Investigating Mobile Learning in Higher Education in Laos PDR and Cambodia

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Abstract   Mobile learning technologies have the potential to change higher education teaching, participation and learning now and in the future. This chapter investigates contributing factors and how these are positioned and considered within higher education in Laos PDR and Cambodian universities. It investigates the cases of two university-based agriculture courses. In particular, it explores the issues under consideration by educators as they develop degree programs that enhance flexibility and learning outcomes through the incorporation of mobile technologies. Literacies, access, barriers and participation associated with adopting mobile learning technologies in higher education in these two countries are explored from the perspectives of the student and the lecturer. The chapter considers the functional aspects of mobile learning relevant to participation and learning including dissemination and access to information and communications, enabling person to person connections in education, and connecting and intersecting learning content with the situated contexts of the learner. Access issues and barriers to the use of the technology within programs are considered. Key insights associated with mobile learning adoption within these universities are highlighted at each of pedagogical, technical and organisational levels.

1. Introduction

Laos PDR and Cambodia are situated in South East Asia. Access to higher education has been expanding over the past 20 to 30 years, with university enrolments increasing in many cases from very low to 20 percent or more (World Bank, 2012a). A World Bank report suggests that these countries must develop the right type of skills and research capacity in order to become more competitive. It suggests that technologies enabling easier access to education and to resources that facilitate education will play a key supporting role. Yet this may occur only as education opportunities and levels increase across communities of both countries, and only as technologies become more affordable and accessible.

Mobile learning (i.e. the use of mobile devices for educational purposes) within higher education appears to be emerging in both countries. Increased ownership of mobile phones across many communities means that mobile learning has some potential for application in a range of educational contexts and within varying community sectors. Mobile learning particularly has the potential to extend educational opportunities to lower socio-economic groups to whom education has traditionally been limited. However, in order to successfully develop and apply mobile learning applications in a formal educational context, there are many factors that need to align (Al-Zahrani & Laxman, 2014; Alrasheedi & Capretz, 2013).

This chapter discusses these factors in relation to a tertiary level agricultural course at the National University of Laos and one at the Royal University of Agriculture in Cambodia. These programs are explored in order to describe current contexts and the factors that might contribute to the potential future development of mobile learning initiatives. Consideration includes the contexts of students and educators, technical capacity, and organisational perspectives, with regard to access, literacies, barriers and equitable participation. Key areas are

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identified that may facilitate future wider applicability of mobile devices in higher education contexts in these countries.

2. Mobile learning and higher education in Asia

Mobile devices such as mobile phones and I-pads have functionalities that may have potential to contribute to facilitating learning including phone calls and messaging, web and email access, e-books, photography, music and video recording and playing, games, diaries, calendars and locational devices (Trinder, 2005, p. 8). Their portability and the ability for use anywhere and anytime warrants consideration of their potential for enhancing higher education learning opportunities.

The functionalities associated with mobile devices can serve as tools in learning for users in relation to their own educational goals (Brown, 2003), including creating and sharing their own digital content (Grant & Hsu, 2014). The technologies allow for a variety of use approaches (Kennedy et al 2010), allowing users to take a more personalised and active learning approach (Traxler, 2007).

Mobile learning can be defined as "learning across multiple contexts, through social and content interactions, using personal electronic devices." (Crompton, 2013, p. 83). Mobile learning can allow learning activities to be more learner-centred (Crompton, 2013), and related to students own personal needs and circumstances (Kukulska-Hulme, Traxler, & Pettit, 2007; Traxler, 2007). It enhances opportunities not only for increased and timely access to information, but for increased engagement and communication between students, peers and with teachers (Butoi, Tomai, & Mocean, 2013).

In this sense, mobile learning adds value to education by allowing learners to change or enhance their learning in relation to their own contexts and experiences (Land & Zimmerman, 2015; Pimmer et al, 2014; Crompton, 2013) and to potentially facilitate the application of learnings from one setting to another (Sharples, Taylor, & Vavoula, 2005). It appropriates a range of approaches to learning that includes independence, interactivity, collaboration and communication (Gikas & Grant, 2013; Liaw, Hatala & Huang, 2010). In higher education mobile learning can be evaluated from the four perspectives of learning, teaching, technical and organisational (Farley et al., 2015); this informs the work presented in this chapter.

