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Preface

Transactions on Mobile Learning presents articles by mobile learning researchers and scholars from Australia, Aotearoa and our region of the world. It is an annual, peer-reviewed journal published by anzMLearn, the Australian and New Zealand Mobile Learning Group. anzMLearn was founded in 2009 at our first Mobile Learning Research Workshop when Professor Agnes Kukulska-Hulme of the Open University in the United Kingdom visited UTS and was our keynote speaker. The journal is available as an open-access online journal from the anzMLearn website:

http://research.it.uts.edu.au/tedd/anzmlearn/publications.

The primary mission of the journal is to provide a forum for anzMLearn members to share their research findings, experience and insights into mobile learning and the development of sound pedagogical practice around mobile technology. Educational environments vary across the world and *Transactions on Mobile Learning* creates a means for developing a body of knowledge that is truly applicable to our local context. How might we define that context? Certainly it is one in which there are many challenges: on the one hand a general paucity of funding for research and, on the other, a need for better pedagogic practices at all levels of the education system to serve our culturally diverse communities.

Articles include evidence-based research, theoretical explorations, critical reflections on practice, and analyses of how mobile learning *is* being implemented and how it *could* be implemented better. It is hoped that it will stimulate further research, improved practice and the greater adoption of mobile learning in the Australian, New Zealand and Asia-Pacific context.

This current volume, like its predecessor, features articles both from Australasia as well as from Asia. This reflects the membership of anzMLearn, which increasingly spans neighbouring countries. For two years in a row we have enjoyed the participation at our annual workshop of colleagues from Asia, and we hope that greater ties can be fostered into the future. The journal is one way of encouraging transnational dialogue and collaboration. This volume thus provides some points for comparative analysis of mobile learning across this part of the world and fulfils the aims of the journal in fostering a regional view of mobile learning research and practice.

Peer Review Process

All papers were double-blind peer reviewed by experienced members of anzMLearn. Authors have acknowledged their manuscripts to be original and not previously published elsewhere. The editor thanks the reviewers for their time in undertaking the reviews and making suggestions for improvement of the articles prior to final publication.

Laurel Evelyn Dyson
Editor-in-Chief
Transactions on Mobile Learning

Mobile Learning Engagement is Location Neutral

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ABSTRACT

Some Aboriginal and Torres Strait Islander pre-service teachers undertake Initial Teacher Education through Community Based Programs which enable them to study while living in their own communities. The use of mobile devices – laptops, tablets and mobile phones – has not been integral to these Community Based Programs. Yet many of these pre-service teachers already own and use mobile devices for social purposes. This research examines their perspectives about the use of mobile devices for professional study. Face-to-face qualitative interviews and focus groups were conducted with sixty four pre-service teachers and Aboriginal and Islander Education Workers in Queensland and South Australia. Locations were categorised as very remote, outer regional and inner regional. This paper shows that voluntary engagement with mobile devices for tertiary professional study among Aboriginal and Torres Strait Islander pre-service teachers enrolled in these Community Based Programs is location neutral. If there is mobile network coverage and mobile Internet access at a location, then there is similar uptake of the use of mobile devices, regardless of the remoteness classification of that location.

Keywords

mobile devices, remote communities, Aboriginal and Torres Strait Islander, Initial Teacher Education, engagement, mLearning

INTRODUCTION

Aboriginal and Torres Strait Islander people in remote communities are using social media, making online purchases, doing Internet banking, creating new forms of cultural material and using a range of other services (Kral & Schwab, 2012). Huggins (2014, p. viii) recently pointed out "… Indigenous people have really embraced digital technology, in particular in remote communities". Not all remote communities have mobile phone coverage or Internet access, yet in coming years, services are expected to improve (BFBA, 2013; RTIRC, 2012). Given the popularity of mobile devices for social purposes among Aboriginal and Torres Strait Islander people in remote communities, what is happening about the use of mobile devices by pre-service teachers in the same contexts?

This question is raised against the backdrop of workforce and higher education issues. The number of Aboriginal and Torres Strait Islander teachers and leaders in the school workforce is below parity. Aboriginal and Torres Strait Islander children and young people make up 5% of the school student population, but around 1% of teachers and leaders (McKenzie, Weldon, Rowley, Murphy, & McMillan, 2014, p. 28). Initial Teacher Education courses offered to Aboriginal and Torres Strait Islander people through Community-Based Programs have completion rates of 15% or less. (Mitchell & Linkson, 2012). This paper suggests that positive engagement with study through mobile devices can occur regardless of geographic remoteness. If, over time, strong engagement improves completion rates, then this could increase the number of Aboriginal and Torres Strait Islander school

teachers. Hence, this research raises significant implications for the delivery of Initial Teacher Education through Community Based Programs.

INITIAL TEACHER EDUCATION THROUGH COMMUNITY BASED PROGRAMS

Two Community Based Programs for Initial Teacher Education for Aboriginal and Torres Strait Islander people have been operating in Queensland and South Australia for twenty five years. The aim of these Programs is to enable a person to gain a qualification while studying in his or her own community, rather than leaving and living away for four or more years. These Programs have two main features: in selected communities there is a classroom dedicated as a tertiary study centre (with Internet access), and a supervisory teacher who assists pre-service teachers with their study.

At the time the research commenced mobile devices were not an integral part of either Community Based Program. However, worldwide trends indicate Higher Education Institutions will increasingly utilise mobile devices for teaching and learning (Johnson, Adams Becker, Estrada, & Freeman, 2014). In commenting on the international scene Vosloo (2012, p. 35) argued "There is a significant opportunity to more fully explore how mobile technology can support teachers …". This paper presents research which took up that challenge to explore how mobile devices can contribute to the training, motivation and retention of Aboriginal and Torres Strait Islander pre-service teachers in Community Based Programs for Initial Teacher Education.

METHODS

This paper reports on qualitative data that is part of a wider mixed methods PhD project. All the participants were Aboriginal and Torres Strait Islander volunteers, most of whom were pre-service teachers from two Community Based Programs as well as some Aboriginal and Islander Education Workers not enrolled in an Initial Teacher Education course. Semi-structured face-to-face interviews were held with individuals and focus groups. Interviews were conducted in English with audio recording from which transcripts were made. A set of thirteen questions were used in the interviews. Participants could choose not to answer all questions and withdraw at any time.

