Exploring digital literacy as a graduate learning outcome in higher education – an analysis of online survey

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This paper explores the notion of digital literacy as a learning outcome in the context of higher education. As the world becomes increasingly digital and technologically connected, the ways in which universities support the development of student digital literacy are critical in order to equip graduates with the knowledge and skills to engage in society meaningfully and productively. Regardless of its importance, given the current landscape where numerous digital literacy frameworks can be found in the literature, the task of effectively teaching and assessing digital literacy within higher education becomes rather complex and challenging.
As such, through the preliminary analysis of an online survey conducted at a large Australian university, we investigate academics' perceptions of digital literacy as one of the graduate learning outcomes. With a successful application to the university's Central Research Grant scheme, the year-long research was conducted in 2017. This project integrated the online survey as well as Change Laboratory as part of the activity theory framework informing this research. Findings discussed in this paper include understandings about the perceived enablers that potentially allow academics to better teach and assess digital literacy in the future.

Keywords: digital literacy, learning outcome, higher education, academics, perception study

Introduction

With the rapid development of technology and proliferation of an increasingly digital world, digital literacy is considered to be one of the essential 21st century skills that university graduates must demonstrate not only to survive but to thrive beyond university (Pangrazio, 2016). As access to digital technologies improves across the world, the fluency in connecting, communicating and creating digital engagement and content has become more of a focus in the discourse around digital literacy (Alexander, Adams Becker, & Cummins, 2016). As students' learning needs become more complex and diverse, the higher education sector has faced the criticism that university curricula ought to provide more opportunities for authentic learning which equip students with transferrable skills outside of formal learning related to the disciplinary knowledge and skills (Jorre de St Jorre & Oliver, 2017). As a response to such criticism, and with a focus towards outcome-based approaches to curriculum, numerous tertiary institutions have created a set of graduate attributes and/or learning outcomes that explicitly touch on developing generic and transferrable skills. Digital literacy therefore is a key graduate learning outcome among these essential skills.

However, when it comes to the reality of teaching and assessing digital literacy as a learning outcome in tertiary curricula, the landscape is much more complex. On the surface, it may seem reasonable to assume that academics and students have an intuitive understanding of what digital literacy is, and subsequently apply particular skills associated in relevant contexts. As we reveal below, this assumption proves to be unrealistic. Looking back on the history of digital literacy it is apparent that there has since evolved an abundance of frameworks that outline the multi-faceted nature of digital literacy (Brown, 2017). These represent attempts to conceptualise the evolving phenomenon of digital literacy while also being responsible for teaching it to students. Put differently, on one hand, teachers in higher education are faced with the problem of understanding and navigating through the complex nature of this concept alone. On the other hand, they are tasked with also developing digital literacy skills themselves and applying the notion to teach and assess students' digital literacy.

Given this backdrop this paper does not aim to provide yet another digital literacy framework, but rather, aims to explore the university educators' perceptions about digital literacy in the context of teaching and learning practices.

Theoretical frameworks of digital literacy

To date, there is no single agreed-upon definition for digital literacy (Bawden, 2008; Pangrazio, 2016) or digital literacies (Knobel, 2008). In fact, there are currently over 100 models and frameworks attempting to capture the various dimensions of digital skills, literacies or competencies (Brown, 2017). The definitions of digital literacy have ranged from a focus on skills and capabilities (Martin & Madigan, 2006) towards more socially critical and politically active conceptions seeking to increase agency and addressing the growing social and cultural gaps (Ávila & Pandya, 2013). Avila and Pandya (2013) note the following aims of their critical digital literacy framework - "to investigate manifestations of power relations in texts, and to design, and in some cases redesign, texts in ways that serve other, less powerful interests" (p. 3). Alexander et al. (2016) also reported in their study that the interpretation can be disciplinary specific - academics in humanities view digital literacy differently to those in computer science, for example. As Brown (2018) noted, the varying degrees of capabilities and access to digital devices can limit people's full participation in universities and society. This gap is not only often overlooked by educators and employers, but also puts many students and employers at a clear disadvantage in their participation in the (knowledge) economy. The notion of 'digital natives' can also mislead the critical engagement with the university and society more generally for the diverse cohort of students (Ng, 2012).

