It takes a village: Supporting the integration of digital textbooks in higher education

Debborah Smith
Bond University

Digital textbooks now incorporate various technological enhancements, and offer many opportunities for learning and teaching in higher education. Despite some enthusiasm for this medium, lecturers tend not to integrate the extra activities into their courses preferring instead to simply have them available as optional extra activities for students. One reason for this barrier to use is the time and effort required to integrate technology into the curriculum in a meaningful way, and lecturers may feel they lack the necessary knowledge to do this effectively. Despite the existence of institutional support to assist educators with technology enhanced learning, the services don't always align with what faculty want or need. As a result, there have been calls to improve staff training and professional development. This paper presents a theorised inquiry into educators' reflections on the integration of digital textbooks using Mishra & Koehler's TPACK framework as an underpinning theory. The findings suggest the need for training and support that is individualised to instructors' specific needs, and allows for increased collaboration between various stakeholders. It is concluded that professional development that focusses on the development of TPACK, and operates within a collaborative and context-specific learning community could support the increased uptake of digital textbooks in higher education.

Introduction

In 1923, noted educational psychologist Edward Thorndike commented that "If by a miracle of mechanical ingenuity, a book could be so arranged that only to him who had done what was directed on page one would page two become visible, and so on, much that now requires personal instruction could be managed by print" (p.165). This 'book' once imagined by Thorndike now exists in the form of an enhanced digital textbook that incorporates learning analytics and adaptive technology which allow for customised program adjustments to be made based on individual students' demonstrated mastery of skills and knowledge as they progress through content. Even without the inclusion of these sophisticated adaptive technologies, digital textbooks can incorporate various enhancements (Dobler, 2015), and consequently offer many advantages over the traditional print textbook to both students and teachers (Hallam, 2012). The affordances of digital textbooks support new and emerging pedagogies (Sharples et al, 2012). Adapting to these new pedagogies and effectively using digital resources including digital textbooks requires lecturers to possess complex skills and capabilities (Gaffney, 2010), but teachers' anxieties about their level of digital skills could create barriers to the adoption of digital textbooks (Hallam, 2012). On the other hand, if a top down approach is taken by the institution, and faculty are mandated for example to use adaptive learning technologies without consideration of how they fit in with curriculum or desired learning outcomes, there may be a considerable risk to student learning outcomes (Johnson et al, 2016, p.28). To overcome this, ongoing professional development is imperative ("Internet2 Textbook Spring 2012 Pilot Report", 2012). Providing support to faculty to assist them with the instructional integration of information technology and to optimise the use of technology in teaching and learning was highlighted as "an enduring theme in the top 10 IT issues in higher education" in a report from the Educause Center for Analysis and Research (Dahlstrom, 2015, p.3). This report also suggested that the current institutional support may not meet the instructional needs of the lecturers, particularly with respect to less widely used technologies such as digital textbooks. This paper examines lecturers' use of digital textbooks in higher education within the broader context of educational technologies. It will explore the scope for broader institutional support to assist individual educators more effectively integrate digital textbooks.

Definitions

Digital textbooks: The basic understanding of a digital textbook is consistent with Hamilton's definition of a textbook: "a book that has been consciously designed and organised to serve the ends of schooling" (1990, p. 1). This understanding of a textbook presumes that the

organisation and design of the content reflects pedagogical principles and aims. Applying this definition to the digital context, digital textbooks are a subset of the eBook format that are written for students, cover core course content, and published for use by educational institutions (UQ Library, n.d.), and can be "conceived as a platform for learning that combines e-learning and publishing technologies, and serves as a dynamic and interactive reading material, and as an interface for learning activities among learners and learner communities." (Gu, Wu, & Xu, 2015, p.26). Digital textbooks are also referred to as 'etextbooks', 'electronic textbooks' and 'eTextbooks' in the current literature, and these terms may be retained to reflect the wording of the original source, and considered to be synonymous.

Adoption: In the user acceptance literature, adoption is generally defined using Rogers' (2003) definition which is the decision to make "full use of an innovation as the best course of action available" (p.177). As will be seen, this definition may not completely apply to digital textbooks as there are varying levels and extent of use that occur. Therefore, this paper will refer to 'adoption' as the decision to use a digital textbook, and 'use' refers to the extent that the features are exploited.

Literature review

Educational publishers have been steadily increasing their offerings of digital resources including digital textbooks. Until recently, digital textbooks tended to be simply digital equivalents of printed books. There is now an increasing trend for digital textbooks to be born digital (UQ library, n.d.), and digital textbooks have become more sophisticated with the addition of interactive features including hypertext, video, audio, 3D models, and social sharing capabilities (Dobler, 2015). Another popular e-learning product is the 'whole course solution' (Hallam, 2012), an online program which integrates multimedia, online quizzes, collaboration tools, and personalised learning paths driven by analytics (Johnson et al., 2016). A consequence of the availability of these various products is that the boundaries of the definition of a digital textbook are becoming increasingly blurred as the line between digital textbooks and other digital products becomes less distinct (Hallam, 2012).

