# Embedding digital literacy: Towards transforming business education

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Equipping business graduates with digital literacy skills can help to enhance their employability and careers. Contextualising digital literacy to the relevant discipline and, aligned with industry expectations can help them navigate through the multiple demands of living, learning and working in a digital 21st century society. This paper draws on a pilot exemplar of the challenges in course design to explicitly embed, develop and assess students on attainment of digital literacy skills in business education. As part of the pilot, and through a cross-functional team, an innovative, media-rich and interactive Digital Literacy Module (DLM) with strong learning design based on authentic activities and scenario-based learning was developed and implemented. Insights presented here will be of value to course leads, curriculum designers, educational technologists and other practitioners to help with embedding digital literacy in higher education.

Keywords: digital literacy, education technology, business education, employability

## Introduction

Business education relies heavily on ensuring course design includes digital literacy and remains relevant to industry needs and cognisant of a broad discipline foundation to ensure graduates have a philosophy for decision making that stands the test of time. This paper draws on a pilot exemplar of the challenges in course design to explicitly embed, develop and assess students on attainment of digital literacy skills. Digital literacy (DL) is a core graduate learning outcome for many institutions, including Deakin University. For Deakin's Bachelor of Commerce (B.Com.), it is an assured course and graduate learning outcome with graduates expected to know how to '*use technologies to Identify, locate, evaluate, synthesise and disseminate and communicate information in the field of commerce'* to ensure they develop into life-long learners and to enhance their employability and careers.

## Pilot Case Study: Commerce

As part of a major course review, a cross functional team, through innovation and leadership, led the effective design, development and integration of the Digital Literacy Module (DLM) within a large bachelor of commerce degree to provide premium learning experiences underpinned by the use of digital technologies. The DLM, is an online interactive and media-rich learning tool supported by active learning design, authentic activities and scenario-based learning aimed at developing digital literacy skills within undergraduate students first year of study in an Australian higher education institution. The DLM was implemented within a common core first unit. The implementation commenced in trimester 1 of 2016 resulting in great student learning success. For students in their first year of study, the DLM provided a foundation set of digital literacy skills, including knowing how to access information in many different formats and diverse sources, critically analyse and evaluate these sources as well as creating new knowledge and appropriately use technology to communicate information and connect with others, to help them early on in their University study.

The DLM is strategically embedded as a required assessment task assessing Digital Literacy skills. The Library team worked together with the Course team to build the DLM and contextualised the content for the broad business discipline. The DLM covers the three elements of digital literacy: *find*, *use* and *disseminate* and was mapped to the University's Digital Literacy Framework (Deakin University Library, 2014). The University's framework is cited as a best practice exemplar in the NMC Horizon report 2016 (Alexander, Adams Becker, & Cummins, 2016). The DLM is equally accessible to all students, both campus and cloud based, providing an equitable experience and students are able to revisit the learning tool as required through offering it in the Course hub site within the University internal learning environment. The DLM is supported by dedicated discussion forums, a direct email address, in class presentations, video and written instructions.

The team mapped the course learning outcomes for the degree to Deakin University's Digital Literacy Framework (Deakin University Library, 2014). This allowed the library team to identify the level of proficiencies of each digital literacy element required of first year students and produce a list of tangible skills the students would be expected to develop after completing the module. Using a constructive alignment approach, learning outcomes for the module were developed and activities and assessments were aligned to them (Biggs & Tang, 2007).

## The DLM Tool

The DLM is an online interactive and media-rich learning resource built on the *Tumult Hype* platform, an innovative web-based and multi-media creation tool. The DLM is designed with interactive and media-rich (see Fig 1) elements guided by Mayer's (2014) multimedia principles to help guide the use of clear and multimedia instruction through appropriate use of words and graphics to foster learning. The learning design is based on authentic activities and scenario-based learning (SBL). Authentic activities have the potential to foster meaningful intellectual accomplishment and learning, since authentic learning activities are directly related to students' real-life experiences (Herrington, Reeves, Oliver, & Woo, 2004). An authentic industry aligned workplace scenario was used whereby students work for a consulting firm whose team have been asked to work with a company that offers accommodation in QLD. Coupled with SBL, the DLM supports active learning strategies that simulates a workplace industry scenario (Clark & Mayer, 2012; Dahl, 2004).