2.1. Mobile technologies in Asian Higher Education

An online review of higher education among Asian student and graduates by the World Bank in 2011 identified limitations in learning and teaching through misalignment of programs with the job and skill requirements of local industries (World Bank, 2011). Participants suggested learning programs should be more creatively focussed on this misalignment. They identified the high cost associated with obtaining higher education and the resultant inequities existing among the population in terms of access. Affordability of education, textbooks, and internet access were key issues. In addition, curricula, lack of laboratories and outdated equipment which were seen as limiting the potential of student success in higher education (World Bank, 2011)

Mobile learning in Asia is considered to have strong potential to enhance learning not just at tertiary level but in more self-directed, informal and lifelong circumstances (So, 2012) and across a range of community sectors. Farley and Song (2015) suggest that these mobile learning initiatives should incorporate regional-specific issues that include economic, political and cultural aspects.

Current initiatives aimed at making learning more accessible and promoting self-directed learning are largely considered to be small-scale and ad hoc (So, 2012). These are seen as advancing basic education and knowledge acquisition (most important for developing countries), through use as a tool to deliver learning materials and resources to students. A United Nations Educational, Scientific and Cultural Organisation (UNESCO) study in 2011 suggests that although mobile learning is considered to be operating at a high level in tertiary education, few projects explore the potential of mobile phones for "knowledge deepening or knowledge creation" (So, 2012, p. 28). Five of eight Asian countries surveyed by UNESCO in 2011 showed a high use of mobile technologies in tertiary education compared with significantly lower use in primary or secondary education, likely due to greater affordability of mobile phones among tertiary students and possible commercial linkages (So, 2012, p. 21).

Farley and Song (2015) reviewed mobile learning in south-east Asia and suggest importantly that the social aspects of relationships developed through mobile learning activities are a key facet contributing to learning, and that these aspects should have explicit rules and roles associated with the learning process. These authors suggest

vigorous research is necessary around large scale mobile learning initiatives in order to access quantitative data about the learning process to inform future initiatives.

Technology access increasingly is parallel to the availability of educational opportunities. This is particularly evident where cost-effective education is limited and a high percentage of people living in the developing world have no access to printed knowledge, ICT skills, or technologies (Valk, Rashid, & Elder, 2010). Technology is considered to have the greatest potential to provide access to learning opportunities for disadvantaged rural community members. Improving literacy levels, especially in these areas, and improving educational opportunities for the high percentage of the population who live in rural areas without access to traditional post-school education opportunities (So, 2012) are key applications. However, limited device ownership and internet access are challenges in these areas.

3. Laos PDR and Cambodia

Laos PDR and Cambodia are countries with low-income economies and low rates of application of technologies, however, development is occurring in these countries at relatively fast rates (World Bank, 2012b).

3.1 Overview – Laos PDR and Cambodia

Laos PDR has a population of 6.7m of which over 60% are rural; over 25% of adults are illiterate, and over 20% struggle with poverty. It has a high rate of early school enrolments and over 17% of the community enrol in tertiary studies (World Bank, 2012a, Table 1). By comparison, almost 80% of Cambodia's population of 15.3m is based in rural communities. It exhibits a similar population growth, a similar level of literacy, and similar early and tertiary education enrolments, but a slightly lower rate of poverty (World Bank, 2012a, Table 1).

Table 1. Population and education statistics, Lao PDR and Cambodia

	Laos PDR	Cambodia
Population	6.7m (2014)	15.33 m (2014)
Population growth	1.65% (2014)	1.64% (2014)
Rural population	62.4% (2014)	80% (2014)
Poverty	23.2% (2012)	17.7% (2012)
School enrolment primary	97.2% (2013)	98.4% (2014)
School enrolment secondary	44.7% (2013)	38.2% (2008)
Tertiary enrolment	17.7% (2013)	15.8% (2011)
Literacy adult	80% (2013)	74% (2009)
Internet users	14% (2014)	32% (2014)

Sources: World Bank, 2012a, UNESCO Institute for Statistics (2014), Internet World Statistics (2015), World Bank (2016).

Increased application of technologies is considered to have the potential to assist both countries in enhancing productivity (World Bank, 2012 B). Improving skills is seen as a way to "enhance capacity to apply, adapt, and create new technology", and research, which "enhances capacity to develop new technology" are considered two key drivers for the economies of both countries, setting an important agenda for their higher education sectors (World Bank, 2012b, p.12)

3.2. Device ownership and internet use

There has been significant growth in the use of the internet in both countries over the past 10 years with approximately 14% of the Lao population and 32% of the Cambodian population being internet users in 2014 (Table 1), and increasing this has been a priority area for governments. Mostly this has occurred through increased availability of mobile broadband internet services in rural areas, through private sector development, and increased access to inexpensive devices and technologies (BuddeComm, 2015).

