Mobile learning in early childhood education: A school-university partnership model

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Chapter 8 Discussion

8.1 Introduction

The purpose of the research was to explore mLearning in early childhood education. This discussion chapter synthesises the key themes from the findings reported in the previous four chapters. Two research questions directed this study: the first concerned the benefits and challenges of adopting mLearning in early childhood education (ECE) for the schools and the University; the second concerned how mLearning implementation in schools impacted on school–university partnerships. This chapter considers the key findings from each research question and presents a model via which to conceptualise the findings.

8.2 Key findings

The study involved early childhood practising teachers and pre-service teachers (PSTs), school leaders, parents and carers, and university academics working together to gauge the benefits and challenges of mLearning in early childhood education. The impacts of mLearning implementation on school–university partnerships, in general, were also considered. A case study approach was used, and data were collected over a three-year period. Tables 8.1 below and 8.2 (p. 284) summarise the key findings, which are then discussed.
Table 8.1

*Key Findings from Research Question 1*

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<tr>
<th>What are the benefits and challenges for schools and the University of adopting mLearning in ECE?</th>
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<td>Children exhibited engagement when using mLearning.</td>
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<td>Practising teachers and PSTs engaged in learning.</td>
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<td>Beliefs of practising teachers and PSTs about using mLearning in ECE became more positive after the authentic mLearning teaching experience.</td>
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<tr>
<td>A lack of mLearning resources and technical support inhibited the use of mLearning in the classroom.</td>
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### 8.2.1 Children exhibited engagement when using mLearning.

The findings of this study showed that children working with mLearning were highly engaged and more able to use mLearning tools than the practising teachers and PSTs expected. When children were asked which activities they had enjoyed the most, their responses were about the content of the lesson and not the mLearning tools used. This focus indicates that the novelty value of the tools was not what had engaged them. Having school and university leaders observe children’s engagement with mLearning was important because leaders have the ability to initiate change. Leaders observed that mLearning was an effective tool in early childhood education despite the negative media associated with young children and technology (F. Simon et al., 2013). The high level of engagement of children in this study was consistent with the existing literature (Boyce et al., 2014; Ciampa, 2014; Chiong, Ree, Kazakoff & Bers, 2014). Jonassen and Kim (2009) state that meaningful learning occurs when there is deep engagement with ideas and that meaningful learning is essential for problem-solving and higher order thinking skills. Common concerns about the distracting nature of mLearning (Boyce et al., 2014) did not arise. No participant indicated that any children were off-task, suggesting that the mLearning activities planned for the children were engaging.
8.2.2 Practising teachers and PSTs engaged in learning.

The PSTs were divided into peer and authentic groups, enabling comparisons to be made about their use of mLearning in the classroom and the extent to which their pedagogical knowledge and technological knowledge were enhanced. The peer groups presented mLearning lessons to their peers in the mode traditionally used in the University, whilst the authentic group presented their mLearning lessons to children in the partner primary schools. The research findings showed that the authentic groups had a richer learning experience than the peer groups and were more able to design lessons to meet the needs of children. This finding is consistent with the Kolb and Kolb (2009) model of experiential learning where concrete experiences followed by reflection enables the learner to conceptualise and actively experiment with new knowledge. The School of Education (SoE) ICT coordinator continued with the authentic mLearning teaching experiences beyond the intended three-year period and removed the peer group so that no PST missed the authentic experience. This continuation of the authentic mLearning teaching experiences for the PSTs indicated that the SoE was satisfied with the outcomes of the mLearning experiences for the PSTs.

The opportunity for the PSTs to present mLearning-rich lessons in an authentic classroom setting gave them increased pedagogical experience, particularly in the use of mLearning. The PSTs also received feedback from the teachers about their teaching. The PSTs made 50 comments reflecting increased personal pedagogical experience. These PSTs in the authentic groups valued the teaching practice that the mLearning implementation gave them. PSTs copied cues from the teachers and lecturers, and commented that it was good for PSTs to see early childhood practices modelled in the classroom. The practising teachers embraced the chance to provide the PSTs with feedback on their lessons and supported them during the lessons. The findings revealed many examples of PSTs lacking pedagogical knowledge. This finding was not unexpected as the PSTs were less than halfway through
their degree. The pedagogical feedback from the practising teachers was valued by the PSTs, as illustrated by the 55 comments they made highlighting the value they placed on such feedback. The authentic mLearning teaching experiences were expected to have an impact on the PSTs, but an unexpected finding was that the difference in the standard of the lessons between the peer and authentic groups was so great. The lessons presented by the peer groups lacked clear explanations, creative resources and were often not age appropriate. The lessons presented by the authentic groups were age appropriate, engaging, supported by creative resources and explicit. The authentic PST lessons were deemed by the SoE staff to be of a superior standard throughout the three-year period.

All the participating teachers increased their technological knowledge and ability to integrate technological, pedagogical, and content knowledge (TPACK) as a result of the mLearning partnerships. The teachers made 40 comments regarding the benefits of the mLearning implementation. The findings revealed that some teachers rated their initial technological knowledge highly because they associated it with knowledge of software programs. Teaching with technology requires teachers to modify their pedagogy. Findings revealed a lack of teacher understanding about how pedagogy needs to be modified to facilitate learning using new technologies. After the PST visits, practising teachers were found to use mLearning in ways demonstrated by the PSTs, indicating that they had gained technological knowledge and were able to apply mLearning in a student-centered manner. This finding highlighted the TPACK learning that occurred through the synergy of the practising teachers and PSTs.

8.2.3 Beliefs of practising teachers and PSTs about using mLearning in ECE became more positive after the authentic experience.

The authentic groups’ teaching experience changed the views of those PSTs who took part. The authentic groups expressed fewer concerns about mLearning than the peer groups.
did after the mLearning lessons. The peer groups’ view reflected a general opinion that mLearning is a passive activity (Carson, Tremblay, Spence, Timmons, & Janssen, 2013; Hinkley, Salmon, Okely, & Crawford, 2013). The authentic PSTs made 44 comments about mLearning, which highlighted a positive orientation towards mLearning in the early childhood classroom.