Using a scenario-based approach, a threaded narrative guides students through the module's content and activities, connecting each section together in a logical way. The use of scenarios has been shown to generate authentic learning experiences in higher education (Agostinho, Meek, & Herrington, 2005; Diekema, Holliday, & Leary, 2011). Using a scenario allowed us to develop an experiential learning environment via virtual workplace learning enabling students to understand how digital literacy is relevant in a real-life work environment. The scenario also aligns with the University's focus on work integrated learning and employability. The scenario was contextualised to an authentic work-based setting where the student takes on the role of an employee in a small consulting firm. A fictional manager appears regularly throughout the module to provide context for the scenario and assign tasks that the student has to complete.

Being delivered wholly online the library embedded activities to encourage active learning and participation from students (Dowell & Small, 2011) and to help increase engagement and motivation (Diekema et al., 2011). Students are required to actively engage with the scenario, to learn by doing tasks that replicate something they would do in a real-world setting. This has a two-pronged effect, assisting in developing their digital literacy skills for employability, as well as the required skills for studying.

The DLM is integrated with MMK101's assessment allowing a focus on scaffolding of learning. The DLM has three sections based on the current Deakin Digital Literacy definition of 'using technologies to find, use and disseminate information' (Deakin University, 2018). 1. Find: How to find information and use *databases in the library; 2. Use: How and when to use different information types and assess their quality; and 3. Share (Disseminate) – ethical use of information and tools for sharing*. Initially, to open the first section of the DLM, students are required to self-assess their digital literacy skills through a short survey. Students then progress through each section where they are directed through different activities designed to teach them first year level skills in DL. Each section is concluded by students completing a short multiple-choice quiz where they are required to achieve a result of at least 80%. The next section is locked and inaccessible until students achieve the 80% passing grade. The DLM is finalised when students complete a post-DLM survey reflecting on what they have learnt and what they believe their digital literacy skills are following all the activities. Further, the DLM is a hurdle requirement that must be completed in the first three weeks of the trimester. Completion of the DLM is required to unlock their first assignment submission dropbox, without which students would forfeit 20% of their final grade in the unit. Each section is set with conditional release in CloudDeakin to ensure students progress and complete each section in order. Upon successful completion students are issued with a certificate of completion which they can download as a pdf for their records and the dropbox for their first assignment opens.

Scaffolded support is provided to students undertaking the DLM with instructions available in different formats. Written instructions are embedded into the assessment documents and in the unit site along with a captioned video. Librarians present to students on multiple campuses and answer questions in live-streamed classes which are also recorded and housed on the unit CloudDeakin site, and monitor a dedicated email address and discussion forum for the DLM which contains a set of frequently answered questions. The DLM also provides students with a pdf that captures their answers to activities they have completed that can be saved for future

reference in addition to the certificate of completion, both of which can be added to their ePortfolio.


**Figure 1: Sample screengrabs of the Commerce DLM**

## Outcomes

The integration of the DLM in the core unit of the BCom involved a comprehensive scaffolding of learning and support by a multi-disciplinary team across the university working successfully to deliver premium learning, resources and experiences. The success of knowledge skill building across the whole course improved eVALUate results as demonstrated by the MMK101 eVALUate results (student evaluation of the unit, its resources, experiences and the teaching within it) since the DLM's inception in T1 2016 (over 5,000 students, from T1 2016 to T3 2017, see Table 1). All eVALUate measures in the unit have improved *markedly* over time. This is evident in key indicators such as Q2, which asks students whether the learning experiences provided helped them achieve the learning outcomes. This measure improved from 78% agreement in T1 2016 to the most recent results in T3 2017 of 93%. When asked whether the learning resources in the unit helped them achieve the learning outcomes (Q3), student agreement increased from 79% in T1 2016 to 91% in T3 2017. Further, students' overall satisfaction in the unit (Q11) has dramatically improved from 66% in T1 2016 to 91% in T3 2107. This coincides with the implementation of the DLM in T1 2016, which provided students with the resources to develop skills and knowledge in the area of digital literacy, skills and knowledge they then use in future assessment tasks in this and all other units of study.