During this period, Asian countries with the lowest number of mobile phone subscriptions have shown significant growth rates (UNESCAP, 2011), largely in city-based areas, but extending well into the lower socio-economic rural sectors. In Lao PDR mobile phone connections grew from 0.2 for every 100 people in 2000 to 67% in 2014 (Table 2) while in Cambodia the number of mobile phone connections has grown from 1 to 133 for every 100 people during the same period (Table 2).

Table 2. Mobile phone ownership – Lao PDR and Cambodia

	No. mobile phone subscriptions per 100 inhabitants (Year)			
	2000	2005	2010	2014
Lao PDR	0.2	11.4	64.6	67
Cambodia	1.0	8.0	57.7	133

Sources: Adapted from United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)(2011), World Bank (2016).

Mobile phones are the most commonly owned mobile devices in both countries with usage having significantly risen since 2005 (Table 2). However, poor development of the telecommunications industry has hindered growth in mobile phone subscriptions in Lao (Budde.com, 2015), with poor investment in network maintenance and deficiencies in appropriate regulations for establishment and management of networks. The authors of the Budde report suggest that use of tablet devices is very limited in both countries with limited affordability being the key issue cited.

4. Mobile learning implementation issues relevant to the Asian context

Mobile technologies are seen to offer significant potential to enhance learning within developing countries. In these countries there is often poor geographical and physical infrastructure and mobile networks are seen to offer quicker and more cost effective internet access (Dholakia & Dholakia, 2004). Motlik (2008) believes that there are advantages of mobile phone technology for learning in developing nations in that it is more widespread, easy-to-use, and familiar to many learners than computer-based online learning.

However, the introduction of mobile learning into developing countries must incorporate a holistic approach as the dangers of initiatives that focus simply on technology ownership, access and infrastructure alone (rather than on the social, cultural and learning contexts) have been identified (Kirkwood, 1998).

4.1. Enablers and Barriers to instigating mobile learning

Costs of smartphones and wireless data transfer are a barrier to mobile phone ownership, and particularly to the development of broader applications of mobile learning (Zhang, 2015 A) in poorer countries. Educators cannot assume that all learners have access to mobile technologies, have connectivity or "ubiquitous" access to the internet, or the ICT skills to apply mobile devices to their learning needs (Petrakieva, 2015 p. 978-979.)

Difficulties with the availability of infrastructure and resources, inappropriate learning content and lack of time and experience to develop or use programs, along with non-user friendly interfaces are also seen as barriers to the development of successful mobile learning solutions. (Skillsoft, 2015). Other problems of relevance that have been previously identified include design and success of potential mobile learning initiatives have been identified to include poor course monitoring; lack of feedback to students; poor design; poor training for instructors; lack of required technology; lack of Internet accessibility; lack of online resources; high costs; and lack of credibility (Baggaley & Belawati, 2007).

The UNESCO study identified enablers to mobile learning rested at government and institutional level along with research, accessibility, connectivity and affordability. Barriers were costs, mindsets, poor training and support, and content. The Government, hardware makers, students and education specialists were considered most likely to promote the use of mobile technologies in learning. Teachers and parents were seen as most likely to prevent use (So, 2012, p.22). Success factors appear to be based on ownership and infrastructure rather than social, cultural and learning contexts outlined by Kirkwood (1998).

4.2 Design considerations

In addition to considering barriers and enablers in developing mobile learning programs, the expectations and value gains from any incorporation of mobile learning into Higher Education programs must be considered carefully. Initiatives can only be successful if the added value is seen by both educators, learners (Petrakieva, 2015, p. 981) and institutions. This added value to learning differs across contexts, and between countries and individual communities (Zhang, 2015).

In designing mobile learning applications in Higher Education, these factors to be considered include learner contexts and learner objectives (Haag & Berking, 2015; Parsons, Ryu & Cranshaw, 2007)). In addition to these context issues, aspects of the various devices, technologies and their usability must be considered (Koole, 2009). These then must be translated into the development of authentic tasks, and opportunities for collaboration, engagement, and meaningful assessments within learner-centred environments (Turbill, 2015, p.229). Teaching and assessment programs can be designed to support reflection, sharing of experiences and responding to others, collaborative learning and working, and application of new practices, using a variety of media (Turbill, 2001). The development of such programs requires educators to have a good understanding of pedagogies and technologies so as not to simply publish content online (Petrakieva, 2015, p. 980).

4.3 Implementing mobile learning in teaching and learning

From a teaching perspective, mobile technologies have the potential to contribute to the provision of resources and educational material and to promote interactive discourse (Kukulska-Hulme & Traxler, 2005). These authors suggest that teachers need to understand their own conceptions of teaching and what they expect of their students" learning in order to assess how technologies can support them. They suggest that mobile learning is not only about enhancing the usability and accessibility of mobile devices in learning, but about the perceptions of whether mobile technologies can support different approaches to teaching (Kukulska-Hulme & Traxler, 2005, p. 28).