Early predictions of a widespread uptake of digital textbooks has not occurred to the extent that was initially predicted (Gu, Wu, & Xu, 2015). Various barriers to the adoption of digital textbooks have been noted, most commonly is an enduring preference for print (Baron, 2015). MacFayden (2011, pp. 2-3) posits that "people try to fit the experience of digital reading into mental models derived from print culture" and "the way users understand and describe their experiences of reading on digital devices are shaped by well-established cultural expectations about the abstract as well as the physical

affordances of the print book". This could be explained by the notion of functional fixedness, which explains how users perceive the relative advantage of an innovation according to a cognitive bias that limits them to using an object only in the way it is traditionally or habitually used (Eysenck, 2001). So, in this instance the functions of the digital textbook are perceived to be the same as the printed book, namely providing text-based content, only with the additional function that the digital version can be read on an electronic device. However, as digital textbooks move beyond simply being containers for text-based content, the reading and research practices associated with print books are superseded. Functional fixedness can impede creative uses of technology, so the affordances and constraints of the new medium need to be recognised (Koehler & Mishra, 2008).

It is important to consider digital textbooks within the wider educational technology landscape to better understand factors and beliefs that can create barriers to their adoption and use caused by the challenge of pedagogical integration. Digital textbooks are a digital tool, but are also characterised by the inclusion of numerous technological features. Using any educational technology effectively requires a certain level of digital fluency (Johnson, Adams, Becker, Estrada, & Freeman, 2014). In both the 2016 and 2017 editions of the *NMC Horizon Report, Higher Education edition*, improving digital fluency was cited as a significant challenge impeding the adoption of technology in higher education (Johnson et al., 2016; Adams et al., 2017). Furthermore, there are increased demands on educators using technology who must now assume new roles as part of their teaching. The 2017 *Horizon Report* also highlighted the changing roles of educators in the new era of technology-enabled approaches, and explains that teachers are expected to take on multiple responsibilities including employing various technologies, engaging in the online space, and leveraging active learning methodologies. They are also tasked with ensuring that students have the necessary competencies to use technology effectively. It cannot be assumed that students know how to engage with technology the way teachers require them to (Hallam, 2012). They have to be provided with explicit instruction even for the use of electronic texts (Dobler, 2015). Consequently, teachers must now think like designers (Goodyear, 2010), and act as guides and facilitators (Adams et al, 2017).

Many faculty believe that if they were more skilled at integrating technologies into their teaching they would be more effective instructors (Dahlstrom, 2015), but institutional support practices don't always align with what faculty want or need. It has been argued that staff training needs to be improved (Johnson et al., 2014). Jones (2008) outlines challenges associated with implementing online learning and teaching including a lack of professional development and institutional

constraints, which encompasses management's lack of support and understanding of resource implications. This is especially pertinent in the case where educators may want to incorporate less widely used technologies into their teaching. For example, data from Educause shows that while over 50% of faculty believed they could be more effective with etextbooks, only 20% of the institutions provide support for this technology (Dahlstrom, 2015).

The effective use of educational technologies that emphasise pedagogy within the curriculum is largely facilitated through comprehensive staff development and support (Lefoe, Olney, Wright, & Herrington, 2009). Research has identified different ways that staff can be supported including individualised training, a focus on how to use the technologies, and the utilisation of peer support (Jones, 2008). Lefoe et al. advocate a social constructivist approach that fosters collaboration as an effective framework for professional development in this space. They noted the benefits of staff training that occurs within communities of practice in which individuals share and co-construct knowledge through a process of mutual engagement and joint endeavour. It is generally agreed that training staff in technology skills in isolation of the teaching context is ill-suited to developing teachers' capabilities in the effective use of technology for pedagogy because "knowing how to use a technology is not the same as knowing how to teach with it" (Mishra & Koehler, 2006, p.1033). Therefore, staff training and professional development efforts need to consider the complexity of knowledge necessary for successful integration.

TPACK framework

A useful theoretical perspective that emphasises a designed-based approach to teaching, and clarifies the nature of the complex knowledge required in order to effectively integrate technology into pedagogy can be explained by the Technological, Pedagogical Content Knowledge (TPACK) framework developed by Mishra and Koehler in 2006 (Koehler & Mishra, 2008). As illustrated in Figure 1, the framework contains three components of teachers' knowledge: content knowledge, the knowledge of the subject matter to be taught or learned; pedagogical knowledge, the deep knowledge of processes and practices of teaching and learning; and technology knowledge, knowledge about using and working with technology. While each type of knowledge is important, more critical are the interactions of these components. Pedagogical content knowledge concerns the transformation of subject matter for teaching; technological knowledge refers to the understanding of the manner in which technology and content influence and constrain one another; and technological pedagogical knowledge is the knowledge of how teaching and learning can change when particular technologies are used in certain ways. Emerging from an understanding of all these

interactions is TPACK, a complex knowledge which the authors maintain is the basis of successful teaching with technology (Koehler & Mishra, 2009).
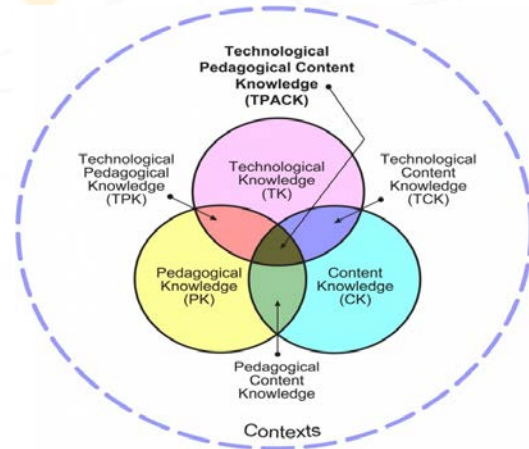