**Table 1: Student satisfaction results from MMK101 T1 2016 to T3 2017**

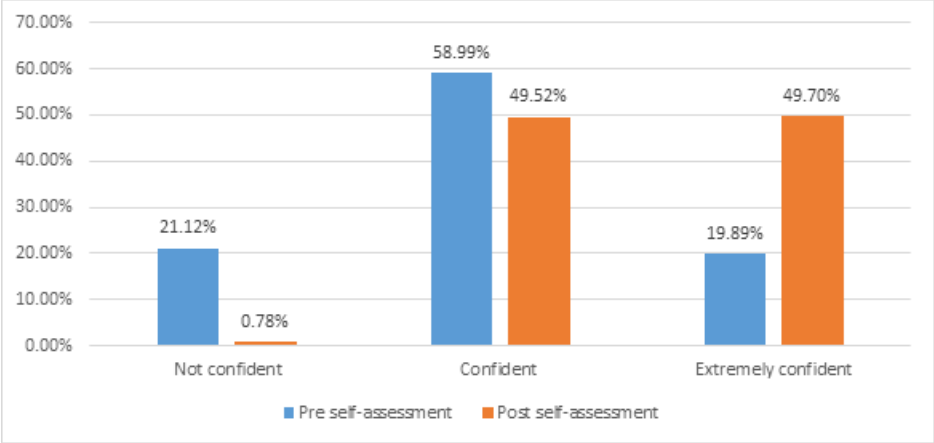
| TEACHING PERIOD | ENROLL-MENTS | Q1 LEARNING OUTCOMES | Q2 LEARNING EXPERIENCE | Q3 LEARNING RESOURCES | Q4 ASSESSMENT TASKS | Q5 FEEDBACK | Q6 WORK-LOAD | Q7 TEACHING QUALITY | Q11 OVERALL SATIS-FACTION |
|---|---|---|---|---|---|---|---|---|---|
| **2017 T3** | 452 | 93 | 93 | 91 | 91 | 89 | 89 | 93 | 91 |
| **2017 T2** | 708 | 97 | 97 | 94 | 97 | 92 | 92 | 94 | 97 |
| **2017 T1** | 1549 | 91 | 86 | 87 | 86 | 82 | 89 | 82 | 84 |
| **2016 T3** | 498 | 99 | 95 | 91 | 91 | 91 | 93 | 95 | 95 |
| **2016 T2** | 962 | 87 | 82 | 86 | 80 | 77 | 79 | 82 | 81 |
| **2016 T1** | 1533 | 84 | 78 | 79 | 71 | 74 | 74 | 76 | 66 |

Feedback in teaching and learning experiences is a vital tool that recognises, corrects, encourages and challenges student performance. Through the DLM the team utilised feed-forward feedback through the modules contained within the DLM, and the quizzes at the end. The due date for completion of the DLM is set two weeks before students' first written research-based assessment task is due, encouraging their new skills be applied in completing this task. This then feeds forward and can be utilised to demonstrate knowledge in all areas of digital literacy to support their learning in MMK101.Students can use the feedback provided within the DLM to improve their future assessment work and demonstrate the skills and knowledge they have developed, to a much higher standard than they could without the DLM. Further, feedback from students to improve the DLM each trimester was also used to better facilitate quality student learning experience via student feedback through the DLM, a designated MMK101 CloudDeakin DLM discussion thread, unsolicited emails from students and eVALUate data are collated, reviewed and analysed to ensure the DLM is aligned with students' needs. This process focusses on a continuous improvement model where the team focused on learning outcomes, skill development and student needs. By the end of T3 2017 a total of 5,379 students had completed the DLM.

Overall, DLM statistics show a significant overall increase in student confidence moving from 21% of students not being confident in their digital literacy skills before completing the DLM, reducing to less than 1% of students not being confident in their digital literacy skills post completion (Figure 2). Students' mid-level

of confidence in their digital literacy skills decreased from 58.99% prior to completing the DLM to 49.52% after completion, but this was compensated by the students' level of extreme confidence in their digital literacy skills increasing from 19.89% before completing the DLM to 49.70% after completing the module.

**Figure 2: Overall percentage student confidence levels in digital skills**




Confidence in individual digital literacy skill areas, including use of advanced searching techniques, finding peer-reviewed journal articles, critically evaluating quality information, finding scholarly overviews without using Wikipedia or Google, and checking copyright permissions, all increased dramatically (Table 2).

**Table 2. Percentage student confidence levels in digital skills**

| | **Pre-Module Self-Assessment** | | | **Post-Module Self-Assessment** | | |
|---|---|---|---|---|---|---|
| | Not Confident | Confident | Extremely Confident | Not Confident | Confident | Extremely Confident |
| **Overall student confidence levels** | 21.12 | 58.99 | 19.89 | 0.78 | 49.52 | 49.70 |
| **I am confident in using advanced search techniques to find specific information** | 13.93 | 66.91 | 19.17 | 0.43 | 47.61 | 51.96 |
| **I am confident in finding peer reviewed journal articles for my assignments** | 21.16 | 57.32 | 21.52 | 0.87 | 45.43 | 53.70 |
| **I can critically evaluate quality information for my assignments** | 12.30 | 65.64 | 22.06 | 0.65 | 49.57 | 49.78 |
| **I am confident I can find a scholarly overview on a topic, using library resources (not Wikipedia or Google)** | 20.61 | 58.59 | 20.80 | 0.43 | 52.39 | 47.17 |
| **I know how to check the copyright permissions to share and reuse an image** | 37.61 | 46.47 | 15.91 | 1.52 | 52.61 | 45.87 |