The mobility of the learner and of learning itself is a key advantage (Pandey & Singh, 2015). There is potentially improved "connectivity for spontaneous communication and collaboration, beaming of stored information from device to device, location-awareness, giving instant information about objects within sight, portable sound-recording and voice-recording, and cameras for taking photos and making video clips" (Kukulska-Hulme & Traxler, 2005, p.31).

In developing educational programs using these technologies, developers must consider the needs of the learners and educators and the pedagogical reasons for developing learning programs (Petrakieva, 2015 p.978). Use of mobile technologies in learning, therefore, requires a change in pedagogies towards self-directed learning for students (So, 2012), which is a significant shift for both teachers and learners.

5. Mobile learning cases – Lao PDR and Cambodia

There is a suite of factors that contribute to creating environments conducive to the development and application of mobile learning in higher education. In order to consider these more specifically in Lao PDR and Cambodia, an investigation of two educational programs was undertaken. This research was based on qualitative investigation and analysis of two cases. Through a focus on each individual course as a case study, the investigation was allowed to pursue an understanding of its current contextual conditions. In-depth interviews were undertaken with one lecturer from each program. Interviews were conducted in English. Lecturers were asked through open-ended questioning to describe how mobile devices were being used in their courses, factors affecting the use of these devices, and successes. Data was collected from interviews as transcript notes by the interviewer, and along with field notes provided the basis for qualitative analysis of the interview transcripts. This analysis identified themes associated with current and potential mobile learning in each institutional context which are identified and summarised below.

5.1. National University of Laos (NUOL), Laos PDR

The National University of Laos (NUOL) is the only national university and is based in the capital of Vientiane. It has eight campuses. Its various faculties include Agriculture, Architecture, Environment, and Development

Studies, Engineering, Natural Sciences, Forestry, Education, Environment and Development Studies Social Sciences, Natural Sciences, Literature, Economics, and Business Administration, and Laws and Political Sciences. The University includes a Continuing and Distance Education Centre and an Information Technology Centre.

The Faculty of Agriculture which is the focus of this investigation delivers High Diploma and Bachelor level training programs in Plant Science, Livestock and Fisheries, Rural Economics and Food Technology with 68 teaching staff in 2014, of which forty-two have postgraduate qualifications. One lecturer from the Rural Economics course was interviewed about mobile learning within their teaching program.

5.1.1. Students

Student enrolments in the Faculty of Agriculture vary from over 500 in 2009/10 to 750 in 2012/3 and graduations have ranged from approximately 250 to 400 over the past seven years. The age range of students in the Bachelor program is approximately 18-20 years, and for students undertaking the Bachelor program who already have a High Diploma, the age range is 23 to 35.

Although almost all of the students in the Bachelor and Bachelor Continuing program have mobile phones, many lack the skills to use them efficiently to support their educational activities. Access to laptop computers generally is limited to one-third to one-half of all students studying at the University. Along with this limitation in the availability of computers, students' use of mobile technology is restricted by the cost and availability of internet access. There is one publicly available Wi-Fi connection within the Faculty of Agriculture, and students have no access to Wi-Fi in their dormitories.

5.1.2. Access to learning content

The Agricultural Economics course offered in the Bachelor and High Diploma program is delivered annually to up to 30 students. Currently, students studying this course must attend lectures that include topics of production systems, agricultural policy, rural economics, agricultural extension and rural sociology. Students, as for all students at the University must attend these lectures in person to access their learning content. Although the University has developed an online learning management system it is not used to formally provide access to lecture content because most students do not have their own computers. Students mostly hand in assignments in hard copy, but most have an email account usually accessed through a smartphone. Email is sometimes used for urgent communications. Students often send their final reports to the Lecturer for checking using email or Facebook. Much of their research for these assignments is undertaken in the library or through books they borrow from the library.

Ownership of mobile phones by some students, however, is playing a role in contributing to their learning. Students are able to call the lecturer anytime, at a time and place convenient to their study with their questions. Some have received lecture notes and additional learning material from the lecturer using email on their mobile phones.

Mobile phones are allowing these students easier and more ongoing access to communication and sharing of notes at any time, as well as the ability to organise learning material. This supplements their learning in addition to the formal presentation of lectures in class. Students are increasingly expected to use the internet for information searching to access additional learning materials, and for undertaking assignments. Mobile phones are contributing to these activities, but only for some students. Due to limited skills of students and limited connectivity, mobile phones are mostly used by students and lecturers for communication rather than information delivery and searching.

