by session. Whilst staff and students appear to prefer the traditional semesters, the April intensive session seems to be popular with both. The July intensive, corresponding to the conventional winter break has been selected by a surprising number of coordinators but does not appear to be popular with students.

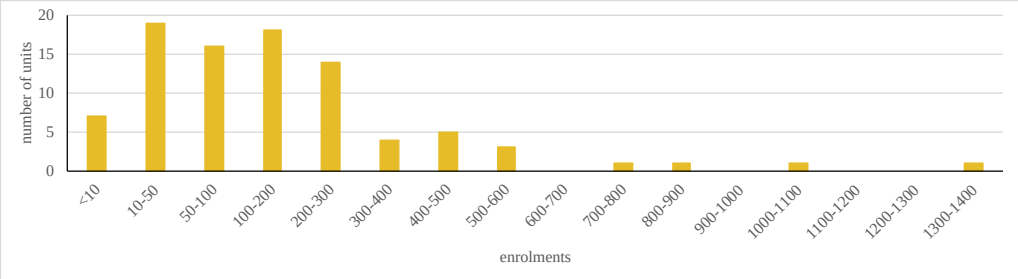


Figure 3: Variation in enrolments for units of study

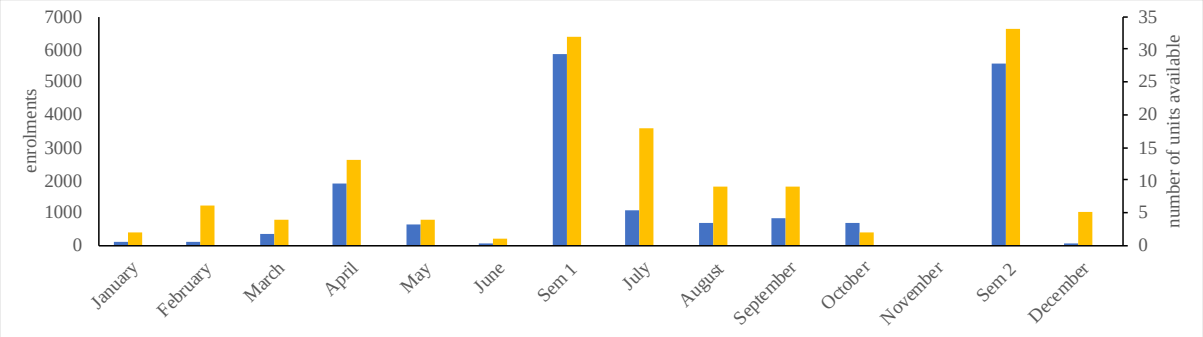


Figure 4: 2019 enrolments (blue) and number of units (yellow) available by session.

Evaluation of the first year of the OLE

In its first year, the OLE attracted 8,279 enrolments with students averaging just over 6 credit points. Preliminary figures for 2019 also suggest that students are taking units approximately equally over the first 2 years. Students from Engineering, Business and Science seem to take advantage of its interdisciplinary nature, with strong enrolments in units run Arts and Social Sciences (FASS). Students from FASS, though, tend to enrol in units from their own faculty, although these cover a wide range of topics. Although Business students tended to pick units run by FASS, very few external students chose units from Business. Overall, in its objective of allowing students to broaden their education, the OLE appears to have been reasonably successful.

OLE units showed wide variability in both student performance and feedback, with pass rates of around 5% lower than for other units and markedly higher absent fail rates. This points to underlying issues with student engagement and the educational design. The percentage of students gaining a “High Distinction” (HD - a mark over 85%) was over twice as high as in other units. This figure hides a considerable variation - 100% of students gaining a HD in some units and zero in others. This may reflect the skill mastery nature of some units but there are equity concerns given the open market nature of unit selection by students.

Overall, students were somewhat less satisfied with their experiences in the OLE units. Again, the performance varied markedly with many popular and unpopular units. Students were particularly critical of the feedback they received on their assessments, including that in the auto-marked online quizzes. Students were also critical on the reliance on video for delivering content and for variation in the expected workload across the OLE. Students also felt that some topics were not sufficiently academic in nature.