Figure 1: TPACK framework and its knowledge components
(Source: Koehler & Mishra, 2009, p.63)

Effective teaching is dependent on achieving a dynamic equilibrium between all three components, but a range of factors influence these connections. Not least of all is the fundamental understanding of technology (TK). This component is difficult to define because innovations evolve. Unlike traditional pedagogical technologies such as pencils and microscopes, which are characterised by specificity, transparency and stability, digital technologies are protean, unstable and opaque, all of which create challenges to teachers wishing to integrate these technologies into their teaching (Koehler & Mishra, 2008). This framework is designed to capture the essential qualities of teacher knowledge required for integrating technology into teaching (Gaffney, 2010), and can contribute to the professional development of educators and the creation of better learning environments (Koehler & Mishra, 2008).

Developing individual TPACK is challenging. Stover and Veres (2013) argue that professional development programs tend to be bifurcated in that they address these different types of knowledge separately rather than emphasising the interrelationship between them; therefore, the use of the TPACK framework in the design of technology professional development programs for teachers is important. Stovers and Veres (2103) report on an action research study in which they observed self-reported learning gains in TPACK of a group of graduate students enrolled in an online university certificate program in Instructional Design in Online Learning. Based on their findings, they recommend partnerships and learning communities which can bring together specialists in each of these domains to assist in the development of this knowledge. In a study by Jones, Heffernan and Albion (2015), six educators shared their experiences of

attempting to effectively integrate technology into the online education of pre-service teachers on a group blog. After analysing the blog posts, it was found that the opportunity to engage in meaningful discussion with colleagues in the same context enhanced TPACK. The authors concluded that "situated collaborations helped overcome the limitations of organisational practices and technologies that were not always well suited to our context and aims" (p.19), and that there are significant limits to what teacher educators can achieve alone as TPACK is distributed across the individual, other persons, and tools, further supporting the argument for collaboration (Lefoe, Olney, Wright, & Herrington, 2009).

It is therefore considered that professional development which focuses on the development of TPACK and operates within a collaborative and context-specific learning community could support the increased uptake of digital textbooks. To explore this further, this paper will present a theorised inquiry into educators' reflections on the integration of digital textbooks. The inquiry is guided by the following questions:

- How do higher education teachers use digital textbooks?
- What challenges and barriers do higher education teachers encounter when using digital textbooks?
- What challenges and barriers do higher education teachers encounter when integrating technology into their teaching?
- How does the level of available professional support assist educators in integrating digital textbook and other technologies into their teaching in the higher education context?

Overview of the study

This paper is derived from a PhD project which has an overall goal of investigating higher education teachers' responses to technological innovation by inquiring into lecturers' motivations for using or not using digital textbooks, and collecting case descriptions of the ways in which educators use digital textbooks for learning and teaching. A qualitative approach was taken in order to gain deep insights into the individual experiences (Grbich, 2012). Data were collected through semi-structured interviews conducted between October 2015 and June 2016 with 17 lecturers teaching in various disciplines at four different types of Australian universities, based on categories from the Australian Education Network (2014). All participants except one were subject coordinators and had autonomy in choosing subject resources. Experience teaching in higher education ranged from 3 to more than 25 years. An overview of the participants is shown in Table 1.

Table 1: Summary of participants

Independent NFP university n=6 3 female 3 male	Group of 8 n=7 6 female 1 male	Regional n=2 1 female 1 male	Australian Technology Network n=2 1 female 1 male
Law Linguistics Australian Studies Communications Planning & Urban Design History	Spanish (2) History Public Relations Chemistry Biochemistry Biology	Physical Education Early Childhood Education	Planning & Urban Design Information Studies

A combination of sampling techniques was used. Initially, convenience sampling was used to recruit participants from the researcher's professional contacts at the different institutions. Thereafter, snowball sampling occurred as interviewees often recommended other colleagues they believed would have interesting contributions to make to the research project.

Research interviews are professional conversations "with a purpose of obtaining descriptions of the life world of the interviewee in order to interpret the meaning of the described phenomena" (Kvale, 2009, p.3). Throughout the interviews, which were approximately one hour long, lecturers were encouraged to discuss an array of issues associated with their teaching and use of technology, including digital textbooks. The same basic topics were pursued in each interview with participants asked for example to describe how they might use technology in their teaching, the benefits and challenges of integrating educational technology, their use of textbooks, and their understanding and perceptions of digital textbooks. By maintaining a semi-structured approach, there was scope to elucidate any emerging themes more fully (Patton, 2002). The interviews were transcribed verbatim, returned to the interviewees for verification, then coded both manually and with MAXQDA software following guidelines for coding and analysis set out by Miles, Huberman and Saldaña (2014). Emergent themes were then identified.