RESULTS

Data was obtained from fifteen sites: five in South Australia and ten in Queensland. Overall there were 64 volunteer informants (55 females and 9 males). Information about the sites and participants is presented in Table 1. For each site this includes the state, remoteness classification, existence of mobile networks, presence of study centre, and the number of participants. Sites were labelled according to the Australian Standard Geographic Classification Remoteness Structure (ABS, 2000).

Table 1: Sites and Participants

Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	#
State	SA	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	SA	SA	SA	SA	
Remoteness	VR	OR	OR	OR	OR	OR	OR	OR	IR	VR	VR	VR	VR	VR	VR	
Mobile network	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	
Study centre	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	N	
Total participants	5	2	4	3	5	2	1	1	1	6	5	6	10	7	6	64

Legend	SA = South Australia; Q = Queensland
	VR = Very Remote; OR = Outer Regional; IR = Inner Regional
	Y = Yes; N = No
	# = Number of cases

The following table (Table 2) restricts data to current pre-service teachers and graduates who had finished their course in the past three years, and shows their uptake of mobile devices by location.

Table 2: Use of Mobile Devices by Pre-Service Teachers & Graduates by Remoteness Classification

Site Remoteness	Informants using mobile devices for study					
	Qld	Yes	No	*SA*	Yes	No
Inner Regional	1	1	0	0	0	0
Outer Regional	7	16	1	0	0	0
Very Remote	2	11	0	5	0	17

DISCUSSION

It is clear there are differences between South Australian and Queensland sites regarding mobile network coverage, and between pre-service teachers from the two states about using mobile devices in their study.

Uptake of Mobile Devices Regardless of Location

Queensland participants from each remoteness classification of location demonstrated spontaneous voluntary embracement of mobile devices for professional study. There was no difference due to the location itself. Pre-service teachers at sites in each of the three Remoteness categories of Inner Regional, Outer Regional and Very Remote areas reported using mobile devices for their tertiary study. This indicates that physical distance from larger centres of population and services in itself does not affect the uptake of mobile devices. The impact of geographic location on the usage of mobile devices for these participants is neutral: it neither increases nor decreases the participants' actual use of mobile devices in their teacher training course. Other factors influencing uptake of mobile devices are discussed below.

Infrastructure and Internet Access and Mobile Coverage

None of the South Australian pre-service teachers used mobile devices in their community for study purposes. All five communities were classed as Very Remote. Internet access and mobile network coverage was present in only one of the five communities and absent in the other four. The absence of such services can limit the types of usage of mobile devices for study reasons. The provision of Information Communication Technology infrastructure is out of the control of both the training provider and the tertiary students. When Internet access and mobile network coverage are not present, this limits the expectations of students, lecturers and administrative personnel about what can be attempted for study reasons. In contrast to South Australia, each of the Queensland communities in the research had Internet access, and all but one of the Queensland pre-service teachers used mobile devices in various ways for their study. Hence the findings indicate that presence of Internet access and mobile coverage contribute to the uptake of mobile devices for these pre-service teachers. However, despite these being present in one South Australian community, none of the pre-service teachers there indicated they used mobile devices in their study. Thus other factors must be sought to explain the non-use of mobile devices.

Online Learning

South Australian pre-service teachers had access to the Internet at their study / work sites in schools. However, they were not required to use their university's learning management system, whereas it was compulsory for those in Queensland. This resulted in Queensland pre-service teachers having highly developed skills for online learning. They were familiar with writing and uploading assignments, checking course outlines for due dates, looking at set readings, using web-conferencing tools, downloading podcasts, using chat rooms, lodging requests for extensions and sending and receiving emails. In contrast, the South Australian pre-service teachers had no experience with online learning which could be transferred from use with desk top computers to mobile devices.

Spontaneous Integration of Mobile Devices for Study Purposes

Research findings show Queensland pre-service teachers' skills in online learning enabled incorporation of mobile devices into their study. They took the initiative to use their own personal mobile devices even though this was not a requirement of the course provider. Pre-service teachers said features of mobile devices were engaging and helped make learning personal. Their study was not restricted only to the designated classroom, but could continue in various places. It was no longer limited to business hours when the study centre was open; rather, they could study whenever it suited them. They formed mobile digital communities of learning and practice, initially through social media, which demonstrated three functions: academic support, administrative procedures and personal encouragement.

RECOMMENDATIONS

The majority of Aboriginal and Torres Strait Islander pre-service teachers in this study already owned and skillfully used mobile devices for social purposes. These strengths can be enhanced. In the light of the finding that engagement with mobile learning is location neutral, and that the uptake of mobile learning is facilitated by previous experience with online learning, then the author makes the following recommendations.

Institutions offering Community Based Initial Teacher Education Programs can

- deliver training to pre-service teachers about online learning and the use of learning management systems as a mandatory course requirement;
- deliver training to pre-service teachers about the affordances of mobile devices and ways these can be utilised in completing assignments both off-line and online;
- support pre-service teachers implementing Bring Your Own Device (BYOD) by ensuring the institutions have appropriate policies, practices, staffing, infrastructure, software and funding.

These recommendations align with a recent report which indicated that BYOD will be common across most of Australia's universities before 2016, and stated : "… the act of a student using his or her own device for learning has proven to increase productivity and engagement" (Johnson, Adams Becker, Cummins, & Estrada, 2014, p. 5).

CONCLUSION

This PhD research has provided evidence that Aboriginal and Torres Strait Islander pre-service teachers enrolled in a Community Based Program for Initial Teacher Education in Queensland, spontaneously incorporated mobile devices in their tertiary study, even though this was not mandated by their course provider. They used existing skills in online learning and initiated digital communities of learning and practice. These skills and the necessary infrastructure form the basis of the voluntary integration of mobile devices into such courses. Geographic remoteness of the location itself is not a factor to the use of mobile devices. Increased engagement could enhance completion rates and thereby increase the number of registered Aboriginal and Torres Strait Islander school teachers.

DISCLAIMER

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Designing Mobile Learning to Support Public Food Literacy: Constructivist Pedagogies and ICT Ecologies

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ABSTRACT
Food is an essential physiological, cultural and social component of human life. How food is produced and consumed has dietary, cultural, environmental, ethical and societal consequences. Despite the central role that food plays within individual lives, public understanding of food and the wider agro-food system varies; much of this existing knowledge is acquired informally in kitchens, homes and gardens. Educational and community initiatives, such as learning gardens and food literacy programs, have arisen in response to the perceived issues associated with an industrialized and distanced mainstream food system. Though face-to-face and community learning are important for addressing food literacy, such schemes have their limitations. With mobile learning increasingly identified as a means of facilitating dialogic, situated and distanced learning in informal settings, there is an opportunity for mobile learning to support public food literacy and extend existing understandings to a wider learner population. This paper describes the educational design of the Red Hen Recipes Food Literacy Project. This paper presents a brief overview of the literature and how the Red Hen Recipes project is designed to support mobile and place-based learning. This research posits the way in which mobile learning can be designed and extended to address a public educational need with a more diverse community learner population.