Given the experimental nature of the OLE, the institutional immaturity in online learning and the need to build enough units to meet the breadth required and the number of students in the participating degrees, it is perhaps not surprising that the results from 2018 were somewhat mixed. At the end of 2018, educational designers produced reports on each OLE unit website, with areas identified for improvement. Each coordinator received these and a detailed quantitative and qualitative analysis of the performance and feedback data. In 2019, coordinators can apply for additional central grant funding to enhance their units. It is likely that low enrolment units will be removed and additional units added as needs or interests are identified. A further review will be carried out at the end of 2019 to ensure that quality improvements have been made.

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Supplementary Information - Open Learning Environment Units

The table below lists all of the OLE units available in 2019 and in development. Links to the 2019 Handbook entries outlining the content of the units and assessments are given where available.

Theme and unit name	Credit points	Level
Basic Skills in Programming		
Coding Literacy	0 + 2	1000
Interactive Web Pages with Javascript	0 + 2	1000
Understanding Web Skeletons & Skins	0 + 2	1000
Analysing & Plotting Data: Python	0 + 2	1000
Analysing & Plotting Data: R	0 + 2	1000
Numbers & Numerics	0 + 2	1000
Foundations of Quantum Computing	0 + 2	2000
Writing with Latex	0 + 2	1000
Data Analysis & Numerical Skills		
Statistical Data Visualisation	0	5000
Beginner Programming for Data Analysis	0 + 2	1000
Managing & Analysing Data with SQL	0 + 2	1000
Data Science in Astronomy: Algorithms	0 + 2	1000
Data Science in Astronomy: Analysis	0 + 2	1000
GIS: Geographic Information Systems	0 + 2	1000
GIS: Problem Solving	0 + 2	2000
GIS: Thinking Spatially	0 + 2	2000
How to Estimate Anything	0 + 2	1000
Shark Bites & Other Data Stories	0 + 2	1000
Complexity: Grids, Contagions, Swarms	0 + 2	2000
Social Network Analysis Principles	0	2000
Developing Research Skills		
Approaches to Cross-Cultural Fieldwork in Southeast Asia	0	5000
Ethnographic Research Methods	0 + 2	1000
Presenting Your Research	0 + 2	5000
Fact or Fake News? Evaluating Sources	0	1000
Field Notes: Interdisciplinary Methods	0	5000
Going Beyond Google: Search Basics	0	1000
Quality of Life Research Principles	0	5000
Research at Large National Facilities	0	5000
Research Data Management	0 + 2	2000
Economics, Entrepreneurial & Design Thinking		
Economic Strategy & Negotiation	0 + 2	2000
Economics of The Everyday	0 + 2	1000
How Economic Policy Remade Australia	0 + 2	1000
The Global Economy in Australia	0 + 2	2000

Understanding Creativity	0 + 2	2000
Business Entrepreneurship: Bootstrap Finance	0 + 2	1000
Business Entrepreneurship: Business Models	0 + 2	1000
Business Entrepreneurship: Guerrilla Tactics	0 + 2	1000
Cryptocurrency Markets & Investments	0 + 2	1000
Ethics, Ethical Reasoning, Contemporary Debates & Critical Thinking		
(Im)Politeness in Global Society	0 + 2	1000
Australian Perspectives: Rugby League	0 + 2	1000
Culture & Urban Environmental Design	0 + 2	2000
Global Ethics: Migration & Nation	0 + 2	2000
Global Ethics: Philosophy	0 + 2	2000
Global Ethics: The Great Barrier Reef	0 + 2	2000
Power & Identity in a Global Era	0 + 2	2000
Thinking Critically	0 + 2	2000
Understanding Europe	0 + 2	2000
Understanding the Arab World	0 + 2	2000
Understanding the USA	0 + 2	2000
World Cultural Heritage	0 + 2	2000
Business Ethics: Interactive Cases	0 + 2	1000
Pseudoscientific Thinking	0 + 2	1000
Understanding Animal Welfare	0 + 2	1000
Music & Australian Indigenous Identities	0 + 2	2000
Mindfulness Research & Practice	0 + 2	1000
Surviving Australia's Deadly Animals	0 + 2	1000
Modern Alchemy: Lotions & Potions	0 + 2	1000
Drug Wars	0 + 2	2000
US Violence	0 + 2	2000
Foundational & Advanced Communication Skills		
Digital Influence Through Social Media	0 + 6	2000
Presentation Skills: Public Speaking	0 + 2	2000
Presentation Skills: Speaking in Class	0 + 2	2000
Writing A Literature Review	0	5000
Writing for The Digital World	0 + 6	2000
Wiki Writing for The Web	0 + 2	2000
Communication In STEM	0 + 2	1000
Reading & Writing Mathematics	0 + 2	1000
Digital Communication: Sound	0 + 2	1000
Music Theory & Notation Essentials	0 + 2	1000
Presentation Skills: Speaking Formally	0 + 2	1000
Writing About Music	0 + 2	1000
Origins of Mathematics	0 + 2	2000
Telling True Stories	0 + 2	2000