5.1.3. Teaching

In delivering this program, the lecturer is increasingly sharing information and resources online. She uses the internet more for information searching and sees her students doing the same:

> there is some change in our lectures since last few years, now we use … more and more social media for communication and share notes and we use also … more and more internet for information searching.

Although mobile phones have made a difference to the ability of some students to seek advice from lecturers in a timely manner, and for students to communicate with other students, some students within the Faculty of

Agriculture are from poor rural families with little or no access to computers or mobile phones. Many lack the skills to use these devices as part of the learning activities. Lecturers, therefore, are challenged in making changes to their course delivery, even in sharing additional notes online or contributing to discussions equitably:

> it is still [remains] a challenge to change the delivery program even though part of the students have their mobile phones or devices. But part of the students are from the rural, poor families of countryside which they have no smartphone and computers and they still [are] weak on technology use. In addition, the IT system and internet network in our school [is] still weak and [of] limit[ed] availability. [For] example: the computer room in our faculty ha[s] a total of 16 computers which is a barrier to computer learning for the students….the mobile phone is mostly used[d] to communicate…limit[ed] use for information delivery and searching…. we need more facilities such computer and internet access.

5.1.4. Communication

In the Rural Economics course mobile phones are used significantly for communication between lecturers and students, largely through phone calls but also through email as described below:

> My students and I communicate using email, yes sometime we used to share the lecture text to the students or the students can send us their assignments via email or social media such facebook. but this is still [a] small portion [of students]. My students and I communicate using mobile phones, we use…sometime for call and chat if the students have questions or in case we have urgent message to the students.

The Lecturer shares her mobile phone details with her students, responds to telephone calls and Short Text Messages from them, and emails using her mobile phone. She can share lecture notes and additional material or homework questions with her students in a timely manner using her mobile phone. Mobile phones are also the main means through which students communicate with each other:

> My students communicate with each other using a mobile phone, the students have their group page in social media, [for] example Facebook… that they can communicate, passing message and for their organization...They rarely use email to communicate with each other.

Access to social media using mobile phones is enhancing communication to support learning. Students have set up group pages on Facebook where they communicate with each other, and as a storage site for additional learning material sent by the lecturer. In this way, the students are taking some responsibility for organising communications between themselves and as a way for the lecturer to communicate with the group as a whole.

5.1.5. Skill levels

Limitations in terms of computing equipment and the skill levels of both lecturers and students would need to be overcome in order to deliver programs that more fully incorporate digital and technology-based resources and processes.

Educators	Up to half of the lecturers within the faculty who do not speak English or who studied within Laos PDR have limited digital skills. It was suggested that they would require significant amounts of training in order to be able to develop and deliver online educational programs and resources:
	> at this point, [I] think it is not easy to make change (in the delivery of our programs) because we still need many thing[s] before able to change such we still need material and skill.
Students	Skill levels of students are limited and this is another barrier to developing more online and mobile-based learning programs:
	> [Students'] skill to use online platform(s) and social media for study and research remain limit(ed).

5.1.6. Technical

NUOL has implemented a number of phases to enhance the use of information and communications technologies. These plans include the development of a network and Internet services; application of ICT in teaching and learning and research activities, and application to planning and managing the University.

The University is establishing systems to manage learning processes online, but their implementation across the organisation appears limited due to low student numbers who have access to computers or mobile phones. It

is progressing towards using Moodle software to deliver lectures and learning content and has organised staff training in the system. However, there are insufficient computers available for all students to access the online content:

> My University has an online Learning Management System…we are planning a distance learning system by using Moodle Software, but our foundation is not yet ready to use, mean that we still lack of IT room for students and most of the students don't have their own computers for this program…we already organised a training course for Moodle use to all staff.

Limitations in technical infrastructure within the University are a drawback to the use of mobile devices in learning programs, with limited connectivity and functionality within the University IT system. Ongoing support for lecturers in developing their programs to incorporate and maximise value from online resourcing is currently limited.

> we rarely get assist[ance] from the computer expert, as we have only 1 person responsible for that…mostly we find our solution by ourselves.

The lecturer suggests that students and staff have very little available assistance in setting up their mobile phones or laptops with internet access or email or gain help with technical problems. With only one technical (IT) expert available to staff and students most students are forced to find their own solutions to computing problems and setting up computers and phones with internet access. There are no available online self-help files or support services.

5.1.7. Organisation

The University has undertaken significant planning to expand the availability of computing facilities for students and increase the level of support for students and staff to adopt more use of technology in their educational activities, but lack of skilled human-based resources is a key limitation as the lecturer outlines:

> we plan to develop more computer room and give more support for technology use, but it still remains an issue, because we don't have skill human resource.