Results

This section presents a summary of findings that emerged from the interview data, and a selection of pertinent interviewee quotes to illustrate lecturers' perspectives on the understanding and use of digital textbooks, challenges and barriers to the adoption of digital textbooks, challenges and barriers to integrating technology into teaching, and the available support. To ensure anonymity, the interviewees are referred to by the codes L1-L17.

Understanding and use of digital textbooks

The understanding of what a digital textbook is varies amongst lecturers, and these different understandings can be seen to influence expectations and use of the digital textbooks. At the simplest level, digital books and print books are understood to co-exist as alternatives of the same product in terms of providing access to text-based content, thus reflecting a narrow understanding of a digital book.

> "Basically a book on a computer. That's what I would see it as. Is that a limited view now?" (L2)

While a number of the lecturers in the study had no knowledge of whether an electronic version of a prescribed or recommended text was available, they were not averse to students accessing an electronic version if it were available. *"I don't care if they buy it that way, I usually give them different possibilities"* (L4). In some instances, students were directed towards the digital version of a textbook for reasons of convenience or for cost, but ultimately the choice of medium remains optional. Students are often provided with links to digital books, or chapters, which are part of the recommended reading for their courses.

There is an increasing trend for publishers to provide a companion website as part of a textbook subscription package that offers extra resources including audiovisual content and interactive quizzes for use by both teachers and students, and which some of the lecturers suggested may be considered to be digital textbooks. Seven of the lecturers interviewed used these products, and for one, this was actually the reason for choosing that particular textbook as she was attracted to the availability of supplementary resources. In several instances, lecturers integrated some of the activities into the course, but for the most part, there was a tendency to just recommend them to students as optional resources, even though they were generally perceived to be of value.

Several of the lecturers were aware of the more sophisticated forms of digital textbooks as expressed in this definition of a digital textbook: *"My understanding of the term digital textbooks is that they are eBooks but they have a whole bunch of other content built into them. So they've often got extra activities for the students to do, and I guess they're for a particular topic, an introduction to accounting type set of content with I guess the additional resources that you would expect to get in a print textbook as opposed to a print monograph"* (L7).

One lecturer was using a textbook available only in e-format, and another at the time of the interview was preparing to switch the first-year subject from a book plus web companion site, to a total adoption and integration of an online textbook.

Challenges and barriers to the adoption of digital textbooks

Four main challenges and potential barriers to the adoption of digital textbooks were evident: a preference for print, perceived lack of value for learning, lack of availability of high quality digital textbooks, and the multiple platforms upon which they operate. It should be noted that challenges are not always barriers, and there is a complex relationship between the various factors which will be discussed briefly.

Many of the lecturers expressed a strong preference for reading in print; thus, for a reading experience, print books are generally preferred to digital books. Print is perceived to be more conducive to established academic reading practices such as skimming, annotating and extended reading of complex material. There were also concerns about screen fatigue. The following comments illustrate these perspectives.

> *"To me, the thought of reading a chapter of a book online makes me sick. I just wouldn't do it. Even though I'm an environmentalist, I'd still print it. I'd print it two per page, and double sided, like I do with everything. But I'd still print it. I hate reading online, can't stand it."* (L6)

> *"There is something about reading a hard copy document of any kind where you can cast your eye over more pages in hard copy, and if you have developed that capacity to scan and to absorb, not necessarily the detail but the general gist of things, that is a lot harder to do with the digital documents."* (L3)

> *"The tangible book is really important at times, to be able to scribble in and dog ear, and bastardise you know?"* (L9)

However, a personal preference for print does not necessarily translate to being a barrier to the adoption of digital textbooks in this study. Even those lecturers who expressed a strong preference for print were not resistant to students using an ebook as an alternative. In some instances, it was in fact encouraged as it was felt that facilitating students' access to texts by providing links to electronic readings on course reading lists may increase the likelihood of them reading required and recommended texts.

For others though, there is an understanding that ebooks and print books can offer different experiences as expressed in these comments from L1:

> *"I think that people do what I did for years, just download it and read a book, but it's not a book, it's an ebook. So, you can do a million things with it. It's in my view a totally new skill, a new*

reading skill, a new multi-digital reading skill that you need to know that if you click this you go there, and you can read this, or you can watch a movie that goes with it, or you can use an advertisement that goes with that. It's a completely different experience."

"I love that idea that it [a digital textbook] provides that overall experience the audio, visual, that is not just the presenting of the content, of the area of expertise…it's almost like a teaching tool."

Availability of good quality digital textbooks in particular subject areas is considered to be a barrier, as a number of lecturers expressed their disappointment with products currently available.

"I guess my responses are probably coloured by the fact that there aren't a lot of great e-textbooks….And the market's just stuffed. The e-book market in general, publishers can do whatever they want. And the suppliers can do whatever they want. And the thing is it's not even like they're supplying a good experience. The platforms are hideous. They're awful." (L7)

Digital textbooks currently operate on multiple platforms and this is also considered to be a barrier, particularly if there is a lack of seamless integration with the learning management system (typically Blackboard). In the following quote from one interview, the lecturer talks about what she believed to be a superior digital textbook to that which they were currently using, but which after consideration they decided not to adopt. This decision was based on several reasons including the need for students to negotiate another platform.