Keywords
Mobile learning, informal learning, food literacy, user-generated content

INTRODUCTION
Urbanization, population growth, lifestyle changes (Anderson 2000) and the wider industrialization of the mainstream food system (Blay-Palmer 2008) have combined to create a knowledge gap between those people who produce food and those who consume food. Though food production is frequently perceived to be a rural issue and agriculture a specialized rural activity (Pothukuchi & Kaufman 1999), public food scares can undermine public trust in a system that is largely obscured from view (Anderson 2000) and in the institutions that insure such a system is safe . As concerns about the food safety, food security, and the ethical and environmental sustainability of particular agricultural practices converge, alternative approaches arise to address these needs. Alternative Food Networks (AFN) that include farmers markets, community gardens and other alternative food provision systems can be interpreted as networks and approaches that deliberately counter or address issues perceived with the mainstream food system. In addition to AFNs, there are also educational initiatives and programs. Within Australia the Stephanie Alexander Kitchen Garden Program gets primary school students engaged in growing food in a learning garden and cooking this in the kitchen (Block et al. 2012; Stephanie Alexander Kitchen Garden Foundation n.d.). Though there has been some uptake of this situated learning within *formal* education, much of our understandings about

food is acquired within informal and community learning spaces. Such learning may occur as part of a community initiative such as those run by coordinated groups like the Slow Food Movement (Petrini 2001; Slow Food Australia n.d.) and Youth Food Movement (Youth Food Movement n.d.). Community and urban gardens may also provide spaces for community-based informal learning. However, outside of the fixed places and organized schemes, individual understandings about food remain the result of an ongoing informal, situated and lifelong process that begins with learning to eat, to cook and to acquire food in different places. Formal education, as it stands, is insufficient in addressing such a diverse learner population.

Food Literacy

Whilst the agro-food literature often acknowledges the importance of learning its focus is typically on the systems, processes and human experiences associated with alternative food networks. This research is rarely explored from an educational or pedagogic perspective. However, recently the emergence of the term 'food literacy' has heralded a more concrete acknowledgement of public learning needs and the educational focus of community food projects. Food literacy can be broadly defined as the understandings, knowledge and skills relating to an individual's food interactions. However, this emergent term has been defined and applied in varying ways. Some definitions emphasize nutritional and dietary goals (Vidgen & Gallegos 2011, 2012) whilst others extend this literacy notion to the 'impact of your food choices on your health, the environment, and our community' (Food Literacy Center n.d., para 6). In this paper we adopt the broader definition that is inclusive of environmental and community concerns. Food literacy has become the explicit target and focus for many schemes in both Europe (e.g. BEST Institut für berufsbezogene Weiterbildung und Personaltraining 2006), the USA (e.g. Food Literacy Center n.d.; Harvard Food Literacy Project 2013; The Food Literacy Project 2010) and Australia (Cullerton, Vidgen & Gallegos 2012). Though terminology such as food literacy enables more explicit and direct articulation of this learning need, the vast body of knowledge and personal experiences relating to food remain informally acquired and outside of the perimeters of such projects and initiatives.

The Affordances of Mobile Learning

Mobile learning (m-Learning) has been described as the processes of coming to know conversations across multiple contexts among people and personal interactive technologies (Kukulska-Hulme 2007; Sharples, Taylor & Vavoula 2007). With calls for greater dialogue between various parties across the food system (Anderson 2000), m-Learning may offer one way in which to facilitate new learning conversations with diverse populations. Especially within the context of public food education, new technologies and cultures of use may better support learning that is situated *outside* of formal learning institutions: 'new technologies, such as the mobile/cell phone, and their widespread availability and use, affect cultural practices and enable new contexts for learning' (Pachler et al. 2010, p. 13). With the rise in ownership of mobile devices, learning is no longer delimited by a physical location (Kukulska-Hulme 2005). Unsurprisingly, m-Learning has been heavily linked to informal learning that occurs outside of the educational institution (e.g. Kukulska-Hulme 2005; Laurillard 2010; Pachler 2010; Pachler et al. 2010; Traxler 2007). Despite this, the majority of empirical studies are conducted with learners already enrolled in primary, secondary or tertiary education. There have been calls from leaders in the field for m-Learning to explore more diverse learner populations such as work-based, community-based, distance and life-long learners (Kukulska-Hulme 2013). Some early mobile public awareness and education initiatives in the developing world have demonstrated both the power and feasibility of m-Learning to be applied to other contexts and learner groups (Traxler & Dearden 2005, p. 1; United Nations Education Program 2011). For m-Learning public food literacy offers a unique context and challenge in addressing the needs of a diverse learner group whose understandings and experience of food cannot be separated from personal factors such as age, taste, dietary needs, culture, and socio-economic background. For public food literacy, m-Learning may extend understandings to populations not usually targeted by

existing programs. In exploring the nexus between public food literacy and m-Learning, both fields stand to benefit.

RESEARCH GAPS AND OPPORTUNITIES

Given the largely informal, situated and lifelong process through which people come to understandings about food, formal educational initiatives, by themselves, remain insufficient. With its affordance for situated and field-based learning, m-Learning provides an opportunity for addressing public food literacy and extending m-Learning research to a wider and more diverse learner population.