Teacher beliefs shifted through the study. Findings revealed that many teachers initially viewed the PST visits as “computing” sessions and did not have an understanding about integrating mLearning as a tool to support the curriculum. In the beginning, teachers commented about the barriers to mLearning; however, as the research progressed, there were fewer comments about barriers to mLearning. The study showed that the opportunity to observe children engaged and learning using mLearning tools changed the perspectives of practising teachers and PSTs from a view of caution to a view seeing the potential educational value of mLearning.

8.2.4 A lack of mLearning resources and technical support inhibited the use of mLearning in the classroom.

There was an initial lack of mLearning resources, including hardware and software in the partner schools and the University. All participants thought that the lack of mLearning resources was a challenge to mLearning in early childhood education and inhibited the use of mLearning. The amount of mLearning resources in both schools increased as time passed. Some of the teachers borrowed Bee-Bots (1), iPads (1), and digital microscopes (1) from the University, and some PSTs (6) borrowed mLearning resources for professional experience. Resources at the University before the research commenced consisted of one IWB (interactive whiteboard) and a computer laboratory with clusters of desktop computers. The iPads (16) purchased for this research were used extensively by the SoE community, which led to the purchase of another set of iPads and discussions about ongoing maintenance of the
devices. The mLearning interventions are likely to have expedited the acquisition of mLearning resources in both schools and the University, as illustrated by the following examples:

- A Principal applied for an iPad grant and installed Wi-fi when the feedback from parents about the mLearning implementation was positive.
- A Principal ordered the school’s first set of iPads a week after observing a PST visit.
- A Principal purchased all the mLearning tools modelled by the University including Bee-Bots, digital microscopes, Story Sequencers and Recordable Butterfly devices.
- The Parents & Citizens (P & C) Association approved the purchase of a set of iPads following a parent workshop.
- The University purchased an additional set of 30 iPads.

The PST visits possibly raised the profile of mLearning in a positive manner in both schools and the University, which encouraged leaders to purchase additional mLearning resources. Although the research focused on the synergy between the practising teachers and PSTs, University and school leaders were regularly invited to view the research in action because leaders had the authority to make decisions regarding the acquisition of mLearning resources. The iPads purchased by the University for the research were used so extensively that from an mLearning perspective they became indispensable. At a time when increasing numbers of schools were considering 1:1 iPad programs and digital literacy had become mandated in the Western Australian curriculum, teacher educators needed to ensure that PSTs were prepared and had access to mLearning resources.

Lack of technical support is a blocker for technology integration (C. Clark et al., 2015). New technologies always present new challenges, and proper support can help teachers overcome such barriers. Careful management of mLearning resources enables teachers to use them more effectively. In the final year of the study, both principals had
systems in place so that all the iPads were synchronised, had hard cases and there was a process for charging, booking, and adding apps.

The findings of this study showed a lack of technical support at both schools and the University. In the first year, there were problems with iPads not working and Wi-fi connectivity. The connectivity issues improved in the second year. In the final year, the Principals had the greatest understanding of these connectivity barriers and were proactive in providing rapid technical support. Without ongoing support and maintenance, mLearning integration is difficult in schools. Principals needed to be aware of the barriers to mLearning in the classroom and to be proactive in providing fast technical support to overcome problems. The following list gives examples of where technical support was lacking:

- IWB was not working for six months at School A.
- Wi-fi would not support more than four iPads at School B in the first two years.
- No system for collecting and recharging the iPads at School B in the first year.
- School B had no cases for carrying iPads in the first year.
- iPads were not numbered at School B in the first two years, so children’s work was often lost.
- Wi-fi was not working in some classrooms in School B at the start of the third year.
- Wi-fi was unreliable at the University.
- No system at the University or schools to easily add apps to the iPads.

Good technical support reduced the barriers to mLearning. This study revealed that teachers made fewer negative comments about mLearning when technical support was in place and problems were resolved rapidly. Teachers also appeared to increase their self-efficacy and became more likely to troubleshoot technical problems when fewer problems arose.
Research Question 1, what are the benefits and challenges for schools and the University of adopting mLearning in early childhood education, revealed three main challenges and three main benefits. Children’s engagement, practising teachers’ and PSTs’ learning (technological and pedagogical), and mLearning beliefs becoming more positive were the key benefits. A lack of mLearning resources, poor technical support, and limited time were identified as the key challenges.

Children’s engagement in the classroom was a benefit well documented in the findings. The fact that there was no evidence that the mLearning tools were a distraction to children indicated that distraction was not an issue if activities were well planned and developmentally appropriate. However, mLearning resources were a challenge to mLearning implementation because at the start of the research one school had no mLearning resources available to use in the classrooms. Technical support was a challenge also, because when mLearning resources were available, poor support gave teachers a reason not to use them. The findings revealed a lack of teacher technological knowledge about the effective use of mLearning in early childhood education. In many cases, teachers used mLearning to replace traditional tools, such as electronic worksheets, as they were unaware how to use mLearning to transform and enhance children’s learning.

The enhanced mLearning teaching experience for the PSTs was documented in the findings and was found to be a key benefit of the mLearning implementation for the University. A key challenge for the University was finding the time to research, purchase and maintain resources. It was also a challenge managing the PSTs as they needed support to plan appropriate lessons that would work in a classroom setting. As a result of the mLearning implementation, the University purchased mLearning resources that were available for other staff to use. The mLearning resources purchased for the research were used extensively by staff within the SoE resulting in the purchase of additional resources. mLearning resources
available for all staff and PSTs within the SoE as a result of the research was a benefit of the mLearning implementation.

Figure 8.1 illustrates the benefits and challenges of adopting mLearning in early childhood education for the schools and the University. Time, resources and technical support are shown in red as challenges, and children’s engagement, beliefs about mLearning becoming more positive and enhanced expertise for PSTs and school staff are shown in green as benefits.