5.2 Royal University of Agriculture (RUA), Cambodia

The Royal University of Agriculture in Cambodia has been providing training in agriculture since it commenced in 1964. Among its eight faculties is the Agronomy faculty which includes Departments of Soil Science, Plant Production, and Plant Protection. Within the degree program in Soil Science, one of the courses offered is the Pedology and Soil Analysis course which is delivered annually to around fifty students. One lecturer from this course was interviewed about their use of mobile learning within their teaching program.

5.2.1. Students

The lecturer indicated that most students in this program are in the age range 20-22 years old and most of these students (around 95%) own their own mobile phones. They suggest approximately 40% of student phones are smartphones while 70% of students use a laptop computer. Most students access the internet at home, many using their smartphones.

5.2.2. Access to learning content

The Pedology and Soil Analysis program is delivered as lectures which students must personally attend. Lecture notes are emailed to each student prior to lectures so students have a chance to review and download the content. Assignments are issued to students in hard copy format and students submit these in hard copy in person to the lecturer.

Research papers and other information related to the course are published on the University website and students download this material as part of their study program. Whilst most students download the material using their laptop devices, the material can also be accessed using smartphones.

The course lecturer indicates he is increasingly looking to include additional aspects to the assessments such as incorporating activities into assignments that rely on students accessing the internet. Although he would like to use more digital approaches in teaching he must use material and resources in formats available to all students. He outlines the changes that have occurred in his University:

> The availability of lecture notes and materials has increased significantly over the past few years due to teachers providing lecture notes and resources online to students and they're being able to access these at any time freely using their own devices. Past students indicate that the enhanced availability of lecture notes and materials online is significantly different to the past model where students had to pay for their hard copy lecture notes available only in class.

The soils lecturer indicates that students are accessing lecture notes anywhere and anytime, before, during or after lectures mostly through computers but many can also use their mobile devices. Those students with mobile phones are seeking additional information to support their learning at a convenient time. Mobile devices are also enabling students to more easily participate in group learning activities and to increase the amount of reading they undertake (at a time and place suitable) as well as allowing students to store learning material and resources in a portable format. The teacher identifies the value of ongoing use of mobile devices in learning for students:

> … Increasing use of mobile phone and device[s] are necessary for [students'] present study and also for their future career. Because the students can access and get lecture notes and updated new technology information, especially they can keep documents for future use and share to others. Moreover, they can store many documents with saving more money from copy and not use a lot of papers (saving environment).

5.2.3. Student research

Students are using mobile devices and connectivity to undertake their research, and access a range of additional information associated with their learning topics:

> Most of students do research using their mobile smart phone and laptop where they can access internet. Even [if] they are going to [the] library … they still use internet from their mobile smartphone. Because internet can provide more information and takes short time to find the information that they are searching.

5.2.4. Communication

Students now also have more opportunities for ongoing and enhanced social learning and interaction as part of their learning in the program. It is in this area of communication associated with learning and teaching that mobile devices have had the most impact in this program. Learning is enhanced through the use of mobile devices and connectivity as students communicate with their teacher on a range of media about learning content and activities. The lecturer is increasingly sharing information and resources on social media so students can access more and timely material faster and more easily (using their mobile devices):

> Personally, the students can communicate with me via any available media (email, Facebook, SMS and phone call, etc.). I also share information or document sources using …social media... because the students can get it faster and easily which they can get update and new technology information and also [it] can improve their reading skill.

This use of mobile devices among students and lecturers has enhanced the ability of students to communicate with teachers at a convenient time. In addition, most students are using available media to communicate with each other about course material and activities. Mobile devices have enhanced the timeliness of these communications and provided a range of different channels, depending on the availability of connections.

5.2.5. Teaching

The lecturer in this program is using mobility and the associated increased connectivity with his students to adapt and build on his formal lecture programs. He believes it is easy to increasingly incorporate more aspects of mobile learning into his teaching programs as students are expecting to use their mobile devices:

> students…prefer to open and read lecture notes from electronic file which easy to access and keep the information for a long [time]… many students want to study using technology as foreigner students do.

The lecturer sends lecture notes via email and sometimes posts information on his own Facebook account. He now has expectations around current and future student learning that are based on this enhanced mobility and

connectivity. These expectations are that students pursue further reading and interaction with others (using their online connections) – taking a more self-directed focus, to add to the basic teachings:

> In my opinion, the students need to pay more attention on finding information on the available websites and increase their reading, especially group working which they can find something new or new ideas from each other.

5.2.6. Skill levels

Beyond expectations is the important aspect of skills and literacies both of educators and students in terms of developing and applying the functionalities afforded through the use of mobile devices.