PROJECT DESIGN: RED HEN RECIPES

As part of an exploratory research project into the affordances of mobile learning for food literacy, this paper describes the socio-technical and pedagogic design of the 'Red Hen Recipes' (RHR) mobile and blended learning project (Figure 1).
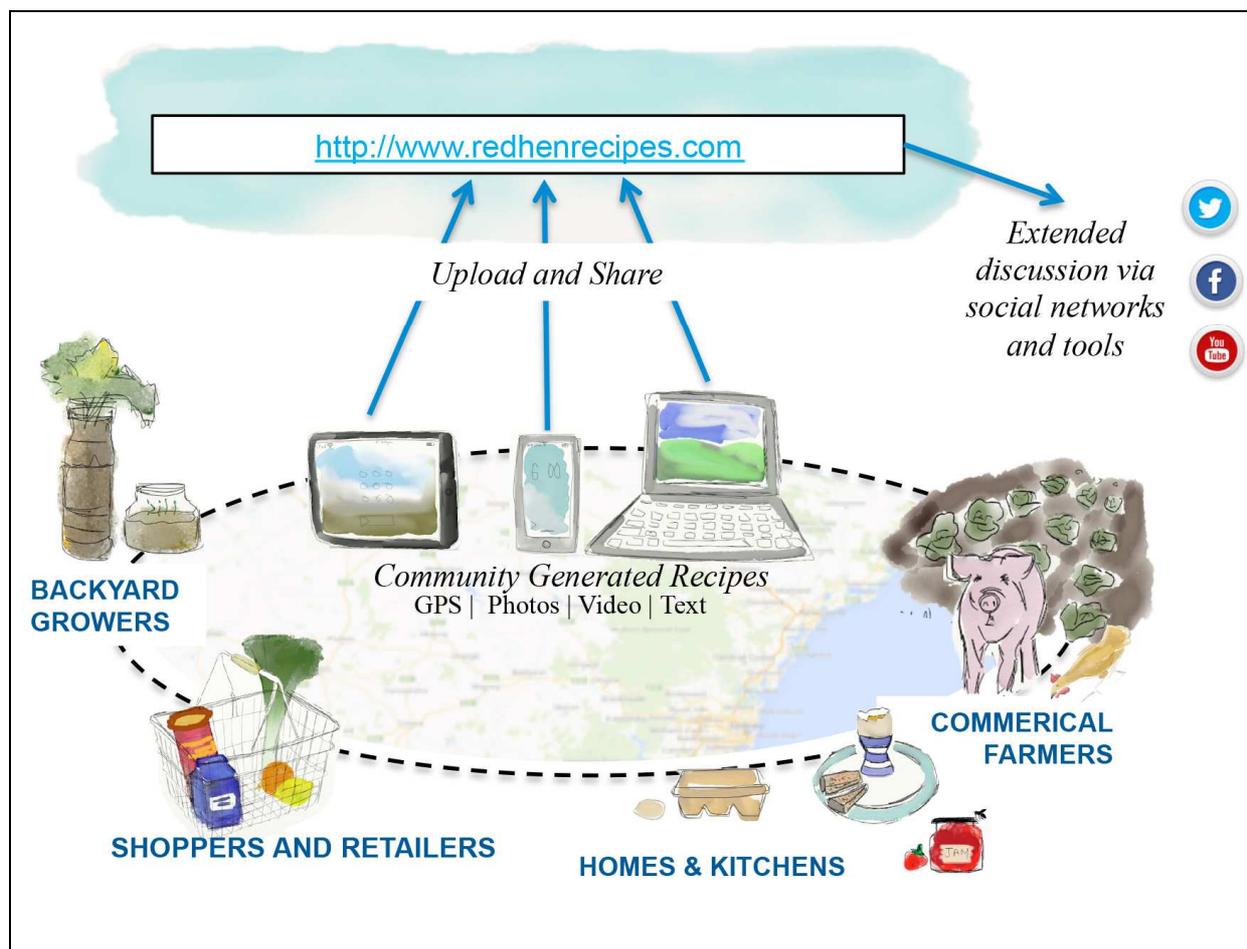
Figure 1. The Red Hen Recipes Project

Learning Activities

Members of the Red Hen Recipes community engage in a range of learning activities (Figure 1.). Firstly, learners create their multimodal and augmented "Red Hen Recipe" by tracing a raw ingredient from farms, gardens, and markets through to a recipe in the kitchen and information on eating this food. The Red Hen Recipe website (www.redhenrecipes.com) supports users in creating and sharing their recipes with photos, video, text and GPS data created by the learner using different devices within a range of mobile contexts and environments. Community members can browse the site and explore other members' recipes, and further dialogue is facilitated through the sharing of this content through social networking platforms such as Pinterest, Facebook, Twitter and Disqus.

Socio-Technical Design and ICT Ecology

Though learners may create and gather content in a range of mobile contexts, their learning is supported by a wider personal ICT ecology that may include laptops, tablets, digital cameras and other devices (Brady & Dyson 2010). In the case of user-generated content, learner's *mobile* practice and learning have been found to be deeply entwined and supported by other, non-mobile ICTs (Frawley & Dyson 2014). This concept of mobile learning is supported by the Red Hen Recipes cross-browser (e.g. Internet Explorer, Chrome, Safari) and cross-platform (e.g. OSX, iOS, Android, Windows) design.

Pedagogic Design

The project is designed to support dialogic learning interactions. This approach aligns with the way learning has come to be both conceptualized and practiced throughout the C20th and C21st. In opposition to previously dominant positivist and post-positivist philosophies of education that assume an objective knowledge available to be transferred, pragmatic (e.g. Dewey 1966) and constructivist (e.g. Vygotsky 1986) theories of learning offer a way of thinking about learning that reframes the role of the learner. Meaning is something garnered through a more interpretive, individualistic interaction between the learner and the world around them (Dewey 1966). In adopting an interpretive and constructivist approach the Red Hen Recipes project acknowledges the subjective and pre-existing understandings that all people bring to a food literacy project such as this one. In addition to changes in theoretical understandings of learning, there have also been changes to our socio-technical landscape. User-generated content (UGC) platforms, such as YouTube and Facebook, give rise to a participatory culture (Jenkins et al. 2009) in which lay people can create and publish their own content. Indeed within a socio-technical landscape that fosters dialogue and interactivity, over monologue, there is the opportunity for technology and our understandings of learning to combine to facilitate meaningful conversations around food that offer more than just didactic content distribution.

CONTRIBUTIONS AND CONCLUSIONS

The design of the Red Hen Recipes project is structured in a way to use mobile technologies in conjunction with the wider ICT ecology to support situated and informal learning interactions within a wide range of contexts. In this project individual learning that takes place in gardens, farms, kitchens and dinner tables can be shared with a wider audience. Participating in this community, either as a creator or a user of these online recipes, may extend dialogic and exploratory learning interactions to individuals not already included in formal food literacy or learning garden initiatives. Furthermore, by extending the reach of this discussion, m-Learning may allow for greater inclusivity of different voices and perspectives.