"In the end I think we decided, because we've got our sort of more interactive online learning which we do, that we'd leave it at that because otherwise it's another platform that they've got to learn. And that's I guess one thing which we hadn't foreseen going to an e-textbook, is that for the students, some of them have a lot of trouble getting their heads around the fact that we have a course website, we have a textbook website, we have an online learning website and they have a lot of trouble assimilating all the different things, the different platforms they need to use. Which is something we didn't foresee them struggling with, but some of them do." (L13)

There is certainly evidence of enthusiasm for digital textbooks, but there remains limited integration of their features. For many of the lecturers, digital textbooks and textbook companion websites contribute to their pool of resources, which can be drawn upon as required. For others, the resources are optional for those students who

may need the extra help, or are driven to engage more fully with the content. Lecturers are very cognisant of the demands on students and are mindful of not increasing their burden by requiring them to undertake the extra activities in digital textbooks, particularly with activities that are not directly connected to assessment. While this is not a factor in the decision to adopt a digital textbook, it certainly impacts on how it is used, and the extent to which it is incorporated into the course.

"This course is already really packed. And it's a big course. It is content-heavy, but it's also conceptually difficult…And as soon as you start setting more online resources they start to panic and you're starting to push them to the point where they start to go, "is this examinable?" (L11)

"that will overload the students with time… we have to integrate those things and give them real value. If you want to watch a film, you can do it anytime, students can watch it on their phone whatever. There has to be a good reason to watch the video or the film." (L12)

Challenges and barriers to integrating technology

Besides the barriers specifically connected to digital textbooks, a number of challenges to the adoption of technology were highlighted through the interviews which could be applicable to the adoption of digital textbooks. Lecturers often expressed a lack of confidence in their skills with using technology.

"I'm not a digital native and I'm not overly confident with technology" (L17)

"frustrating because I'm not actually a technology whiz," (L3)

At the same time, lecturers also felt they were simply expected to know how to use technology.

"sometimes I feel like being an academic they expect us to be able to do everything, and to be honest I used to be much better at technology than I am now, and that's mainly because I don't have time to learn it." (L13)

"In the last five years or so there is an expectation that staff are on top of it., that teachers are supposed to stay ahead of technology" (L17)

A strong finding from this study was that lecturers avoid gratuitous adoption and use of technology. Lecturers are discerning in their choice of learning resources and a strong barrier to the adoption and use of any technology is the belief that it lacks a clear learning and teaching purpose. If a resource is judged to be inferior or

inappropriate in terms of the content, potential learning outcomes, or student experience, lecturers will not use it.

> "The one thing I'm a bit concerned about is that we've got to be a little bit careful not to use technology for technology's sake" (L13)

> "I am not going to [use technology] if it doesn't fit" (L2)

> "I am very conscious that I'm not just going to jump on a bandwagon. Only if I can see the definite benefits for both myself and the students will I jump on and give it a shot" (L6)

> "I think you can over-technocise-Is that a word?" (L17)

> "my philosophy is that I won't put anything in just because it's groovy, funky or popular. …I wouldn't do it unless I know the students are benefitting and learning, so there has to be some sort of learning gain. So I always evaluate to see if there is, and I think if there isn't you've got to question is it really adding value to the learning?" (L14)

It was also noted that it is erroneous to assume that students have the necessary skills to use the technology to effectively leverage their learning opportunities. Even though students can appear to be comfortable with the technology, it was observed that they do not always use the tools in the way the lecturer intended.

> *"But the thing about technology is that although we might be engaging with it, the engagement of the students isn't necessarily in the same direction or at the same level."* (L10)

> *"I think a lot of students will use digital textbooks because they are cheaper, but sometimes it takes me to show them what they can actually do with it…I think what is really needed I believe is training yet again- how to use ebooks. And I think how to use ebooks for both teachers and students as well because I don't think people know how to use them really."* (L1)

However, providing this training and support creates another dimension to the educator's role.

"We're very much now more aware that we have to provide multiple ways of accessing the tools that we're using, and if a student can't access something we're using as part of assessment, they can contact us and we will troubleshoot with them until they can. That's a new layer to what we do in teaching I think." (L14)

The interviews revealed a widespread understanding that technology needs to be carefully integrated in a structured and meaningful way, which can create challenges.

> *"Technology's got to be sequenced and structured. Like all good teaching, it's got to fit in with it, you can't just plonk it in"* (L10)

> *"You know that as long as you're organised, and you're not just rocking up to class and throwing on a bunch of videos. As long as you've thought about the learning outcomes, and you've thought about how to create a nice reflective environment after you've showed the resource, then I don't think there's any risk"* (L6)

> *"I think that the challenges are of course the combination of the two, actually of the three in my mind- so it's the combination of technology, pedagogy and the content. So what do we teach, how do we teach it, and what sort of technology we can use to do it?"* (L1)

Effective integration of technology requires a significant time input at all levels: staying abreast of technological developments, choosing the most appropriate tool for the desired outcome, learning how to use the technology, and setting up the technology, all of which may involve changes to the curriculum.