![Diagram](image)

*Figure 8.1. Research Question 1: The benefits and challenges for schools and the University of adopting mLearning in early childhood education.*
Table 8.2

Key Findings from Research Question 2

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<thead>
<tr>
<th>How did the mLearning implementation in schools impact on school–university partnerships?</th>
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<tr>
<td>Both mLearning implementation and school–university partnerships were affected by leadership.</td>
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<td>The role of parents and carers was important in the implementation.</td>
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<td>The maintenance of partnerships was time-consuming and had to be beneficial for both partners.</td>
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8.2.5 mLearning implementation and school-university partnerships were affected by leadership.

The school leaders at both schools were enthusiastic about cultivating mLearning partnerships to support teaching and learning. This finding was consistent with existing literature about the characteristics of effective school leaders (Woods, Husbands, & Brown, 2013). The fact that all the Principals agreed to release teachers to visit the University to meet the PSTs at the start of each school year, visited the classrooms during PST visits, and offered professional experience placements for PSTs from the University showed a positive disposition towards the mLearning partnership. In the final year, both Principals purchased the mLearning resources that had been used by the PSTs.

The University understood that careful selection of teachers for the mLearning intervention was an important factor, but it was not until the school leaders valued the importance of having the right teacher that school leaders selected the teachers themselves. When the Principals took the initiative to select teachers for the partnership they chose teachers who had the potential to become technological leaders within their schools. Such teachers needed to be open to using mLearning, exploring new pedagogies, and willing to share their acquired knowledge with colleagues, which is consistent with the findings of Winslow et al. (2012) concerning the qualities of good technological leaders. In the final year
of the study, both schools had leaders who selected the participating teachers. The longitudinal nature of this research enabled the partnerships between the University and the schools to grow because it was possible to adapt to meet the needs of the respective partners.

To maximise the benefits of the partnership, principals needed to be proactive in seeking opportunities for the school. One Principal spontaneously released additional early childhood teachers during a PST visit in order to maximise the learning opportunities for other teachers. The action of this Principal is consistent with findings by Akcaoglu et al. (2014) about how good school leaders find ways to upskill staff. In the fourth year, this Principal rearranged teachers’ planning time so that all staff would have the opportunity to observe the PST visits.

The key findings indicated that good leadership maximised the outcomes of the partnership and leadership lacking support for technology stalled mLearning integration. Poor technological leadership was evident in the study when a leader remained at a school for a short period and when a leader lacked interest in technology and consequently did nothing to prepare under-skilled staff for technology integration.

8.2.6 The role of parents and carers was important in the implementation.

Parent associations are an important source of income for small schools and enable the purchase of additional mLearning resources (Fabricant & Fine, 2012). At both partner schools, the P & C Association purchased a set of iPads and raised considerable funds each year. At School A, the P & C Association raised an average of $20,000 each year. At School B, the P & C Association raised an average of $12,000 each year, with the amount raised increasing each year. The P & C Association’s decision to purchase iPads at School A was influenced by parents who attended a University-delivered parent mLearning workshop,
had children in classes that were part of the mLearning intervention, and were members of the P & C Association.

The use of mLearning in early childhood education is said to be a concern of parents and carers (DeLoache et al., 2010; Siraj-Blatchford & Siraj-Blatchford, 2006). Some of this concern may relate to knowledge gaps about the educational benefits of using mLearning in the classroom. Parents and carers may fear that mLearning will have a negative impact on language development (McCarrick & Li, 2007). There may be a perception that children use ICT excessively, and that there are limited benefits if children passively use technology rather than use it in a more socially constructive teacher-initiated way (Napier, 2014). Some parents may find it difficult to untangle the complex relationships between education, gaming, and social networking (Granic, Lobel, & Engels, 2014). A. Simon et al. (2014) suggested that parents need to work with teachers to guide and support children. Parent workshops such as those in this study gave parents and carers access to more information so that they could make informed decisions. All parents who attended mLearning workshops indicated that their views about mLearning became more favourable as they saw how mLearning tools were used to support the curriculum. This is consistent with existing literature by L. Emerson, Fox, and Fear (2012) who found that engaging parents has the greatest impact when it is focused on specific learning outcomes.

At both schools, many of the parents placed more importance on arts and music than on technology. When a Science, Technology Engineering and Mathematics (STEM) specialist replaced the music specialist teacher at School A, some parents complained indicating that they did not place value on STEM. The parents who complained had not attended any of the mLearning parent workshops, which might have enabled them to see the educational benefits and make a more balanced judgement. Pegrum (2009) found that informing educators, including teachers and parents, enabled them to figure out the real
dangers and make informed decisions. The findings of this research showed that the common parental view about mLearning was one of concern, but this view changed when parents were informed about the developmentally appropriate use of mLearning through parent workshops such as those in this research. The research showed that parental views could change as a result of positive hands-on exposure to mLearning.

The growing interest in the BYOD (bring your own device) model of technology integration means that parental support of mLearning is vital (Australian Government Department of Education, Employment and Workplace Relations, 2013; US Department of Education, 2010). If a school places tablet computers on booklists for children, then tablet computers become a factor for parents to consider when choosing a school for their children. Small schools such as those in this study are trying to grow and so losing enrolments is not desirable. Investigating the BYOD model of technology integration was in School A’s business plan, which indicated that the Principal and school board were open to the idea.

The findings of this research showed that parents influenced a school Principal at School A to apply for an iPad grant after the Principal stated that he had no intention of purchasing any iPads for the school. This finding addressed the second research question showing that mLearning interventions can have an impact on school communities, which can lead to changes in a school. One Principal misjudged the impact of a school community when he stated that the P & C Association was not engaged. The research found that, on the contrary, the P & C Association was highly engaged and had raised $20,000 each year. The impact on the school communities was found to be significant in this research because of the influence they had on the direction and leadership of the schools.
8.2.7 The maintenance of partnerships was time-consuming and had to be beneficial for both partners.

Sustainable partnerships require time to develop (Killion, 2011). Time and shared experiences build trust so that positive experiences outweigh negative ones. The findings showed that all participants were committed to continuing the partnership at the end of the third year. The longitudinal nature of this research meant that the relationships formed had time to develop and became personal with school and university participants greeting each other warmly and sharing personal experiences beyond the partnership. The findings revealed that participants deemed the additional time required to sustain the partnerships worthwhile. This finding was consistent with the existing literature (Walsh & Backe, 2013).