In this study, we draw on the Joint Information Systems Committee (JISC) framework as "one of the most cited efforts to develop a comprehensive framework for digital literacy" (Brown 2017, p.2). This particular framework defines digital literacies as "those capabilities which fit an individual for living, learning and working in a digital society" (JISC 2014, p.1). Through some iterations, the JISC framework (2014) outlines six dimensions of digital literacy - i) ICT proficiency, ii) information, data, media literacies, iii) digital creation, innovation and scholarship, iv) digital learning and self-development, v) communication, collaboration and participation and vi) digital identity and wellbeing. This framework constitutes a useful conceptual framework for our analysis as it provides a current broader view of digital literacy as opposed to a traditional narrow view strongly associated with information literacy.

The research design and methodology

DigiHub project – Change Laboratory

The aim of the research project was two-fold: i) to explore university teachers' perceptions and practices of teaching and assessing digital literacy as part of a suite of graduate learning outcomes and ii) to facilitate transformation in the conception and practices of digital literacy for teachers and practitioners through a Change Laboratory, underpinned by activity theory (Engeström, Virkkunen, Helle, Pihlaja, & Poikela, 1996). Change Laboratory is a well-known interventionist approach, which emerged through a school of activity theorists (Virkkunen, 2013). It is an approach to social and constructivist transformation by bringing a group of people with diverse backgrounds and talents together so as to identify a gap/challenge in the activity systems and generate solutions to this gap as a collective of dynamic change agents.

In our research project we explored digital literacy as a concept that brings challenges in the learning and teaching communities of higher education. We then facilitated three Change Laboratory (group) sessions called DigiHub with an aim to establish a hub of educators that brought diverse expertise together to discuss and work through this problem in 2017. Each Change Laboratory session was 2-3 hours in length and all the interactions were video/audio-recorded and transcribed for text and thematic analysis with NVivo. A research ethics approval was sought and granted by the university's ethics committee (HAE-17-124).

Online survey

As part of this research, an online survey was also conducted. Data from this survey were used as 'mirror' devices or 'stimuli' (Engeström & Sannino, 2010) to initiate and facilitate discussions in our DigiHub Change Laboratory sessions. The analysis of this online survey data is the focus of the current paper while discussions and analysis of the DigiHub sessions will form another paper in the future.

The online survey had 16 items stemming from a literature review with both open and closed questions. The primary aim was to quickly scan the insight on the attitudes around digital literacy from educators and practitioners at the university. The invitation for educators at the university to participate in the survey was sent via Faculty newsletters during May to December 2017. A total of 37 participants from all four faculties, as well as the Library and Divisions, agreed to complete the survey. Responses were gathered and subsequently formed

a basis for our thematic analysis and discussions in this paper. The participants in this research included associate professors, (senior) lectures, librarians and academic developers.

Table 1: Number and demographics of the participants

Faculties/divisions	Arts and Education	Business and Law	Health	Science Engineering Built Environment	Others (L&T unit and Library)
Number	5	5	8	7	12

In the survey, questions were asked about participants' previous experiences with digital literacy in their teaching. The table below outlines that firstly, 65% of our participants had listed digital literacy in their unit/subject as one of the graduate learning outcomes (GLOs) and secondly that most of those who answered the questions (24 out of 37) in fact taught (75%) and assessed (70%) digital literacy in their practice.