> *"It's time. And expertise in the sense that we're very willing to learn, but I think in a sense that finding the right platform or tools because it's very specific to a context and I think that's the thing. So we know in our heads as academics what we want to achieve and how we think our students will do it. I think probably at the cross-institutional level they're very aware of the tools and how they can be helpful, but the connection between the coalface and the imagination is a different thing, and I think the hurdles generally come from that because it is about time, availability of people".* (L14)

While time was the most frequently mentioned challenge in the interviews, it was not always a barrier. If lecturers believed that a particular technology could create learning opportunities, they were prepared to invest whatever time it took to incorporate it. Thus, perceived learning outcomes were seen to mitigate time and effort as a barrier.

Supporting lecturers' use of technology

The availability of institutional support was acknowledged by the interviewees, although many of them reported not accessing it because they either preferred to work out the technologies themselves, or there were limitations to the support available. It can be difficult for academics to identify and locate the key people who can offer the support required: *"The support is out there, it's just knowing where to go for it"* (L9) and *"We struggled to actually identify who we needed to support going on to our online course. We knew we had the content, we were*

over that, but what's the best way to turn that into something useful for online learning?" (L14). Sometimes the extent of support available may be limited and cannot meet the needs of the educator. *"But again the practicality of it is that you get there and it's, "Oh yeah we can help you with this little bit but not that bit", or "We can show you how to use the equipment but then you've got to do it yourself"*. (L13). Several of the lecturers use technologies that are not commonplace in educational practice, and there may not be the necessary support available in the institution. This means that lecturers are often working in relative isolation, learning how to better use technologies for their own individual purposes.

It was also noted that there are different types of support required for effectively integrating technologies: technical assistance, assistance with design, and pedagogical support.

> *"So there's the pedagogical help for the underpinning reason for doing what you're doing, and that's really necessary. So we've got a group of people that will help with that. And then you've got the help about setting up your study desk, making it look aesthetically pleasing."* (L9)

> *"I think going forward we need more people who actually understand the technologies and uses for it to guide the people who are doing the teaching as to, don't just do this because it's new....different things are going to be appropriate for different types of teaching I think."* (L13)

One way this is achieved is through the use of teams of experts. Two of the lecturers spoke of the benefits of such teams.

> *"what I'm doing now, I could never do it on my own because you actually can't do it on your own. I believe that you need other people, you need to be part of a team."* (L1)

Despite acknowledging that institutions provide avenues for support, there were a number of comments made about how institutions could make improvements in this area. It was suggested that there is a need for increased collaboration between faculty, the provision of targeted support, and greater investment into support services.

> *"What we need is increased educational discourse around how we use the new technologies to facilitate that learning"* (L3)

> *"Where I see a need in the University is with coordination of e-learning efforts. So there's lots and lots of technology. There's lots of terrific technology. There's lots of terrific people doing terrific things. And most of them don't know*

about what the others are doing. So it's really, really fragmented. I think the students get overwhelmed by the technology opportunities that are out there, and the academics get overwhelmed by the technology opportunities. And the University gets overwhelmed in terms of supporting all the different technology opportunities" (L11)

> *"But there are ways that Universities could support this stuff to make it less time consuming. I don't need to be troubleshooting my own WordPress installations when I'm running a week-long gamification activity and spending the whole week plugging holes in the system. If there were options within Universities for different learning environments or learning tools that we could use and deploy and they were supported, then that stuff would be a lot easier."* (L7)

> *"I would like to see greater university resources directed toward the skills set development of teaching staff in my area particularly, so that we can stay ahead of the pack because to me teaching is constantly a balance between staying on top of the material and staying on top of the technology and both of them are full time jobs"* (L17)

> *"I think what we have to do is encourage fearlessness with technology rather than the skills, and that's very difficult,"* (L7)

With respect to digital textbooks, publishers have a vital role to play in providing support. This appears to be occurring to some extent as evidenced by lecturer E15, who at the time of the interview was preparing to fully integrate a digital textbook into a course she was responsible for. She spoke favourably of the support received from the publishing company and its representatives.

> *"they've been great, that's what I want to say, both the rep that deals with the orders, and the Tech Support. They both came to see me yesterday and we spent a good hour talking about things and the Tech support person was telling me that he can sit down with me once I have come up with my course outline with learning outcomes and learning objectives and so on, and he can guide me through some ideas. And the other rep said they also have some what they call best practice courses or gold standard courses, so the shell of what a really great course might look like on the Connect platform that I can have access to and borrow ideas from, even copy into my course some of the strategies they use an so on."* (L15)

Publishers may be able to contribute more to supporting educators in their use of digital resources in a rapidly changing space, as suggested by comments from L1.

> "the basic training materials should be produced by the publishers, and maybe administered at some level by the university. I have no idea whether there are trainings when I've adopted textbooks, but it would be nice because we buy these books, and because publishers know that we are adopting these books because you've contacted publishers for the desktop copy, or I talk to publishers and say this is what I'm interested in.. it would be great to get an email saying this textbook is available in the etextbook form, because I honestly can't keep up with it. Very often students tell me that particular books are available as ebooks…But it would be nice to get an email from the publishers saying 'Hey this is available in ebook form, and there's a series of videos that you can watch with ideas of how to use them, and what tools are attached to them, and what these tools actually do"

Discussion

The potential of digital textbooks

In the present study, it was found that some lecturers retain a narrow understanding of a digital textbook as an electronic version of a print book, and their expectations and use are based on their experience with the print medium, thus supporting the idea that cognitive bias based on prior experience can limit the use of new tools to established and traditional practices (Eysenck, 2001). There are however many lecturers who recognise the opportunities that digital textbooks offer, and are positive about this medium's potential for learning and teaching. While a number of the lecturers have decided to adopt them as a text for the course, they are rarely integrated. The raft of extra features, while acknowledged as being valuable, are often not used beyond being extra resources for those students who wish to engage further with the content. Knight (2015) argues that this kind of "bolt on effect" (Ellis & Goodyear, as cited in Knight), where digitalisation is used as a means of conveying textual information by simply bolting it on to existing course design, should be avoided. Instead he stresses that the potential and power of learning technologies should be harnessed to improve students' learning outcomes.