Time was required at the beginning of each year to liaise with schools to set up a workable timeframe for the PST visits. In addition to the PST visits, time was needed to release the practising teachers to visit the University, meet the PSTs, and provide curriculum support. Releasing the teachers to come to the University meant that the schools had to organise cover, and the teachers had to think about the content that would be relevant when the PSTs visited to teach lessons. Time was required to introduce the teachers to the ICT lecturer and PSTs, and explain the partnership to the participants. The school leaders needed to select teachers with the potential to become technological leaders and liaise with them about their role in the mLearning partnership. It also took time to research, purchase and maintain mLearning resources that were developmentally appropriate, usable across the curriculum, and cost effective. Although mLearning resources from the University were available for the participating teachers to borrow, few teachers took up the offer, which supports the literature that teachers are unlikely to explore new mLearning resources to which they have not been previously exposed (C. Hill, 2010).
At the onset of the partnerships, the SoE staff were concerned that PSTs in the peer groups would feel that they had missed out on an mLearning teaching experience in a real classroom. The authentic groups indicated that preparation for the school visits was time-consuming but worthwhile. An unexpected outcome of the study was that the PSTs in the peer groups indicated they were glad that they had not undertaken an authentic experience because of the associated time commitment that it required.

Considerable time was spent attending, planning and organising professional development workshops. It was time-consuming to meet the needs of the schools on occasions, particularly when some requests did not meet the partnership goals of the University. However, meeting the needs of the schools was an important way for the University to demonstrate a commitment to the partnerships and develop relational trust. Although the partnerships became easier to manage and organise as they progressed, time was still needed because invariably there were new participants. Schools are busy places and initiatives such as the mLearning partnership in this research competed with many school priorities. Powell (2014) supports this finding, saying that teachers are overwhelmed with choices and often do not have time to look at new mLearning resources.

The findings revealed that principals who invested time in the partnership tended to maximise outcomes. In the final year, one busy new Principal took the time to ask many detailed questions about the partnership. When the University attended her school, she always extended an invitation to share the mid-morning break and engaged in discussions about avenues for the partnership. She was particularly interested in professional learning opportunities for her staff.

By the final year of the study, the connections between the schools and the University were well established, and the partnerships were mutually beneficial. Both school business plans contained the words partnership and community, illustrating the importance of
community connectedness at the schools. The findings revealed that children, practising teachers, and PSTs could learn concurrently. This finding was consistent with the existing literature about maximising opportunities from a mutually beneficial partnership (Chorzempa et al., 2010).

Independent Public Schools (IPS) are reviewed every three years and need to demonstrate outcomes from their business plans. A partnership with a University was a measurable outcome for the schools. Likewise, universities need to demonstrate partnerships within the community because good school–university partnerships can result in quality professional experiences for PSTs (Australian Government Department of Education and Training, 2015a). Teaching degrees at Australian universities are regularly accredited by Australian Institute for Teaching and School Leadership (AITSL, 2014) and need continual evidence of excellent practice. Partnerships with schools provide beneficial evidence for a University. An unexpected outcome of the study was a University representative becoming a member of both school boards. Such an association was mutually beneficial because it demonstrated a connection with the local community for the schools and the University.

The decision to continue the partnership beyond the original three-year plan was a positive outcome of this research, demonstrating that the mutual benefits deemed by key stakeholders were worth maintaining. Benefits of the partnerships were professional development offered by the University, additional teaching practice in the schools for the PSTs, the synergy between practising teachers and PSTs and a community connection. These benefits align with the Australian government’s Students First policy, which focuses on improved student performance and states that universities must work more closely with schools (Australian Government Department of Education and Training, 2015b).

The high cost of teacher relief made attendance at ICT workshops for practising teachers, alongside the PSTs, financially prohibitive for schools, so the University provided
alternative opportunities for the teachers through an ICT intensive unit during the school
holidays. However, in the three-year study, only one teacher attended the ICT intensive, even
though both schools expressed an interest. Providing opportunities for teachers in the school
holidays meant that the teachers needed to give up personal time. The finding revealed that
few teachers were able to commit personal time for mLearning, which is consistent with the
current literature (Bubb & Earley, 2013; Ritzhaupt, Dawson & Cavanaugh, 2012). Schools
were not able to pay for teacher relief so that teachers could attend the ICT unit at the
University in work time and teachers were not prepared to attend the ICT intensive at the
University in their own time. A possible solution made by a Principal at School B was a
compromise where teachers attended the ICT intensive in the school holidays and the time
was traded for a school professional development day so that teachers did not have to give up
additional time and schools did not incur the cost of teacher relief.

In the final year, parent workshops became mutually beneficial when an idea
suggested by a school of having PSTs deliver a parent workshop eventuated. Using PSTs to
deliver the parent workshop gave PSTs, who were only in the second year of a four-year
teaching degree, the opportunity to engage with parents as technological experts. Parents who
attended this workshop were positive and indicated how their views on mLearning had
changed.

The schools valued the workshops delivered to teachers, parents and carers, and
education assistants. The University provided such workshops at no cost as a way of raising
the profile of mLearning in the schools and gaining insight into parental perceptions. The
parent workshop delivered by the PSTs aligned with the Australian government’s Teacher
Education Ministerial Advisory Group report, which recommends that PSTs build skills and
confidence to raise learning outcomes for children and work with parents to achieve this
(Australian Government Department of Education and Training, 2015a). The ICT coordinator
and researcher were doubtful that the PSTs would be able to deliver a workshop to parents at an appropriate standard because of the support that the PSTs required earlier in the year. 

Having PSTs deliver a successful parent workshop at School B was an unexpected positive outcome from the research. The opportunity to deliver an mLearning workshop to parents at School B provided the PSTs with a unique opportunity within their degree, and therefore enhanced their PST training. Having parents visit the school meant that the Principal was also present for the workshop. The Principal viewed many mLearning resources, such as Recordable Butterflies, Bee-Bots, and Story Sequencers, for the first time at the parent workshop and subsequently decided to purchase them all.