Table 2: Participants' previous experiences with teaching and assessing of digital literacy

	Have you had DL listed as one of the GLOs in your unit? (Answered: 37)	Have you taught DL in your unit? (Answered: 24)	Have you assessed DL in your teaching? (Answered: 24)
Yes	25 (65.57%)	18 (75%)	17 (70.83%)
No	7 (18.92%)	4 (16.67%)	5 (20.83%)
Don't know	5 (13.51%)	2 (8.33%)	2 (8.33%)

Discussion

Demystifying digital literacy

In the online survey there was an explicit question that asked participants to provide their own definition of digital literacy (no more than 200 words). Unsurprisingly, some participants described it with more focus on ICT and information literacy only. This could be easily understood as an influence by the University's articulation of digital literacy as a Graduate Learning Outcome – i.e. "using digital technologies to find, use and disseminate information" (GLO3: Digital Literacy). However, as a whole, our participants generally conceptualised digital literacy more broadly, typically including the creation of digital media and engagement with digital tools that are socially connected to enabling our lives. One of our participants observed that: "digital literacy encompasses a set of practices and strategies that enable us (student, academics, professional staff) to adapt to changing technologies that are ubiquitous and essential for studying, working and living in a digital world (Participant A)." Some of the representative definitions provided by our participants are mapped against the JISC model in the table below.

Table 3: Definitions of digital literacy provided by the participants

JISC (2014) the six elements of digital literacy	Our participants' responses/definitions
i) ICT proficiency	• 'Knowledge, skills and behaviours necessary to effectively use digital devices and technologies to achieve desired goals.' • 'To look up/process/present information.' • 'To use digital tools to effectively and efficiently produce quality work that is fit for purpose.'
ii) Information data, media literacies	• 'Make an internet search to find trustworthy information.' • 'To find, use and disseminate information.' • 'To work in the digital environment and communicate with images as seamlessly as with words.'
iii) Digital creation, innovation and scholarship	• 'Use technology to change the way you do your tasks and change the way you think.' • 'To effectively and confidently navigate through a world that relies on technology.'
iv) Digital learning and self-development	• 'Building experience and confidence in technology as part of career pathway.' • 'To use technology to support learning and work activities and for life needs.' • 'Ability to seek and apply digital technologies to complete academic work.'
v) Communication, collaboration and participation	• 'Knowledge of digital tools, platforms, equipment and software that enable to perform work effectively and to communicate knowledge transfer with colleagues, industry and students.' • 'Knowing how to best use technology to communicate/provide information to your audience.'

	• 'Facility with the use of digital technologies for communication.'
vi) Digital identity and wellbeing	• 'To interpret and create meaning digitally or in digital environments.' • 'Understandings of the impact of technologies – how technology supports/distracts in an individual's personal and professional life, and the potential empowerment/disenfranchisement, economic or otherwise, impact on the global community.'

Attitudes towards digital literacy, teachers, students and the University

The survey also asked participants about their attitudes towards digital literacy in the context of learning and teaching at university, and in relation to their/students' capabilities and the university's responsibilities. Our participants largely believed that i) the use of digital technologies is critical to teaching, learning and assessment (90% for agree + strongly agree) and also ii) they thought the University had the responsibility to equip students (90%) and academics (96.7%).

However, when they were asked about the level of understanding around digital literacy to confidently teach and assess it, a level of uncertainty crept in (24.14% neutral) and 10.34% of the participants disagreed. Interestingly, when they were asked about their knowledge and skills compared to their students, there was a small but recognizable portion of uncertainty (72% combined in Q5 and Q6) and disagreement (31% combined). Finally, participants generally didn't seem to think they received enough support from the University to develop digital literacy skills (28% disagree + 36% neutral) and only 36% agreed.