Health Challenges & Medical Science		
Cancer Survivorship	0 + 2	2000
Radiological Interpretation: The Chest	0 + 2	1000
Chronic Disease Prevention	0	1000
Health Challenges: Cardiovascular Disease	0 + 2	1000
Health Challenges: Diabetes	0 + 2	1000
Health Challenges: Evolution, Health & Disease	0 + 2	1000
Global Challenges: Planetary Health	0 + 2	2000
Health Challenges: Allergy & Autoimmunity	0 + 2	1000
Health Challenges: Oral Health	0 + 2	1000
Health Challenges: Pain & Society	0 + 2	1000
Health Challenges: Physical Inactivity	0 + 2	1000
Health Challenges: Sleep	0 + 2	1000
Toxicological Evaluation	0 + 2	2000
Anxiety & its Disorders	0 + 2	1000
Health Literacy for Better Lives	0 + 2	5000
The Science of Health & Wellbeing	0 + 2	1000
Introduction to Pathogen Genomics	0	5000
Pharma Insights: A Global Perspective	0 + 2	5000
Medical Frontiers: Assisted Reproduction	0 + 2	2000
Medical Frontiers: Stem Cell Therapies	0 + 2	2000
Health Challenges: Weight Regulation	0 + 2	1000
Personal, Interpersonal & Intercultural Skills		
Aboriginal Sydney	0 + 2	1000
Community Engagement for Change	0 + 2	1000
Cultural Competence: Fundamentals	0 + 2	1000
Cultures of Food: Europe	0 + 2	1000
Disability Awareness & Inclusivity	0 + 2	1000
Experience China	0 + 6	2000
Experience Germany	0 + 6	2000
Experience Indonesia	0 + 6	2000
Experience Italy	0 + 6	2000
Experience Japan	0 + 6	2000
Experience Korea	0 + 6	2000
Experience the Arab World	0 + 6	2000
Experience the French-Speaking World	0 + 6	2000
Experience the Spanish-Speaking World	0 + 6	2000
Indigenous Histories	0 + 2	2000
Professionalism in the Workplace	0 + 2	2000
Sacred Feasts: Ritual Food & Drink	0 + 2	2000
Understanding Critical Reflection	0 + 2	1000
Student Leadership: Community Engagement	0 + 2	1000

Student Leadership: Peer Mentoring	0 + 2	1000
Student Leadership: Representation	0 + 2	1000
Cultural Competence in Natural Science	0 + 2	1000
How We Make Decisions	0 + 2	1000
The Science of Sexuality	0 + 2	1000
Developing Your Emotional Intelligence	0 + 2	1000
Psychology of Faith	0 + 2	2000
Ethnopharmacology	0 + 2	2000
From My Degree to My Career	0	1000
STEM Literacy		
Astronomy: From Big Bang to Darkness	0 + 2	1000
Astronomy: From Earth to Exoplanets	0 + 2	1000
Astronomy: From Stars to Black Holes	0 + 2	1000
Psychology of Crime	0 + 2	2000
STEMM in the Workplace	0 + 2	2000
Symmetry	0 + 2	1000
Teamwork, Team Leadership & Project Management		
Managing Your Project	0 + 2	1000
Project Management for Research	0	5000
Ethics (HDR)		
History of Research Ethics	0 + 2	5000
Fieldwork Ethics	0 + 2	5000
Qualitative Analysis (HDR)		
Qualitative Research for Law & Policy	0 + 2	5000
Understanding & Using ABS Data	0 + 2	5000
Quantitative Analysis (HDR)		
Research Design for Clinical Studies	0 + 2	5000
Computational Analysis for Omics Data	0 + 2	5000
Data Wrangling	0 + 2	5000
Linear Modelling	0 + 2	5000
Multivariate Data Analysis	0 + 2	5000
Experimental Design for Life Sciences	0 + 2	5000
Quantitative Research Design	0	5000
Fundamentals of Quantitative Research Design	0 + 2	5000

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