PSTs need more time in schools to connect what they learn at university with real-world practice (Australian Government Department of Education and Training, 2015a). The University teacher-training courses all exceeded the required number of professional experience days, demonstrating the importance placed by the University on practical experience for PSTs. The partner schools offered more professional experience placements to the University, and there was an offer from one Principal for PSTs to liaise with the school for help with assignments or classroom observations. The level of support offered by the schools was an unexpected benefit of the partnership for the University.

Figure 8.2 illustrates how the mLearning interventions in schools impacted on school-university partnerships. The key factors identified were leadership, the importance of parents and carers, and the need for time to develop mutually beneficial partnerships.
Figure 8.2. Research Question 2: What are the impacts of mLearning implementation on school-university partnerships?

8.3 The chain model

Five themes have emerged from the results of research as improving the quality of school–university mLearning partnerships and partnerships more generally. These themes are discussed as a set of links in a chain including that of community, cross-fertilisation, leadership, professional knowledge, and relationships and are presented diagrammatically as a chain model in Figure 8.3. The chain model has been a useful framework in which to conceive sustainable mLearning partnerships between schools and universities. Each link of the model requires planning and continuous nurturing to both strengthen the link and help protect it against possible destabilisation.
The school-university partnership model is conceived as links in a chain. Each link strengthens the next, adding to the overall success of the partnerships and improves the overall quality of the teacher training received by the PSTs. The chain model is now discussed in detail.
8.3.1 Enhanced sense of community.

Ensuring that the partnerships were community-based involving all stakeholders helped to create ongoing momentum. The school and University communities included children, teachers, school leaders, EAs, parents and carers, PSTs, and academic staff from the SoE at the University. Involvement of parents and carers was important because research has shown that parents see mLearning tools as educational but do not know what they should buy or how to use the mLearning resources (Henderson & Yeow, 2012). Increasing numbers of children have access to and use mLearning tools at home, so parents and carers as the primary educators of the children need the skills to help their children (Statista, 2014). Members of a school community (apart from children) are potential members of school boards and P & C Associations with the ability to make decisions regarding mLearning in a school. In this study, more than 95% of children had access to an mLearning device at home and the most common use (76%) was for playing games. However, parental views (44%) reflected a wider community perception that mLearning can be socially isolating. The parental view indicates that parents are not happy with how the devices are used by their children.

The growing interest in BYOD means that parental support is required (New South Wales Department of Education and Communities, 2014). If parents have only been exposed to media about the risks of cyberbullying and excessive screen time they are not in a position to support mLearning. While cyberbullying and excessive screen time are legitimate concerns, they are negative aspects associated with technology that need to be balanced with the positive effects of mLearning on children’s learning. Integration of developmentally appropriate mLearning requires careful planning so that teachers can use it appropriately and parents can gain an understanding of the benefits of using mLearning in a well-balanced curriculum. One of the schools requested a professional development workshop on
cyberbullying, reflecting concerns in school communities (Pegrum, 2009). The ICT lecturer from the University delivered a workshop preferring to call it active citizenship rather than cyberbullying, couching cyber-safety in a positive manner. A show-and-tell mLearning workshop delivered by PSTs at the request of one of the Principals focused on the positive aspects of mLearning. While both cyberbullying and creative use of mLearning need consideration, it was important to balance traditional negative views with the positive aspects of mLearning. The parents who attended the show-and-tell mLearning workshop started by sharing their concerns surrounding excessive screen time. However, at the end of the session they were reluctant to leave and wanted details about the mLearning resources demonstrated, which indicated a change in disposition towards mLearning. They had experienced first-hand young children using mLearning devices in an outdoor setting engaged and actively learning.

Maintaining or increasing student enrolments was a goal of both schools. One of the schools took part in a performance review in 2010 and, as a result, there was a loss of community confidence, and many families left the school. A new Principal was brought to the school to restore community confidence. The support of a school community is important to maintain or grow a school (L. Emerson et al., 2012). If the number of enrolments falls, then the funding available is reduced. A school Principal needs to ensure that the community has confidence in the way that the school operates. New initiatives such as mLearning partnerships, therefore, need the support of the parent community and can also be used as marketing strategies to promote schools as contemporary and innovative.

The research took steps to be inclusive of the parent communities by planning parent workshops at each school each year. Research by L. Emerson et al., (2012) has shown that positive parental engagement in learning, which is distinct from engagement in schooling, improves children’s academic achievement and well-being. Existing research supports the idea that parental engagement should be resourced and is essential to educational reform in
Australia (L. Emerson et al., 2012). The parent mLearning workshops were not priorities for the schools and few parents attended. However, the parents who did attend indicated that the workshops were valuable and shared information about the workshops with friends, who requested details about the mLearning resources used in the workshops. Ultimately, the desired outcome would be for the schools to deliver parent mLearning workshops either with or without the support of the University. Providing parents with a balanced view about mLearning in early childhood education is likely to gain their support and better enable them to support the needs of their children in a technological world.

The parent bodies at both schools were supportive and involved with their children’s education even though attendance at workshops was poor. When one school made STEM a focus area and replaced the music teacher with a science and technology teacher, the parents indicated their displeasure at the loss of the music teacher and did not acknowledge the gain of the science and technology teacher. Parents needed opportunities to see the benefits of innovations such as mLearning implementation to gain their support.

8.3.2 Cross-fertilisation of knowledge and skills.

Cross-fertilisation of ideas and practices between practising teachers and PSTs provided the partnerships with a sense of purpose. According to Chorzempa et al., (2010), successful relationships can bridge the gap between theory and practice. The practising teachers and PSTs had the opportunity to learn from each other. The PSTs gained valuable classroom experience and received pedagogical feedback in a supported environment. The classroom teachers had the opportunity to observe a variety of mLearning tools used purposefully in the classroom and gain technological expertise. Cross-fertilisation arising from this research included practising teachers’ and PSTs’ levels of confidence rising using mLearning in the classroom, practising teachers’ and PSTs’ beliefs regarding mLearning in
early childhood education becoming more positive, teachers’ technological knowledge increasing and PSTs’ pedagogical knowledge increasing. The synergy between participants, all of whom had different skill sets and who were at various stages of development in integrating mLearning, required constant attention to optimise benefits for participants. For example, each new participating teacher needed guidance with how PST lessons ran, so that PSTs with limited pedagogical knowledge could manage, the children could have a rich learning experience, and the teacher had the opportunity to learn about the mLearning tools used.