As part of the post-completion self-evaluation contained within the DLM, students were asked about the perceived benefits they received from the DLM. Two key themes identified – the value of the skills students developed, and the benefits gleaned from the design of the module itself. Students clearly valued the skills they were able to develop and the knowledge they gained in digital literacy. Students clearly perceived that they learned key information about the Library and Library resources available to them. As one student explained succinctly, "*overall, I learned there was a lot I didn't know about the Deakin library*". The ability to search for relevant information more efficiently and effectively was identified as a skill set developed by students: "*I also improved the awareness of the way I should search*" and "*this module has really expanded my understanding of the proper use of data and information*". The DLM also highlighted that students had little prior knowledge of copyright and copyright permissions – "*copyright of images was something I was unaware of previously*".

Beyond the knowledge and skills developed, the design of the DLM was identified as a key benefit. Students perceived "*the module was interactive, easy to follow and has great information*", and that there was a "*massive*

*amount of information provided*". Students reported that the benefits of the DLM enabled them to develop further, as self-directed learners, as "*more than informative, I believe it has mostly built up my confidence*" and that they will "*use the knowledge gained for my studies and career*".

The scaffolded learning and support model taken to integrate the DLM in the BCom course and unit incorporating feed forward and feedback and a continuous improvement has improved the student learning experience. Due to the innovative DLM, student success and retention has increased markedly as a further demonstrated measure indicating the enhancement provided in teaching and learning and the student experience. The increases in student success and retention has clearly had a positive impact on our equity-based students as shown below. It can be clearly demonstrated that from T2 2015, when the DLM did not exist (Table 3), through to T3 2017, when the DLM had been embedded in MMK101 every Trimester for two academic years, success, retention and, most interestingly, success of equity-based student cohorts have all increased (Table 3).

**Table 3: Percentage student success and retention before (2015) and after (2016) DLM implementation**

| **Student cohorts** | **Percentage** | | **Unit success rate** | | **Mean mark for unit** | | **Percentage not completing unit** | |
|---|---|---|---|---|---|---|---|---|
| | **2015** | **2016** | **2015** | **2016** | **2015** | **2016** | **2015** | **2016** |
| **All students** | | | **68.2%** | **82.6%** | **56.2** | **55.0** | **4.0%** | **2.0%** |
| International students | 6.6% | 42.1% | 84.6% | 88.1% | 54.8 | 54.0 | 0.0% | 0.9% |
| **Domestic students** | **93.4%** | **57.9%** | **67.0%** | **78.4%** | **56.3** | **55.8** | **4.3%** | **2.8%** |
| Low SES students | 10.8% | 12.4% | 70.0% | 82.4% | 54.0 | 55.3 | 0.0% | 0.0% |
| Regional and remote students | 19.5% | 18.6% | 61.1% | 81.1% | 52.3 | 57.4 | 2.8% | 2.8% |
| Students with disability | 5.9% | 6.6% | 54.5% | 88.9% | 49.2 | 63.1 | 0.0% | 10.5% |

The student success rate has increased by almost 15%, attrition rate has halved, while amongst equity-based student cohorts the success rate has increased even further to between 10-30%, as well as their mean final mark in MMK101 also increasing.

Across all students in the unit, the success of the DLM was reflected in their achievement of the learning outcomes in the unit. In the assurance of learning of digital literacy demonstrated by students in the unit summative assessment, results have improved dramatically. This clearly demonstrates the value and impact of the DLM in teaching and learning.

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**Please cite as**: Ngo, L., Tyrell, S., Volkov, M. & Bridson, K. (2018). Embedding digital literacy: Towards transforming business education. In M. Campbell, J. Willems, C. Adachi, D. Blake, I. Doherty, S. Krishnan, S. Macfarlane, L. Ngo, M. O'Donnell, S. Palmer, L. Riddell, I. Story, H. Suri & J. Tai (Eds.), Open Oceans: Learning without borders. Proceedings ASCILITE 2018 Geelong (pp. 466-471).

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