	STRONGLY DISAGREE	DISAGREE	SOMEWHAT NEUTRAL	AGREE	STRONGLY AGREE	TOTAL
I feel that using digital technologies is critical to teaching, learning and assessment.	3.33% 1	0.00% 0	6.67% 2	43.33% 13	46.67% 14	30
The University has a responsibility to equip students with digital literacy/skills.	0.00% 0	0.00% 0	10.00% 3	40.00% 12	50.00% 15	30
The University has a responsibility to equip academics with digital literacy/skills.	0.00% 0	3.33% 1	0.00% 0	26.67% 8	70.00% 21	30
I understand digital literacy enough to be able to confidently teach and assess this outcome for my students.	0.00% 0	10.34% 3	24.14% 7	55.17% 16	10.34% 3	29
My knowledge of digital literacy is more advanced than my students'.	0.00% 0	13.79% 4	31.03% 9	51.72% 15	3.45% 1	29
My digital literacy skills are more advanced than my students'.	0.00% 0	17.24% 5	41.38% 12	34.48% 10	6.90% 2	29
I receive enough support from the University to develop my digital literacy/skills.	7.14% 2	21.43% 6	35.71% 10	25.00% 7	10.71% 3	28

Figure 1: Attitudes towards digital literacy skills and knowledge

Ways of finding out new digital technologies

When the participants were asked about how they found out about new technologies, they responded with a wide range of sources (Figure 2). Work colleagues were unsurprisingly the most popular source (86.67%), followed by online/digital sources (63.33%), professional networks (63.33%) and friends/family (60%). Others, for example, included: conferences, communities of practice, faculty learning and teaching team and volunteering in primary schools.

ANSWER CHOICES	RESPONSES	
Friends/family	60.00%	18
Work colleagues	86.67%	26
Online/digital source	63.33%	19
Recommended by students	23.33%	7
TV	10.00%	3
Radio	13.33%	4
Newspaper	13.33%	4
Library	20.00%	6
Professional networks	63.33%	19
Other (please specify)	20.00%	6
Total Respondents: 30		

Figure 2: Sources for finding out new digital technologies

Support and resources needed - potential enablers

The participants were also asked about what resources or support they thought they needed to teach and assess digital literacy effectively. The responses to this question had a variety of ideas, which are then categorized into the following four themes – a) pedagogical support, b) technology support, c) time and smoother process and d) team expert support:

Pedagogical support

- 'Ways to express digital literacy skills in Unit Learning Outcomes.'
- 'Skills taxonomy for academics (not students) linked to Bloom. A resource of what digital literacy looks like when taught and assessed.'
- 'Support/resources that integrate this [i.e. digital literacy] into the context in which it is being used for each unit.'
- 'I would like to be more aware of the digital literacy levels that employers/industry are requiring and to ensure that students are being taught at this level.'

Technology support

- 'Technical support is greatly appreciated.'
- 'Access to dedicated IT help for staff.'

Time and smoother processes

- 'Time, WAM allowance, Relaxing constipated processes.'

Team/expert support

- 'The Pods [i.e. faculty learning and teaching units] could have a key role in supporting academics in developing their own digital literacy skills and in embedding the teaching of digital literacy skills in their courses.'
- 'A team with skills and expertise to assist with learning design. A team that contributes expertise to student online study/research skills & online academic resources (Library). A team that contributes expertise to student comprehension and writing skills (Language Learning Advisors).'
- 'Access to dedicated coaching as I learn to use the technology effectively and with confidence.'

Conclusion and future implications

This preliminary investigation into university educators' conceptions of digital literacy has revealed some of the complexity that underlies the challenge to teach and assess digital literacy in the context of higher education. The participants in this study revealed a broad range of conceptualisations around digital literacy when analysed using the JISC framework. However, none of the participants perceived digital literacy in a manner that covered all dimensions of the JISC framework in their single definition. The activity of teaching digital literacy as a learning outcome is therefore challenged by the need to be 'assembled' across the multiple activity systems of the university. While educators, academic developers and librarians all contribute to a conceptualisation of digital literacy consistent with their more localised activity system, this really calls for new ways of working with these activity systems to develop a shared and more coherent understanding of digital literacy as a learning outcome. The Change Laboratory model which we applied in the second part of this research project provides a basis for achieving that outcome and will be reported in a separate paper.

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