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The Academics' Voice: mLearning Student-Generated Activities in a Malaysian University

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ABSTRACT

mLearning, or mobile learning, student-generated activities enable students to adopt an active approach in learning their subjects. In developed countries, such as the USA, UK and Australia, this method is widely practiced compared to developing countries, such as Malaysia. The largely qualitative study reported in this paper focuses on extending this practice to the Malaysian context. An intervention involved students of local cultural studies creating multimedia content using mobile devices, such as mobile phones, to record video and audio, and take photos. Following the intervention, interviews with five academics at a Malaysian university were undertaken in order to understand the academics' voice in this student-generated mLearning. The data from the interviews were analysed using thematic analysis and organised using NVivo software. The main themes that emerged were the affordance of mobile devices for mLearning, particularly in student-generated learning; mLearning achievements; and opportunities and requirements in overcoming mLearning challenges. Thus, this study indicates the holistic perspectives of academics concerning the contributions of student-generated activities in the Malaysian context in studying local cultural subjects.

Keywords
Malaysian university, academic, mobile learning, student-generated content, multimedia content

INTRODUCTION

mLearning involves different types of activity for students as compared to the passive traditional 'chalk and talk' didactic classroom activities. One type of mLearning is student-generated activities. For example, students can use their mobile devices, such as the multimedia functions of mobile phones, to generate multimedia content. A lack of mLearning content has been reported for a large number of subjects in Asian countries, including Malaysia (So 2012; Ariffin, Dyson, & Hoskins-McKenzie, 2012). Since there is a large ownership of mobile phones among Malaysian university students (Hussin, 2011), there are possibilities for students to create their own multimedia content for learning. This can be applied to local cultural studies (LCS), or the study of the local Malaysian culture that pertains to subjects relating to the humanities. By facilitating mLearning student-generated activities, students are introduced to a more up-to-date approach which could enhance learning LCS. This author believes that student-generated mLearning activities could be used to reduce the challenge of the lack of local content for the Malaysian context. Likewise, students could become content producers.

LITERATURE REVIEW

Studies conducted in other parts of the world demonstrate the success of student-generated mLearning. For example, students conducting fieldwork could use mLearning, such as for audio and video recordings through interviews with a field expert (Dyson et al., 2008; Litchfield et al., 2010).

In addition, students taking photographs in a specialised context inside or outside the classroom has been reported (Lai et al. 2007; Looi et al., 2009).

mLearning activities lend themselves to LCS in a variety of ways. A UNESCO mLearning report in Asia by Deriquito and Domingo (2012) explained that students needed to be given the opportunity to produce more local content through mLearning. This could be undertaken through the use of mobile devices, such as mobile phones. In fact, student-generated content could happen anywhere, whether in the classroom through practical activities using mobile phones, such as recording videos and taking photos, or outside the classroom (Shih et al., 2012). However, there is limited literature concerning student-generated content for LCS in the Malaysian university context.

METHODOLOGY
This research approach was qualitative and involved interviews (Mertens, 2010) with five academics who teach the following subjects: Local Culture and National Heritage; History; Education Action Research; Drama; and Cooking. The selection was based on their interest in the intervention of student-generated content using mobile devices. The interviews took place following the first stage of a larger scale data collection garnering perspectives on mLearning contributions to LCS in which students generated content using their mobile devices (Ariffin, 2014; Ariffin & Dyson, 2012).

The semi-structured questions were devised based upon the mLearning literature; for example, the student-generated activities in experiential learning were as demonstrated by Dyson et al. (2008) in the developed world, and in Asian countries by Pouezevara and Khan (2007), and Valk, Rashid and Elder (2010). This assisted in understanding the perspectives of the academics concerning the contribution of mLearning for LCS.

The interview questions included: "How did the students use mobile devices for student-generated content activities?" "What are the advantages of student-generated activities in learning?" "What challenges do they encounter in performing these activities?"

The data from the interviews were analysed using thematic analysis (Braun & Clarke, 2006).

FINDINGS
The major themes that emerged from the interviews were the mobile devices' affordance for mLearning, particularly in student-generated learning; mLearning achievements; and opportunities and requirements in overcoming mLearning challenges.

Mobile Devices Affordance
Some sub themes that emerged from this main theme include the increased awareness for resource and information sharing; mobile phones as a tool for revision; enhancement of communication between academics and students; and the saving of travel time.

Increased Awareness for Resource and Information Sharing
Academics reported that their students could use mobile phones to share multimedia content even though they were in remote areas. For example:

> "*But things will be different during the long semester break. Most of them will be returning to their own village (Kampung). With the availability of the mobile phone, the increase in the information sharing for student-generated activities will happen no matter where they are.*"

Mobile Phones as a Tool for Revision
The academic from the Drama class informed the researcher how his students could record choreography movements of dance steps for revision and practice for a concert. For example:

> "*To remember the steps and flexibility of their body in dancing, therefore they will video record their moves. It can be practiced either at home or outside the classroom.*"

Enhancement of Communication between Academics and Students

The academic from the Cooking class recounted that her students, who were videoing themselves cooking in her class, communicated with her using Facebook concerning her orders for ingredients in preparation before the class. For example:

> "*It is a good tool for communication with your students about your subject.*"

The Education Action Research academic used email to manage his class when he could not meet up. Additionally, he used the mobile phone to assist students to solve queries about the subject directly.

Saving Travel Time

Students always carry mobile devices such as mobile phones. As a result, when they visit cultural sites, such as museums, palaces and archaeological sites, they can use their phones for recording without having to collect special recording equipment. This saves a lot of time. For example:

> "*They can save their time and there is no need to go back from class to find the information.*"

mLearning Achievements

The interviews that followed the student-generated local content activities demonstrated the involvement of students with classroom activities and outdoor fieldwork activities. Students engaged in self-exploratory learning using mobile devices and worked collaboratively with friends in undertaking their assignments. It is worth noting that these activities involved a mixed use of mobile devices, such as mobile phones, cameras and laptops. In this activity, mLearning was utilised to complement and enrich existing learning. The sub-themes that emerged were students accomplishing assignments using mobile devices, development of new multimedia skills and achieving better learning outcomes.

Students Accomplishing Assignments using Mobile Devices

The academic for the Cooking class stated that her students used video recording functions intensively for their Cooking assignment concerning food preparation for the Royal State of Perak. This was the first time students in her class developed digital video demonstrations to be submitted with their reports. She indicated that her students presented their assignments using mobile devices. For example:

> "*About 98% of them can video record using their own mobile phones for the Cooking assignment.*"

Development of New Multimedia Skills

mLearning has contributed to developing new skills among the students, such as being able to record and to create their own videos using mobile devices. As an example, the Cooking teacher mentioned that her students developed multimedia skills to record their own ideas through voice recordings and videos. The students used these skills to generate digital videos on recipes and food cooking assignments. The academic assessed her students' performance via the digital video that the students produced. This demonstrated their understanding concerning how they were able to cook the food properly.

