A mobile ecology of resources for Covid-19 learning

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Mobile devices and a vast array of accompanying applications offer significant affordances to create, consume, share, collaborate and communicate—affordances that could be easily leveraged to facilitate meaningful learning. A positive disruption arising from Covid-19 that aligns with the affordances of mobile learning is the uncoupling of time and space in the learning process. Traditionally formal learning is a process that is predominately viewed as an experience that is 'timetabled'— scheduled to eventuate at a 'place'—lecture or a tutorial (or similar) in a room or lecture theatre. In this concise paper, an ecology of resources is discussed along with guiding principles for designing and facilitating uncoupled authentic and student-determined learning post the emergency remote teaching phase.

Keywords: Mobile learning, ecology of resources, Covid-19, collaborative learning

Introduction

Educators around the world have had to switch to emergency remote teaching in a matter of days, for some it happened overnight (Bozkurt et al, 2020). While students have always met the educators in their space that is equipped and set up for learning and teaching (e.g. computer labs, simulation rooms, tutorial spaces and lecture rooms), Covid-19 meant the educators now had to venture into spaces students dwelt in to facilitate learning, as they learnt from home. More so, a lot of what students did and how they learnt depended on the devices they owned, resources they had access to and internet connectivity. To ensure access and an equitable learning experience many universities created and supported learning using a virtual private network (VPN), in particular, for students in China. Many campuses closed completely, and staff and students were requested to teach and learn from home. The switch to emergency remote teaching made it clear, even to those that were already working online, that there were going to be an enormous number of challenges (Crawford et al, 2020). These challenges included the need for teachers to rethink their teaching approach, course design, assessment, strategies for facilitating learning (learning tasks and activities) and access to content, which would normally be delivered in a physical space through a lecture. In addition, for many, working at home would have been a challenge in itself with issues of Wi-Fi connectivity, privacy and the disruption caused by the blurring of work and home environments.

The ASCILITE Mobile Learning SIG established in 2016 consists of a group of teacher-researchers specializing in mobile technology who meet online to discuss and research the opportunities that mobile learning offers (Cochrane & Narayan, 2018). The SIG responded to the Covid-19 situation by creating a number of collaborative documents over a six month period with the aim of supporting staff and students in higher education. The SIG has more than 70 members based in several countries, including New Zealand, Australia, the UK and Japan, who bring an international perspective to the affordances and limitations of mobile learning. One of these documents is a co-curated selection of mobile tools that can be used to respond to the challenges of emergency remote teaching. This paper will describe how this Ecology of Resources (EoR) (Luckin, 2008) was created, list the main tools that are included, and make a number of recommendations in terms of implementing mobile learning.

Literature review

Over the last decade, the ownership of mobile devices and, in particular, smart mobile devices (phones and tablets) and accessories (VR headsets, smartwatch, etc.) have increased at a phenomenal rate (Pew Research Centre, 2019). A high percentage of students entering higher education in Australia and New Zealand own these devices, almost comparable to the rate of ownership of laptops (Beetham, Newman, & Knight, 2019). Mobile devices and the plethora of accompanying applications offer significant affordances to create, consume, share, collaborate, co-create and communicate—affordances that could be easily leveraged to facilitate meaningful learning (Narayan, Herrington, & Cochrane, 2019). A positive disruption arising from Covid-19 that deserves further investigation but aligns with mobile learning is the uncoupling of time and space in the learning process (Sharples, 2015). Formal learning is a process that is predominately viewed as an experience that is 'timetabled'— scheduled to eventuate at a 'place'—lecture or a tutorial (or similar) in a room or lecture theatre.

Uncoupling the two constant variables that have dominated learning and teaching requires a significant rethink and understanding of where and how learning occurs (Beetham and Sharpe, 2020). To begin, it implies that learning can occur at any time and any place. Perhaps a critical question to ask at this juncture is at what times and what places/spaces. Central to this argument is the fact that educational institutions no longer have control over this process—for a change students do. The contexts where learning and teaching occurred changed overnight during the emergency remote online teaching phase—off-campus and into the informal spaces students dwell in—including the cultural, social, digital and temporal spaces (Bachmair & Pachler, 2014). This change significantly impacts the type of content that is traditionally created by the teacher for the students, the learning tasks and activities, assessment and learning scaffolds. Agreeing with this, Beetham, Newmen and Knight (2019) state that when digital technologies are effectively integrated into the design of the course and facilitation processes, it enables independent learning and allows the students 'to fit learning into their life more easily' (p. 13). With increased learner autonomy in the process, the students are able to drive and determine their own learning path and processes (Hase and Kenyon, 2000), find true-collaborators to scaffold their learning and learn in authentic contexts (Narayan, Herrington and Cochrane, 2019).