The applicability of the TPACK framework

Barriers often apply to the integration and use of digital textbooks rather than the decision to adopt them. There is a resistance to adapting existing curricula to incorporate digital textbooks in a way that optimises the learning opportunities they offer. One reason for this can be considered from the broader perspective of educational technology. Educators are aware that well-

considered integration is imperative and will not use technology gratuitously without a clear and distinct learning purpose. However, achieving this requires significant investments of time and complex skills and capabilities that lecturers often do not possess. "Fluency in the digital realm is more than just understanding how to use technology. Training must go beyond gaining isolated technology skills toward generating a deep understanding of digital environments, enabling intuitive adaptation to new contexts and co-creation of content with others" (Adams et al., 2017, p.2). One way to achieve this is through the enhancement of lecturers' technological, pedagogical and content knowledge, the complex knowledge that sits at the intersection of all three specific domains of knowledge as explained by the TPACK framework (Mishra & Koehler, 2006) Studies into the use of TPACK support its viability as a framework for informing professional development in the digital space.

Institutional support and a distributive view of TPACK

While it was widely acknowledged that support is available to assist with technology use in universities, the lecturers in this study tended not to take advantage of it because it was perceived to lack value and specificity for their individual needs, particularly for those employing less mainstream technologies, a situation also highlighted by the literature (Dahlstrom, 2015). As a result, the lecturers for the most part are working in isolation when integrating technology. Notable exceptions to this were the two lecturers who developed their online courses with a team of colleagues who contributed different expertise. It is unrealistic to expect that any individual can possess such highly complex knowledge appropriate to individual contexts (Stover & Veres, 2013). A distributive view of TPACK (Jones, Heffernan, & Albion, 2015) suggests the need for partnerships. Lefoe, Olney, Wright & Herrington (2009) advocate for a social constructivist approach to professional development fostering collaboration between various individuals with different expertise, and this is further supported by Jones, Heffernan & Albion (2015). Teams of experts could potentially save lecturers time, and result in more innovative approaches to teaching and learning in the digital space. Other stakeholders also contribute to this learning community (Dahlstrom, 2015). Institutional managers responsible for decisions concerning the provision of staff support and training also need to be involved. The existing support structures are possibly limited in their scope as they are not targeted to the individual needs of the lecturers. The Educause report (Dahlstrom, 2015) argues that training and support must be meaningful to staff, so rather than adopting a one size fits all approach, institutions should seek to understand faculty and student interest in particular educational technologies for which support may not be readily available, for example digital textbooks, so they can make

more informed decisions about investing in broader deployment of training services and support. Publishing companies also have a greater role to play in supporting lecturers adopting their digital textbooks and related resources.

"Technology and digital tools have become ubiquitous but they can be ineffective or dangerous when they are not integrated into the learning process in meaningful ways" (Adams et al., 2017, p.7). A lack of knowledge about how to effectively integrate digital textbooks into the curriculum, and a lack of relevant support to assist with this process may create barriers to their adoption and use in higher education. The findings of this study suggest that overcoming these potential barrier requires professional development and training that recognises the transformative potential of developing TPACK within a broader learning community.

Conclusion

Digital textbooks offer many opportunities in the new paradigms of learning and teaching in higher education which encompass online pedagogies. They can be distinguished from a print textbook as they offer a different experience, and this difference becomes more pronounced with the inclusion of advanced technologies such as adaptive learning capabilities. It is unrealistic and possibly risky to expect lecturers to have the necessary skills to effectively incorporate digital textbooks into the curriculum without appropriate training and support. Findings from this study together with a review of the literature suggest the need for institutional support that is individualised to instructors' needs, and allows for increased collaboration between various stakeholders. The TPACK framework could be useful in underpinning professional development efforts to support the effective integration of technology. By taking an approach that taps into the expertise of the broader group, there is the potential to develop the required knowledge and capabilities of the individual lecturers within a community of practice. Just as it takes a village to raise a child, so too does it take a village to support educators in optimising the learning opportunities of digital technologies including digital textbooks in higher education.

References

Adams Becker, S., Cummins, M., Davis, A., Freeman, A., Hall Giesinger, C., & Ananthanarayanan, V. (2017). *NMC Horizon Report: 2017 Higher Education Edition*. Austin, TX: The New Media Consortium.

Australian Education Network (2014). *Australian University Groupings.* Retrieved from http://www.australianuniversities.com.au/directory/australian-university-groupings/

Baron, N. (2015). *Words onscreen: The fate of reading in a digital world*. New York, NY: Oxford University Press.