Achieving Better Learning Outcomes

Academics reported better learning outcomes and students reported better understanding from student-generated activities. Students were motivated and had worked collaboratively. This approach leads to assignments of a better quality compared to the traditional approach. The Cooking class academic informed the researcher that her students were producing better quality assignments as demonstrated by the production of their local cooking videos using mobile devices. They had made a significant improvement in their learning. The quality of the videos showed that the students had understood what they had been taught in class. For example:

> "*When I see the report, it reflects the comment that the group has recorded my advice during class using mobile phones. That is one of the transformations.*"

Opportunities and Requirements for Overcoming mLearning Challenges
Challenges are barriers that could delay the progress of mLearning for LCS. However, most of those challenges can be overcome as demonstrated from the findings. The following are the sub-themes of the perspectives of the participants concerning the opportunities and requirements: overcoming technical challenges; overcoming academics' reluctance to allow students to use mobile devices in class and fieldwork; and the requirement for the implementation of a standardised mobile device.

Overcoming Technical Challenges
One of the academics reported that students assisted one another to convert the file format, which reduced the failure of the conversion of the audio files. Peer assistance emerged as one of the possible solutions to solve technical issues in this research. For example:

> "... *with the assistance of their friends, the problems were resolved.*"

Electricity recharge points for the mobile phones are extremely important for the mobile phones to be functional. There is a power station to charge their mobile phones and cameras at the archaeological sites of 'Gunung Senyum', as mentioned by the History academic. For example:

> "*There is also a charger at the base camp that provides electricity.*"

Overcoming Reluctance to Allow Students to Use Mobile Devices in Class
Academics are more open to using mobile phones in their classes after experiencing student-generated activities. The Cooking academic reported that her class had undergone a transformation by using videos in the classroom.

> "*This is a positive transformation in learning the cooking subject.*"

Implementation of a Standardised Mobile Device
Participants suggested consideration for the implementation of standard mobile devices, similar to the previous implementation of laptops by the Malaysian government. This implementation of standard mobile devices could assist in learning LCS more effectively. For example:

> "*The most important thing is that we need to standardise the technology and devices.*"

DISCUSSION

Empowering Students to Undertake Activities for Student-Generated Content: Reducing the Challenges of the Lack of Local Content

This study demonstrates that student-generated mLearning activities positively benefit LCS subjects in the creation of multimedia local content. In addition, students were empowered to complete their assignments with mobile devices, through student-generated activities. This is aligned with the studies demonstrating 'learning by doing'. For example, this study has accomplished the following: students conducting and completing their assignments using mobile devices, developing new multimedia skills in the creation of videos, and achieving better learning outcomes for the subjects of LCS. This study is comparable with that of Dyson et al. (2008) who incorporated mLearning activities. However, this research added the Malaysian context in LCS for student-generated activities. Students are motivated and engaged in student-generated activities through the creation of multimedia content (Litchfield et al., 2010). In addition, this facilitated their accomplishment in managing and completing their work for the LCS studies. Thus, students can potentially become content producers and reduce the challenges that exist from the lack of local content that has been highlighted in Asian countries, as reported by So (2012).

Academics Become More Open and Show More Interest in mLearning after Student-Generated Activities

Academics reported being more open, particularly after being exposed to student-generated content activities after witnessing their students' good performance in creating quality multimedia content. They encouraged their students to use the multimedia functions of the mobile phones, such as the

video recording, audio recording and photography functions. This experience is aligned with the studies of Pouezevara and Khan (2007), and Valk, Rashid and Elder (2010) in Bangladesh, who found that academics are more appreciative of the use of mobile phones after student-generated activities. Furthermore, academics in this study changed their attitude and expressed more interest in using mobile phones for learning after experiencing the mLearning activities for LCS.

CONCLUSION

This research reflects the change of attitude of academics towards learners being more proactive in their use of emergent technologies of mLearning. They changed their perspectives to become more open towards mLearning student-generated activities. In addition, this study demonstrated the abilities of the students to become content producers and reduce the challenge of the lack of learning content. There is considerable potential for mLearning student-generated activities, particularly for LCS in the Malaysian university context. Thus, from the perspectives of the academics, using mLearning student-generated activities did enhance learning LCS for their students.

FUTURE RECOMMENDATION

The study could be expanded to measure the change of attitude of academics by comparing these findings with attitudes of academics prior to experiencing their students engaging in student-generated activities using mobile devices.

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Facilitating Enhanced Learning in Tutorials through Tablet Computing Enabled Sharing and Annotation Technologies

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ABSTRACT

The purpose of this study is report on a trial of tablet computing enabled sharing and annotation technologies in an Introductory Accounting subject. These technologies allow student homework to be photographed using a tablet computer (iPad in our study), shown to the class instantaneously through a data projector and annotated live by the tutor, along with student participation, using the tablet computer. These technologies are intended to address calls for more student–centred approaches to learning, moving away from the didactic approach that dominates much of accounting education. Two focus group sessions were conducted to explore the effectiveness of the technologies, with the first group from a class where the tutor used the iPad and the second from a class where there was no iPad use. The findings from the focus groups suggest that in the class where the iPad was used, there was a far greater ability to focus on the questions and problems students were facing, a lot more material could be covered, student felt more comfortable participating because they could see their fellow students faced similar challenges and they were far more likely to complete homework prior to class. Overall this indicates there were significant benefits for students.

KEYWORDS

Accounting education, sharing and annotation technologies, student–centred learning, tablet computing

INTRODUCTION

Emphasis on active, student–centred learning has been found to enhance student engagement, motivating students to adopt deeper approaches to learning (Prosser & Trigwell 1999, pp. 90-92). Despite this there is still a largely didactic approach to tertiary education, at both the lecture and tutorial level, particularly in the area of accounting education (Stevenson et al., 2014). Addressing this issue is important in accounting education, as accounting students are typically not highly intrinsically motivated (Ottewill & Macfarlane 2003) to complete required homework, which is critical for mastery of the subject matter. There have been a range of calls to address this issue in accounting from practice and literature, particularly given the links between enhanced student engagement, positive attitudes to learning, development of better communication skills, higher order thinking and enhanced student performance (Ballantyne & Larres 2009; Ravenscroft et al., 1999).