There were some unexpected findings relating to increased technological knowledge of the participating teachers. One teacher used newly acquired mLearning skills to seek a new position; another teacher used her connections with the University to secure a part-time position at the University. The teacher who used mLearning skills to seek a new job had limited technological skills at the start of the study. Two years later, her mLearning skills enabled her to create a movie that she used at a job interview, indicating that her technological skills had significantly increased.

Cross-fertilisation between practising teachers and PSTs was a desired outcome of this research. During each PST school visit the practising teachers were asked to provide pedagogical feedback. The pedagogical feedback was valuable to the PSTs with limited teaching experience but also forced the practise teachers to observe all of the mLearning activities and therefore gain personal technological knowledge from the experience. Teachers provided feedback in writing in the first two years and in the final year the teachers were invited to attend debriefings with the PSTs immediately after the mLearning lessons and give their pedagogical feedback in person. The cross-fertilisation between the practising teachers and PSTs was revealed in the findings. However, on occasions, some of the PSTs did not deliver educationally sound lessons and did not demonstrate appropriate use of mLearning. In
these circumstances, there was no cross-fertilisation as there was little for the practising teachers to gain. The SoE staff learnt from these poor lessons and discussions took place in advance with the PSTs to avoid a reoccurrence of poor delivery. Despite such care, each year one group of PSTs delivered a weak lesson; however, for each poor lesson, there were several at a very high standard, which ensured cross-fertilisation.

8.3.3 More informed leadership.

School leadership affected the acquisition of mLearning resources, technical support available, and opportunities for teacher professional development in the area of mLearning. Leaders with the most positive dispositions towards mLearning made the greatest steps towards implementation in their schools. Integration of mLearning needs a leader who is open to exploring mLearning as an enabler for student learning, and can lead a school along the journey of technology integration.

At both schools, the Principals handled the acquisition and maintenance of mLearning resources and monitored usage. The appointment of an interim Principal for six months at School A stalled technology integration because the Principal was not supportive of mLearning. Despite the approval for the purchase of mLearning resources and Wi-fi installation before her arrival, it was not a priority for the interim Principal. She noted that staff were not ready to implement mLearning but did nothing to prepare the staff. This finding supports C. Clark et al.’s (2015) assertion that a leader needs to be supportive of mLearning for implementation to occur.

The loss of all the key participants posed a threat to one of the partnerships in the final year, but the partnership survived because the new Principal was a strong supporter of mLearning. One Principal was tech savvy and passionate about integrating mLearning, but did not have the same effect as her successor, possibly because she did not have a permanent
position, was not the Principal of an IPS, and lacked leadership experience. In the final year, one of the Principals was knowledgeable about teaching with technology, which enabled her to observe how technology was used and to know what support teachers needed. Another Principal had not personally taught using technology but was aware that he needed upskilling alongside his staff, and he employed new teachers who had good mLearning skills.

The research revealed that both schools were at an early stage in their journey of mLearning integration. There was a lack of technological knowledge among staff at both schools. All principals indicated that staff needed professional development. Principals at both schools sought professional learning opportunities from the University.

The Principals at both schools used the school’s business plan as a way of embracing technology in the school in the final year. Each business plan was created in conjunction with each school board, comprising school and community members. Strong support from principals was required to drive mLearning in the schools but the support of the teachers and school communities were also advantageous.

This research draws on the work of Crevani, Lindgren and Packendorff (2007; 2010) and Gronn (2008) to present an emergent view of leadership that focuses on the collective rather than the individual. The shared view of leadership challenges traditional management and leadership literature that focuses on charismatic, heroic figures, rather than acknowledging the collective knowledge and skills that reside within an organisation. Shared leadership centres on the ability of individuals in universities and schools to value and embrace the various collaborative initiatives (e.g. classroom activities, workshops) that comprise the partnerships. Further, leaders inspired others to become involved in these initiatives at different levels.
The participating teachers demonstrated their technological leadership in a variety of ways, which included attending an ICT intensive course during the school holidays, borrowing mLearning resources, sharing professional knowledge with colleagues, organising parent workshops, and inviting the University staff to visit classrooms to talk to parents about mLearning. The level of technological leadership exhibited by the teachers varied. Of all the teachers, Jessica was considered by the University staff to be the best technological leader. She came to the partnership with very limited technological knowledge but gained more than the other teacher participants and was prepared to share her acquired knowledge.

Jessica immersed herself in the partnership when she gave up her leave to attend the five-day ICT intensive course at the University, which empowered her with knowledge and skills. Immersing herself in the partnership to such an extent also gave her the type of professional capital that perhaps influenced the school Principal. Later the Principal covered for her, so she could attend additional professional development. Jessica’s actions and practices demonstrated her leadership in the partnership regarding direction, alignment, and commitment, as defined by Crevani et al. (2010). Jessica appeared to think beyond personal gain toward the partnership as a whole and the gains for the school community. Jessica demonstrated this by organising parent workshops, sharing her acquired technological knowledge with colleagues, giving up personal time to attend professional development on mLearning at the University, and frequently communicating with the University.

Arranging professional development activities may be an example of what Crevani et al. (2007, p. 62) describe as “inverted delegation”, or the tendency for tasks to be delegated upwards rather than downwards. There certainly was a sense that the needs of participants were driving the partnership rather than being directed by leaders in positions of authority at both the schools and the University. This is demonstrated by the fact that in the final year of the study, no parent workshop took place at School A – because Jessica was not there to
organise and promote it. Losing Jessica at School A was more than losing a participant, as she was a technological leader with the ability to influence others.