Educators   Although lecturers at RUA are increasingly developing their teaching programs to incorporate more use of mobile devices, they are left on their own to accomplish this. Many appear to have sufficient skills to develop digital material and deliver programs that incorporate mobility and connectivity, but they believe there are additional skill needs amongst staff in developing and using systems that can be more tailored to individual users:

> I think many lecturers at RUA have enough capacity and skill in using digital technology to develop and deliver courses [and] materials, but they also need some training course on how to develop a security network system. It means that each student must to have his or her personal username and password for access [to] the lecture… notes and information relate[d] to their study and research.

Students   Students in the program mostly have higher levels of digital skills than lecturers, but these do vary significantly, a point educators must constantly consider in developing their programs:

> Presently, the students have higher digital literacy levels than lecturers...because there are more available digital devices on the market and they take a computer science course in part-time (1-2 hours per day). The students' skills in searching the internet or using online platforms or social media for their study and research are completely different depending on their level of digital literacy and experiences.

5.2.7. Technical and organisational

The Royal University of Agriculture is supporting the increasing use of mobile devices in teaching and learning through its technical support and availability of WIFI. Technical support is available at RUA for both lecturers and students for setting up mobile phones or laptops with internet access or email, and free WiFi is available. However, this support is limited, with very little support with technical problems, and no assistance for lecturers in terms of adapting their content so it could be delivered online.

> .. the university does not help for adapting the content to be delivered online. But university can help to share your information or posted your research on the website of university. Anyway... this support is not sufficient.

The RUA is developing plans to change to more online delivery of courses and introduce more support services, however, the lecturer suggested that:

> financial and technical support is needed to successfully make those changes.

6. Discussion

The two cases outlined indicate that the increasing ownership of mobile devices is indeed impacting on the teaching and learning occurring in both Universities. In these two teaching programs, both lecturers and students have a vision to maximise value from the use of mobile devices in University teaching and in student learning.

Mobile phones in both programs have enabled students to receive and access additional information related to the program more easily and in a timelier fashion. It has facilitated more regular and easier communication with their lecturers and with other students during their course. Use of social media, mostly from mobile phones has also allowed students to store and manage their learning content more easily, and to do this within a social learning context.

6.1. NUOL, Laos PDR

Mobile phones are contributing to learning activities among a small number of students, in particular through access to information, searching for information, communication with lecturers and other students, and in submitting assignments. However, there is significant variation in ownership of devices and in connectivity. Rural students from poor communities do not have access to mobile phones or computers, and they do not have the skills to use these devices. This limitation, along with the lack of resourcing and skills within the education institution is hindering any potential development and broad application of mobile learning.

6.2. RUA, Cambodia

This case highlights increasing connectivity and mobility within the Higher Education sector in Cambodia, and therefore, the possibilities for students and teachers to use educational approaches that are based on access to mobile devices. In this example, increased communications and flexibility in the provision of and access to learning content have occurred in line with increasing access to mobile devices and connectivity among students. Additional approaches to expand educational opportunities for connected students were being developed by individual lecturing staff, and this was occurring with an expectation that students would enhance their mobile-based learning associated with the course content.

It may be that the sharing of expectations between lecturers and students about the possibilities of mobile learning may help map a pathway for future mobile learning development in this program. The ability for lecturers to share their approaches with each other along with the identification and documentation of training and infrastructure needs may also help educational institutions map their pathways to broader mobile learning applications and functionalities.

There appears to be scope for educational institutions, in acknowledging the widespread and increasing use of mobile devices by students to formulate policies and strategies for institutions that will enable both groups to increase and develop their learning applications within mobile arenas. This case review suggests that these must include additional technical and systems-based approaches and incorporate standards and training to ensure security and protection of educational content and for system users.

6.3. Evaluating mobile learning

In each case, mobile learning was occurring through enhanced timeliness of learning, enhanced access to additional learning material and opportunities, increased capacity to search for additional information, connect with others and manage learning content, and more social and ongoing interactions to stimulate the learning process. Use of mobile phones among students has meant that students are approaching their learning by including additional activities - social-based communications and some timely information searching around particular problems or questions they have. This more ongoing use is helping students to develop their own understandings of the relevance of the learning content. The new functionalities are contributing to redefining traditional concepts of learning.

Teachers in these two cases were providing more learning content and communicating more with students throughout the course. This occurred beyond formal lectures, using mobile phones which provided a platform for access to email, social media, and Short Messaging Service (SMS). They answered students' specific questions in a timely manner. The provision of this additional material and communications through social media requires a level of commitment from lecturers beyond formal lecture and assignment material and resources.