To address the calls for greater levels of engagement, the use of tablet computing and annotation technologies was trialed in selected tutorials of a large Introductory Accounting subject. This is studied by approximately 1,500 students in the first semester and 700 students in the second semester of the year. These technologies enable tutors to take photos of student homework in class using a

tablet computer (iPad in our case), show these images to the class instantaneously using a data projector, and annotate these images through the tutor's use of the iPad (along with student input), with these annotations being projected live to the class (Figure 1).
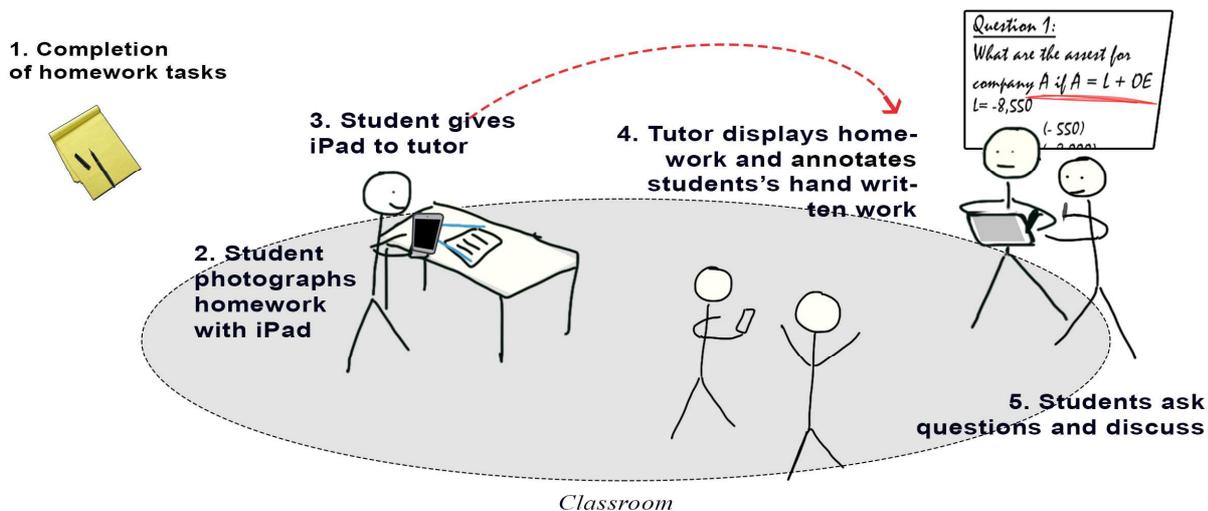

Figure 1. Image Sharing and Annotation Process in Class

RESEARCH METHODS

The image sharing and annotation was evaluated using several methods that were conducted sequentially. These methods are described here:

1. *Pre-implementation in-class observations:* Prior to the use of the sharing and annotation technologies, one of the researchers not associated with the subject sat in on one of the tutorials and took notes of her observations. Observations focused on student participation.

2. *Comparative Focus Groups:* Following the trial of the iPad innovation two focus groups were conducted. One comprised students who were enrolled in tutorials where the iPad innovation had been implemented, another was comprised of students attending a traditional tutorial. Students were given the incentive of lunch or afternoon tea if they attended. The focus groups were led by one of the research team while notes were entered on a laptop simultaneously by another using as much of the students' own language as possible. Neither of these researchers was known to the students, nor are they involved in teaching accounting. The notes were anonymised before sharing with the Business School researchers who teach the subject.

3. *Surveys:* Surveys were distributed to students to gather further evidence and corroborate the findings from the iPad tutorial focus group. These surveys were distributed to students attending tutorials in which the sharing and annotation software were introduced. Students answered nine questions with a 1-to-5 Likert-scale (Strongly Disagree to Strongly Agree).

FINDINGS

Pre-implementation In-class Observations

Within the standard tutorial the researcher observed that the tutorial was very teacher-centred, with most of the 'talk time' coming from the tutor, who provided and explained solutions to the homework questions. Very little time was spent on student discussions, despite the tutor encouraging students to ask questions and sometimes challenging them to contribute a comment or answer to the class. The students' questions and answers were normally very brief (only 1 or 2 were sustained) and in total took up less than 10 – 15% of the tutorial time. Only a minority of students participated in this way: only 9 students, mostly males, spoke out of the 28 students present in the class. Of the 18 total student contributions to class, 13 consisted of questions to the tutor and 5 comprised students answering a question posed by the tutor. However, all students with one exception were intensely

focused on the class, closely following the tutor's working through of solutions and his explanations of what he was doing, and a few took photographs of the solutions with their smartphones or iPads.

Comparative Focus Groups

Focus groups with both those in the traditional tutorial and those with the iPad innovation were conducted. We present findings for these focus groups separately, but discuss comparisons in the discussions of this paper.

Traditional Tutorial

Both focus group participants who came from the traditional tutorial confirmed that most tutorial time is spent going over the homework. The procedure is as follows: 'She presents a problem and we all brainstorm it', individually. If a student knows the answer, they volunteer their solution. If no-one knows, the tutor explains it: as she works through the solution, she will ask, 'Who knows what to do now?' Someone might volunteer, or if no-one can do it, the tutor steps in and continues through the exercise. Most students do not volunteer since, as the exchange student said, 'What's the point of me? The answer might be wrong.' However, unlike the other student, this student sometimes volunteers: 'It takes you out of your comfort zone.' The tutor usually suggests the questions to go over since she knows which ones students normally get stuck on. Then sometimes she will ask students what questions they want to work on. The focus group participants noted that there is interaction between the tutor and the students but 'Between students, not much.' If a topic is tough, students are more likely to ask questions of the tutor. The majority of time is taken up by some of the questions that are very long, with others being skipped.

When asked what they would like to happen in tutorials, both students came out strongly for groupwork: 'Groupwork would make the class more engaging. This is a bit lacking.' For example, the brainstorming could be done in groups: 'I think most of them would know each other. Getting in groups would break the ice'. They could work in a group and then present to the class. An added benefit would be that students would get to know other students and could study for exams together. They were adamant that students needed to do more of the work in the tutorial since they have to become independent learners: 'It has to be … they have to study by themselves'. One student, who attended extra tutorials aimed at students who had failed or needed extra help, was enthusiastic about a group activity in which students re-assembled a financial statement, which the tutor had cut up, and then did the calculations to complete it.