The participating staff and some of the PSTs at the University exhibited leadership by delegating responsibility. For example, the Dean of the SoE distributed leadership allowing staff to oversee and manage partnerships. Maintaining effective school–university partnerships is time-consuming, therefore distributing leadership among several stakeholders ensures the success of a partnership (Greenfield, Braithwaite, Pawsey, Johnson, & Robinson, 2009; Hudson, English, Dawes, & Macri, 2012). The leadership at the University associated with the mLearning partnerships was distributed among several lecturers. Leadership at the University was associated with being flexible to the needs of the schools because of the perceived benefits of the partnerships to the PSTs. University staff rewrote unit outlines to accommodate school visits, prepared and delivered professional development for schools, and took PSTs to schools.

Distributed leadership centres on the ability of individuals in universities and schools to value and embrace the various collaborative initiatives (e.g. classroom activities, workshops) that comprise partnerships. The role of leaders is to inspire others to become involved in these initiatives at different levels (Searle & Hanrahan, 2011). At the two schools and the University, distributed leadership was exhibited at different levels and at different times. Two unexpected but positive outcomes of the study that reflected distributed leadership within the SoE were the ICT lecturer’s decision to extend the partnership by including more schools and PSTs in authentic mLearning-rich classroom experiences and the ICT coordinator’s decision to continue the partnership beyond the proposed three-year period.

In summary, a good leader is required to implement change successfully in a school (Clarke & Zagarell, 2012). For changes regarding mLearning, a leader needs good
technological skills and staff who are willing to become technological leaders and share technological knowledge within the school. The leader needs to be aware of the barriers to mLearning and provide good and rapid technical support to resolve problems that arise. In addition, the leader needs to gauge and meet the professional learning requirements of staff. The leader needs to dedicate time to any partnership for it to be successful. The findings indicated that the level of support a Principal gave to the partnership affected the learning opportunities within the school.

The mLearning partnerships needed technological leaders in the schools to maximise the synergy between practising teachers and PSTs, engagement of the community, enhanced technological knowledge of teachers, and relationships between the school and the University. The technological leadership would ideally be distributed between participating teachers and the school Principal so that the workload was not too great for any one individual and the partnership was not dependent upon one individual. Technological leaders need to share knowledge in the school community. This research attempted to encourage leadership among the participating teachers by accommodating their needs such as borrowing mLearning resources, providing technical support and one-on-one professional development sessions. Providing the participating teachers with as much support as possible made them more likely to use ideas and mLearning resources used by the PSTs after the PST visits.

The frequent change in leadership at both schools highlighted the importance of having participating teachers, or other members of the school leadership team, involved for the continuity of the partnership. The University maintained a stable team in the mLearning partnerships over the three-year research period. At the end of the third year, there was a change in one of the key University participants: the ICT lecturer. Forewarning of this participant change and having other staff remain constant enabled the partnership to continue without disruption.
8.3.4 Development of professional knowledge.

The professional knowledge theme is about the professional learning of teachers, school leaders, community members, University staff and PSTs. Teachers need both technological and pedagogical knowledge to use mLearning in the classroom (Perrotta, 2013). Teaching with mLearning requires teachers to change the way they teach (Mantei, Kervin, & Latham, 2010). A commitment to professional knowledge and evidence-based decision-making, particularly about pedagogical approaches and the purchase and deployment of equipment and mobile applications, ensured that the partnership was using credible ICT and had a proper audit trail. Professional development for teachers is most effective when conducted in an authentic context where teachers have the opportunity to view and provide feedback (King & Newmann, 2000). Authentic learning for PSTs is associated with authentic achievement. PSTs who actively engage with real children in a genuine classroom setting can have substantive conversations with children to build an understanding of how children learn (Newmann, Marks & Gamaron, 1996).

For participants to gain professional knowledge, it was important to embed the partnerships within an established theoretical framework and link it to contemporary literature to enhance credibility and provide participants with a sense of purpose. It was decided to anchor all decision-making in evidence-based research. For example, when purchasing equipment or recommending mobile apps, ensure that these purchasing decisions considered age-appropriate learning theory (Powell, 2014). The University spent considerable time researching the most appropriate mLearning resources for early childhood education and made sure that the mLearning resources used had a purpose and were not used as tack-on activities. As the partnership grew, schools took the advice offered by the University (suggested apps and mLearning resources) and the University embraced suggestions made by the schools (PSTs delivering professional development in schools).
Professional knowledge included the professional development that occurred through the synergy between the practicing teachers and PSTs (cross-fertilisation), the professional development workshops run by the University for school staff, parents and individual teachers, and the ICT intensive course. The synergy between the practicing teachers and PSTs provided professional learning through differentiated learning experiences in authentic classroom settings, which have been shown to be more important than mLearning resources and support in mLearning implementation (Lydon & King, 2009).

The synergy between the practicing teachers and PSTs was the starting point for teachers to learn about the developmentally appropriate use of mLearning. However, without teachers who were willing to share, and principals willing to encourage and support sharing, the knowledge could remain with the participants and not spread throughout the schools. Sharing with the school community was considered to be important so that a balanced educational view was presented to counteract negative media perceptions. The Principals’ decision to select the participating teachers at the end of the third year was a positive outcome as it indicated that the Principals could see that suitable participants would be more likely to share technological knowledge within the schools. Pamuk et al. (2013) found that effective teachers shared knowledge within their professional networks.

Early in the partnerships, the University realised that access to professional knowledge on mLearning for schools was costly and scarce, so provision of mLearning workshops was a benefit of the partnership for the schools. The provision of mLearning workshops was a way for the schools to gain a measurable outcome. The University planned opportunities for the schools to maximise professional knowledge from the partnership. The University nurtured partnerships by providing professional development outside the scope of the partnership when requested by a school. Professional knowledge opportunities took place in the form of professional development workshops for staff, parents, carers, and education
assistants. Such workshops enabled all staff, not just those participating in the mLearning implementation, to take part. The findings revealed that these workshops provided an opportunity for teachers with a negative disposition towards mLearning to engage in activities and become more positive in their disposition towards mLearning.