Another significant rethink that is required when space and time are uncoupled is the role of the learning environment (Holland, 2019). A consistent ingredient ever-present in higher education is the use of a learning management system (LMS). While in a formal learning environment, effective use of an LMS may complement learning, Luckin (2008) suggests an alternative learner-centric ecology of resources model (EoR) to scaffold learning in student spaces. Luckin espouses an EoR as a collection of people (knowledgeable others), resources (technology, books, digital resources, the library, etc.) and environment (cultural, social, digital and temporal), where the learner's interactions between the three elements create a context for the student to create new meaning and knowledge. An EoR is not a static collection of people, resources and environment rather an on-demand ecology that the learner might create to inform the learning process—it is dynamic, collaborative, social and changes according to the needs for the learner. The following section discusses how the mobile EoR was created as part of the Mobile learning SIG.

Methodology

The idea for a teaching and learning resource comprised of research-informed practical strategies to leverage the unique affordances of mobile devices to respond to the enormity of challenges to upskilling academic staff in their rapid shift to online learning drew upon several activities that the SIG engaged with over a number of weeks through their weekly webinar series. The weekly webinars discussed a range of emerging current topics, two-minute tips, and presentations of best practice from invited guests. Some of the resources that the SIG drew upon for discussions included recently published practical guides for Web 2 (Bower & Torrington, 2020), facilitating open book exams (Deneen, 2020), designing authentic mobile learning (Cochrane, 2020), JISC reports (Newman, Beetham, & Knight, 2019), and a guest presentation calling for capitalising on opportunity within chaos (Blaschke, 2020). The SIG chose Padlet as a rapid development platform to co-create a mobile learning ecology of resources guide. Over two weeks the SIG collaborated to create and curate this guide both synchronously via Zoom, and asynchronously and involved critical SIG member reflections on practice and on their research in mobile learning.

As summarised in Figure 1 the co-created [Padlet](#) resource was structured around several key themes brainstormed by the SIG members. The Padlet drew upon the SIG expertise in various discipline contexts and knowledge of the literature, illustrated by a range of best practice ideas and resources collated under these central themes.
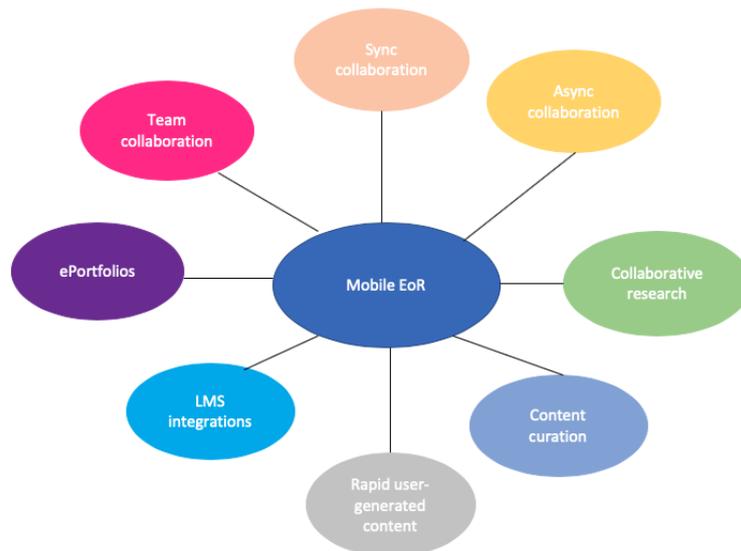
Figure 1: Summary of key themes for A Mobile Ecology Of Resources (EoR) during the Covid-19 crisis

The key themes were structured around the authentic use of mobile learning, focusing upon the learning and teaching strategies enabled by the unique affordances of mobile devices, with a focus upon moving beyond substitution of pedagogical practice on a mobile platform to redefining the pedagogical possibilities afforded by mobile learning (Puentedura, 2010). The themes and tools are discussed in the section below.