Other suggestions by the students were to include discussion of news articles to engage students, incorporate examples of real-world practice so that theory is related to practice, and either make the tutorials half an hour longer or structure the tutorials in such a way that all the material is covered.

The focus group participants were asked what they thought of introducing iPads into the class for photographing students' homework for display and discussion: 'Depends on the person … I think they would be a bit nervous showing it to the entire class.' They thought it would be good to compare one's own work to the student whose work was up there, but that it would not be such a great experience for the student whose work was on the screen. However, it would be a good method of identifying problems 'on the spot.' If you could share homework anonymously, then they thought it might work but were still hesitant about the idea: 'I think so. I think that's a good idea. It depends how you do it.'

iPad Tutorial Focus Group

The three focus group participants who were enrolled in a tutorial in which the new procedure was being trialed expressed a high level of enthusiasm with regards to the tutor's use of the iPad, as comments quoted below show. Moreover, there was consensus between them and a fourth student who spoke to the researchers' informally after the focus group had concluded.

According to the participants, the tutorials are conducted in the following manner: First, the tutor asks the class which questions they want to discuss, and which questions they have problems with.

Going over homework questions and discussing them takes up 'pretty well the whole tute'. When someone volunteers their solution to a question, the tutor uses his iPad to photograph the student's work and share it with the class. One student said that some people always volunteer their work, depending on where they sit in class and how easy it is for the tutor to reach that student with the iPad. The participants also agree that the tutorials are very interactive – in fact, they state that as the semester progresses, students become more enthusiastic and more frequently volunteer to have their homework displayed on the screen.

The participants stated that the two most important aspects of the approach were seeing where their work stood with respect to others and getting the tutor's feedback. They said it was nice to see other students' work because it made them feel 'like you're not the only one who got it wrong or didn't understand'. Compared with when they are doing it home alone, in the tutorial it becomes clear: 'He goes through it step by step, so it really breaks it down. It's nice to know that other people are struggling with the same things that you are.' Another advantage is that the tutorial questions are answered quickly, which saves a lot of time: you 'get through a whole lot more content.'

When asked how they felt about having their work corrected by the tutor in front of the class, there was consensus that, 'There's no judgment if we don't get the question right.' One stated that, knowing that your homework might be shown on the screen 'makes you actually do it.' However, of the three participants, only one had ever volunteered her work: this student stated that 'even though I got a few wrong, at least I was able to correct it [from the tutor's annotations and discussion of her work in the class]. … It really does help.' Of the two students who had never volunteered their homework, one claimed it was because her handwriting was not good, while the other could give no reason.

When asked how they felt about having *another* student's work corrected by the tutor in front of the class, they all liked this. Typical comments included 'I kind of like the student work', and 'It made you feel OK if you didn't get it right.'

Regarding the use of the iPad, the students stated they were 'Definitely a good investment' and 'It's very helpful.' One student affirmed that 'These tutes have probably been the most helpful of all the subjects I've done so far', another that 'For this content, it's really well structured. … For Accounting it's really, really helpful.' One of the focus group students had attended another tutorial where the iPad was not being used by the tutor and the tutor told the students the answers: 'I hated it. It was horrible.' Moreover, the tutor must be able to use the iPad to its full capabilities: 'They really have to be comfortable with it.' In addition, they said the technique with the iPad would not work in all subjects since some do not have structured homework and tutorials consist of discussions of topics. By contrast, in accounting, 'There is a right and a wrong answer, and there is a process to go through.'

The only suggestion for improvement that the students had was to make the tutor's corrections to students' work available online in order to help them with exam revision. However, they realized that there would be issues with students' copying the solutions.

Surveys
From a sample of 65 students, the data suggests that the use of the iPad is well-received, with tutorials becoming more engaging and interactive. The sharing of answers via the iPad created a learning environment that was more conducive to student comfort and participation, relative to the traditional tutorial. Respondents felt that the use of the iPad enhanced their learning experience in the subject (4.40/5.00) and only a minority believed that using the iPad was time-consuming (2.08/5.00).

DISCUSSION AND LIMITATIONS
The findings drawn from the surveys and the focus groups are consistent with prior literature (Park & Choi 2014) and strongly suggest that the traditional classroom environment has crucial weaknesses – in this context, it is not very conducive to class participation, with little or no incentive for students

to offer their own solutions. On the other hand, the introduction of the iPad bundled with sharing and annotation software greatly increases student comfort in the classroom and their propensity to participate and engage in class discussions. The greatest benefits of this approach, as identified by the iPad tutorial focus group are: (1) the assurance that other students were facing similar struggles in completing the homework, and (2) receiving feedback from the tutor. This additional knowledge appears to be important in encouraging class participation, as evidenced by the growing eagerness of students to display their homework on the screen throughout the semester. Unfortunately, the number of students who volunteered to participate in the focus groups was low (three students in the first focus group, and two students in the second). In addition, the students from the traditional tutorial may not have been 'typical' students – one of the participants was an exchange student, enrolled at a university in the United Kingdom and undertaking a year of his degree in Australia, while the other had previously failed the subject. However, since failures are high in Introductory Accounting, in some ways he may be regarded as all too 'typical' (unfortunately so). Thus the students' comments in both focus groups need to be taken with caution but give an indication of student views and provide direction for further research.

CONCLUSION

Facilitating student-centred learning is critical to enhancing student learning outcomes. To address calls from practice and literature for more student-centred approaches to learning, we trialed tablet computing enabled sharing and annotation technologies in a large Introductory Accounting subject. Students who had experienced the tutorials where the iPad innovation was introduced were extremely enthusiastic about its use in the class, whether they were one of those who volunteered their homework for display and discussion or had never done so. They appreciated being able to get instant feedback and seeing where their work stood with respect to other students. The lack of anonymity in providing answers did not seem to worry them. Furthermore, they appreciated being able to cover such a large number of the homework exercises. The inability to cover all the required content in class was a major concern for the students from the traditional tutorial who had participated in the second focus group. These students confirmed much of both the lecturer's views and researcher's observations on how the tutorials are normally conducted and why they need improving, namely the adoption of a very teacher-centred approach, with many students never interacting with the tutor and little interaction between students. The findings of this exploratory study of introducing iPads into Introductory Accounting tutorials to shift the focus of learning from the tutor's explanations to the students' worked examples gives us encouragement to continue with this innovation on a larger scale next year. A full evaluation of the innovation will then be undertaken, including more rigorous comparison of the students' learning experience in tutorials with and without the iPads, and an evaluation of the impact on learning outcomes.

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