Dahlstrom, E. (June, 2015). *Educational Technology and Faculty Development in Higher Education*. Research report. Louisville, CO: ECAR, Retrieved from http://www.educause.edu/ecar

Dobler, E. (2015). e-Textbooks: A personalized learning experience or a digital distraction? *Journal of Adolescent and Adult Literacy*, 58(6), 478-487. doi:10.10002/jaal.391

Eysenck, M.W. (2001). *Principles of cognitive psychology* (2nd ed.). Philadelphia, PA: Psychology Press.

Gaffney, M. (2010). *Enhancing teachers' take-up of digital content: Factors and design principles in technology adoption*. Retrieved from http://www.ndlrn.edu.au/verve/_resources/Enhancing_Teacher_Takeup_of_Digital_Content_Report.PDF

Goodyear, P. (2010). *Teaching as design. HERDSA Review of Higher Education*, 2. Retrieved from www.herdsa.org.au/herdsa-review-higher-education-vol-2/27-50

Grbich, C. (2013). *Qualitative data analysis: An introduction* (2nd ed.). London, England: Sage Publications.

Gu, X., Wu, B. & Xu, X. (2015). Design, development and learning in e-Textbooks: What we learned and where we are going. *Journal of Computer Education*, 2(1), 25-41. http://doi.org/10.1007/s40692-014-0023-9

Hallam, G. (September, 2012). *Briefing paper on eTextbooks and third party eLearning products and their implications for Australian university libraries*. Retrieved from http://www.caul.edu.au/content/upload/files/learning-teaching/eTextbook2012report.pdf

Hamilton, (July, 1990). What is a textbook?. *Paradigm, 3*. Retrieved from http://faculty.education.illinois.edu/westbury/paradigm/hamilton.html

Internet2 eTextbook Spring 2012 Pilot Report (August, 2012). Retrieved from http://www."Internet2".edu/netplus/econtent/docs/eText-Spring-2012-Pilot-Report.pdf

Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2014). *NMC Horizon Report: 2014 Higher Education Edition*. Austin, TX: The New Media Consortium.

Johnson, L., Adams Becker, S., Estrada, V., Freeman, A., & Hall, C. (2016). *NMC Horizon Report: 2016 Higher Education Edition*. Austin, TX: The New Media Consortium.

Jones, D., Heffernan, A., & Albion, P. (2015). TPACK as shared practice: Toward a research agenda. In L. Liu & D. Gibson (Eds.), *Research highlights in technology and teacher education 2015* (pp. 13–20). Waynesville, NC: AACE.

Jones, H. (2008). Pestering staff into online learning: An integrated plan for implementation. In *Hello! Where are you in the landscape of educational technology? Proceedings ascilite Melbourne 2008*. http://www.ascilite.org.au/conferences/melbourne08/procs/jones-h.pdf

Kvale, S. (2009). Interviews: Learning the craft of qualitative research interviewing (2nd ed.). Thousand Oaks, CA: Sage Publications.

Knight, B. A. (2015). Teachers' use of textbooks in the digital age. *Cogent Education*, 2(1), 1015812. https://doi.org/10.1080/2331186X.2015.1015812

Koehler, M.J. & Mishra, P. (2009). What is technological pedagogical content knowledge?. *Contemporary Issues in Technology and Teacher Education*, 9(1), 60-70.

Koehler, M.J. & Mishra, P. (2008). Introducing TPCK. In AACTE Committee on Innovation and Technology (Ed.). *Handbook of technological pedagogical content knowledge (TPCK) for educators*. New York, NY: Routledge.

Lefoe, G.E., Olney, I. W., Wright, R., & Herrington, A. (2009). Faculty development for new technologies: Putting mobile learning in the hands of the teachers. *University of Wollongong Research Online*. Retrieved from http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1078&context=edupapers

MacFayden, H. (2011). The reader's devices: The affordances of Ebook readers. *Dalhousie Journal of Interdisciplinary Management*, 7 (Spring). Retrieved from http://dalspace.library.dal.ca/bitstream/handle/10222/13823/MacFadyen%20-0The%20Reader%E2%80%99s%20Devices.pdf?sequence=1

Miles, M. B., Huberman, A.M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Mishra, P. & Koehler, M.J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.

Patton, M.Q. (2002). Qualitative research and evaluation methods (3rd ed.). Thousand Oaks, CA: Sage Publications.

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: The Free Press.

Sharples, M., McAndrew, P., Weller, M., Ferguson, R., FitzGerald, E., Hirst, T., Mor, Y., Gaved, M., & Whitelock, D. (2012). *Innovating Pedagogy 2012: Open University Innovation Report 1*. Milton Keynes: The Open University. Retrieved from http://www.open.ac.uk/iet/main/sites/www.open.ac.uk.iet.main/files/files/ecms/web-content/Innovating_Pedagogy_report_July_2012.pdf

Stover, S. & Veres, M. (2013). TPACK in higher education: Using the TPACK framework for professional development. *Global Education Journal*, 10(1), 93-110.

UQ Library (n.d.). *eTextbooks for courses*. Retrieved from https://web.library.uq.edu.au/library-services/teaching-staff/etextbooks-courses#diff

Note: All published papers are refereed, having undergone a double-blind peer-review process.