Discussion

Socio-cultural pedagogies dating back to Dewey (1916) have advocated collaboration, communication and co-creation as effective pedagogical strategies. It placed students at the centre of the learning process and as main agents in creating knowledge and meaning through interaction in multiple contexts. Pre-Covid, there was perhaps no catalyst of this magnitude in academia to meet the students in their world. Covid-19 imposed significant limitations in a very short timeframe and in many instances created knowledge gaps that simply could not be attended to. The mobile EoR created by the SIG members based on reflections on their teaching, expertise, support strategies and research highlights three elements critical for designing and facilitating learning using mobile devices in student spaces. (1) Collaboration at an individual, group and class level including the ability to connect with others beyond peers and teachers synchronously and asynchronously. (2) The ability to create, capture, co-create and curate content for use in the learning process and (3) easy access to critical information and content. Central to the three elements is the role of mobile devices, its affordances and the app (application) ecology that support different types of engagement and learner actions in informal contexts. The different affordances act as mediators for establishing and encouraging interactions in the EoR between people, resources and environment (Bachmair & Pachler, 2014). Drawn from the Mobile EoR PADLET Table 1 provides an overview of three categories, mobile applications and how it may be implemented in learning and teaching during Covid-19.

Table 1: The EoR, affordances, tools and implementation

Category	Affordances	Applications	Implementation
Collaboration	Team collaboration	Slack, MS Teams, Trello	- Establish a learner community. - Encourage students to share resources, ideas and their work. - Create group learning tasks and projects.

	Synchronous collaboration	Zoom and other video live streaming tools, Teams chat, Blackboard Collaborate	- Utilise the time to create social presence embedded in collaborative learning principles. - Provide scaffolding and support.
	Asynchronous collaboration	Twitter, WhatsApp, Yammer, Flipgrid, Padlet	- Establish a learner community. - Create learning tasks that enable communication and co-creation between students and knowledgeable others. - Create tasks that students can complete at their own time and pace. - Encourage students to create organic groups for social and learning purposes.
	Research collaboration	ResearchGate, Mendeley, academia.edu	Create opportunities to share knowledge and resources that might benefit others in class.
Create, curate and capture	ePortfolio Apps	Behance, WordPress, PebblePad, Padlet, LinkedIn	- Embed an ongoing semester-long assessment in the course. - Encourage students to curate data and content as part of their learning. - Help students establish a professional online identity. - Facilitate reflective learning.
	Rapid user-generated content	Video mobile apps, Adobe Creative Mobile Suite, Filmic Pro, Audio recording apps	- Allow students to experiment with their knowledge in real-world contexts (or equivalent). - Encourage students to capture multimedia content as part of their learning journey. - Create tasks that require students to co-create content and meaning together.
	Content curation	RSS - Flipboard, code sharing - GitHub, simple web content - Google Sites, Padlet	- Integrate open educational resources in your teaching. - Encourage students to share and collect learning resources for the web. - Encourage open learning—knowledge is everywhere, it is a matter of where and how you seek it. - Encourage tagging for resources at a class level.
Access to content and information	LMS Interaction	LMS mobile apps, Quitch, polling apps, quiz apps	- Provide easy access to information and learning resources. - Create formative assessments. - Provide timely, supportive and constructive feedback.

Conclusions

This concise paper provides a conceptual framework and guidance for implementing mobile learning that is informed by research and reflections on teaching practice from members of the ASCILITE Mobile SIG. Covid-19 took from academia elements that were prized and had been refined over many years—the affordances of being on campus. It proposed a new challenge to teachers, for some almost overnight, to venture into uncharted territory going beyond physical institutional barriers and into the student world. It created serious adversities for teachers and students alike, but it also created an unprecedented opportunity to look at learning from a student's perspective and from the world they live in. For the SIG, it provided an opportunity to understand and analyse in a very short time frame strategies for using the one device the students have with them constantly that can be utilized for learning and teaching. Not just the device but also investigate the different contexts the learners live and dwell in and how it could be used for facilitating authentic and learner-determined learning experiences. As a result, the mobile ecology of resources for teaching during Covid-19 is provided (Figure 1) along with guiding principles (Table 1).

Limitations and implications

The paper discusses a small number of mobile applications and affordances as an ecology of resources that could be used for Covid-19 learning and teaching. It provides a snapshot of some of the emergent mobile pedagogies and tools during the early-mid (March-August) Covid-19 phase that are still evolving at a rapid rate.

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