Although both organisations were committed to developing technology-based teaching and learning systems, the instigation and roll out of these were hindered by a lack of resources including equipment, staffing, and training. Teachers were implementing approaches that incorporated use of mobile devices to add value to learning. However, in both cases, these approaches were undertaken by individual teachers alone, with little guidance from their organisations. Teachers' expectations were for students to take more social, self-directed approaches to their learning. They were expecting students to show evidence of additional self-directed learnings and for more group interaction in their learning – through their use of social media on their mobile devices.

Students' ownership of smartphones means that there is less requirement for institutions to provide computing resources in order for learning content to be accessed. However, in both cases, more widespread student access,

ownership, and skill are required for this to occur. Students who cannot easily access Wi-Fi for affordable connectivity are not able to take maximum advantage of their mobile devices. Enhanced availability of Wi-Fi for students and mobile devices for those students who do not currently own them will ensure more equitable access to mobile-enhanced learning, activities, and content.

Murphy and Farley (2012) developed a Mobile learning evaluation framework which identifies the different levels and facets to consider in evaluating mobile learning within Higher Education contexts. Table 5 lists findings from the evaluation of mobile learning in both Laos PDR and Cambodian case studies in relation to the various levels of this Mobile Learning Evaluation Framework.

Table 5. Key insights from evaluation of Mobile learning within Higher Education in Laos PDR (one case) and Cambodia (one case) at levels of the Mobile Learning Evaluation Framework (Murphy & Farley, 2012)

Framework levels	Lao PDR	Cambodia
Pedagogical (learning)		
Student perspective	Communication & organisation of content	Communication & information access
		Information sharing
	Access to additional content	Portable storage of learning content
Learning needs & desires	Enhanced communication	Students want to use technology
		Easier access to content
Current & intended use	Additional learning content	Self-directed, social, communicative
		Group learning
Demographic & social context	Limited access to devices, connectivity and skills among poorer & rural students	High mobile phone ownership
Pedagogical (teaching)		
Educator perspective	Individual approaches	Educators develop their own individualistic approaches
	Increased availability to students	
Beliefs & pedagogies	More timely and communicative approaches to learning	More self-directed and empowering
Critical success factors / barriers	Limited digital skills and equipment	Device ownership and range of skills
	Need for equity among students to develop new approaches	Student motivation
Context & learning objectives	Provision of additional content and communications	Increased expectations of students for additional reading and social learning
Technical		
Processes & policies	Need for policies to cover resourcing and upskilling	Wi-Fi and some technical support.
		Organisational commitment.
Organisational barriers	Focus on technology without support	Range of literacies
Resourcing	Lack of computing, connectivity and technical support	No support for developing mobile learning approaches
Technological context	Require focus on people to apply new processes.	Educators want systems for personalising
Organisational		
Institutional strategy / vision	Need holistic planning of online initiatives	Commitment to future online development
Focus & commitment	Technology & system focus	Focus on infrastructure and online publishing
Leadership support	Focus on staffing and supporting individuals	Limited holistic approach in planning
		Support for individual staff
	Training and support required.	
Sector context	Incorporate communities, local, commercial and cultural aspects in planning	Incorporate communities, local, commercial and cultural aspects in planning

Both universities provide support to ensure staff and students have access to the internet on their mobile devices and that lecture and course material is published online. Technical support, training and resourcing for lecturers to move their programs and educational activities online are necessary factors in supporting lecturers to develop more online content, resources and digitally-based educational processes.

Mobile learning offers opportunities that may require less investment in equipment and more on people and learning program design (Bandalaria, 2005). It is in the design of programs specifically suited to the particular needs of the course, the students, their regional particularities and the economic, cultural and political environments and systems operating that the most progress can be made. These aspects should guide future applications in mobile learning.

7. Conclusion

Higher education is an important factor in the growth and development of Laos PDR and Cambodia as it can potentially provide skills and research that can support growth in productivity and innovation. Enhancing the quality of teaching and learning using mobile technologies has the potential to add value to programs by providing more continuous, portable and social aspects to learning.

Although there are various levels of ownership of mobile devices and access to internet connectivity among students in both countries, mobile learning is occurring for those students who have mobile devices, and more particularly in Cambodia. Lecturers in both countries are instigating approaches that incorporate the use of mobile devices to add value to learning. These approaches are undertaken by individual teachers or students alone, with little guidance from their organisations.

It appears that although both organisations are committed to developing technology-based teaching and learning systems, the instigation and roll out of these, in particular, mobile learning is hindered by a lack of resources including equipment, staffing, and training. Higher Education organisations in these two countries are encouraged to develop step by step planning approaches to implementing technology-based learning and to consider future research through pilot and case studies in order to fully identify requirements for successful operation and adoption.

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