8.3.5 Closer relationships.

Relationships were primarily concerned with the interactions between the participants in the schools and the University, and, in particular, the desirability of personal relationships, particularly at the leadership level, to be secure and lasting. The process of developing partnerships was concurrent with the development of relationships between participants. The research found that trust was a non-transferable currency, and was consistent with current literature that the best way to preserve trust was through stable governance (Manna, McGuinn, & Finn, 2013). Partnerships require stakeholders to collaborate with a shared purpose, accomplished through hard work, open communication, trust, and mutual respect (Parker et al., 2012). Partnerships are created by strong and sustained trust-building behaviours at all levels, and sometimes take the time to grow and develop. According to R. Clark (1999), mistrust is the natural state of the relationship between schools and universities, and Killion (2011) refers to relationships between schools and universities as a struggle, with universities regarding themselves as superior to schools. Relationships had the potential to weaken between the two schools in this study and the University because of changes in staff from year to year.

The research acknowledged the significant risks associated with aspects of human resource management such as participants’ career aspirations, or teaching staff being on short-term contracts, and sought to minimise these risks by broadening the reach of the research to include the entire school community. At each school in the study, there were three
principals in the three years. The small size of the schools made them stepping-stones for promotion for aspiring principals. A critical mass of willing participants, committed to the mutual goals and supported by their institutions, is a necessary precondition for a partnership to be successful (R. Clark, 1999). The partnerships were strongest in both schools in the final year, despite there being a new Principal at both schools. The human relationships established between university staff and teachers were strong enough to sustain the partnerships so that they could grow. A stable partnership requires the right person with the right attitude, and preferably not too many changes in participants (Jones et al., 2014).

The minimum number of participants at each school would have been the same two teachers and Principal for the three-year period, i.e. three participants. At the end of the three years, the number of teachers and school leaders in the partnership at School A was eight, and at School B was five. Reasons for the high staff turnover were staff being on fixed term contracts and staff seeking promotion or positions elsewhere. Having participants who could commit to a partnership for two or three years would be ideal. However, even with the best intentions, partnerships cannot avoid unexpected change, and so to survive they must be flexible.

The stability of the parent communities was an important factor in this study. Several parents had children involved in the partnership for more than one year. The feedback the parents received from their children was passed on to school Principals and P & C Associations. The positive feedback from parents is likely to have influenced a Principal and P & C Association to consider purchasing mLearning resources. Parental stability enabled parents and carers to be exposed to the mLearning partnership multiple times and, therefore, increased the likelihood of gaining their support.

When a leadership change occurred, a handover including participating teachers, or other members of the leadership team, was beneficial for ongoing partnerships. When the
leadership changed at School B, the Deputy Principal was able to convey information from one Principal to the next to provide continuity and a smooth start to the beginning of the school year, ensuring that the early childhood practising teachers were able to come to the University and meet the PSTs. The succession planning was useful in sustaining the partnership because newly appointed teachers or school leaders are busy in a new job and have less time available to explore a partnership. Research by Bauer and Brazer (2010) found that new principals struggle with role ambiguity, stress overload, and isolation, which suggests that exploration of new partnerships could be limited.

Having participating teachers for consecutive years was desirable, but teachers needed to be willing to remain engaged. The teachers at School B remained with the partnership throughout and a good rapport developed between these teachers and the University staff, which made the PST visits much easier in successive years. The stability of the participating teachers at School B was useful in the establishment of the partnership, but after three years these teachers had benefitted from the partnership but not shared their knowledge with the wider school community as much as they could. When the Principal actively selected specific teachers who would act as technological leaders for the future PST mLearning visits, these original teachers were not selected. Having a Principal actively select the most appropriate teachers was an initial recommendation of the partnership, but it took time for leaders to make this a priority. Two of the teachers at School A were in the partnership for two consecutive years, but the relationship did not develop with both to the same extent. While having stability in the participants was important, the participants had to be willing to engage fully in the partnership for the school to maximise the benefits. Selection of participating teachers was important to secure teachers with a desire to engage in the partnerships, and the support of school leadership enables this to happen.
The key University staff involved in the partnership remained constant throughout the research, and this level of stability in human resources contributed to the formation of strong and successful partnerships. At the end of the third year of the partnership, the ICT lecturer left the University, and the ICT coordinator went to considerable effort to find a suitable replacement that would be able to take on a new teaching position at the University and manage the complexity of classroom visits at the partner schools with PSTs. The University staff worked together to ensure that the partnerships would continue seamlessly the following year.

The actions of the University staff indicated the value they placed on the partnerships. The partnerships took three years to become fully established, and the University staff did not want them to fade away. The fact that both school Principals decided to select the future participating teachers was a sign that the partnerships were truly collaborative and had reached a sustainable point. The University initiated the partnerships in this study, so it was vital to have stability at the University to establish the relationships that enabled the partnerships to grow. Establishing the partnerships took time and effort to visit schools, source and purchase mLearning resources, and prepare participants. The stability of the University staff was deemed vital to the establishment of the partnerships.

The University placed importance on establishing good relationships with the partner schools. When opportunities arose to strengthen relationships, the University staff nurtured these opportunities by listening to and acting upon ideas suggested by school participants. Such ideas included conducting workshops for EAs, increasing the number of visits to each school and joining school boards. When a participating teacher attended a five-day ICT intensive at the University, a member of the SoE staff remained with this teacher to make sure she gained as much as possible from the intensive course and to nurture the relationship between school and University staff. The inclusion of parents in the partnerships was also
important because the parent body remained relatively constant when the leadership within the schools changed frequently. Parents and carers had the ability to influence principals, so good relationships between the parents and the University enabled parents to view the mLearning partnerships in a more positive manner.

A poor lesson in the first year of the partnership was a disappointment to one participating teacher who conveyed her views to her Principal. As a result of this poor lesson, staff at the University took extra care to ensure that lessons delivered by the PSTs explicitly met the needs of this teacher. Carefully nurturing the relationships enabled subsequent glitches to have less effect on the partnerships.

8.4 Conclusion

Five themes, have emerged from the results as critical to the effective use of mLearning in early childhood education and the success of school–university partnerships more generally. Research Question 1, concerning the benefits and challenges for schools and the University of adopting mLearning in early childhood education, affected Research Question 2, concerning the impacts of mLearning implementation in schools on school–university partnerships. The mLearning implementation in the schools played a role in establishing the school–university partnerships more generally. To optimise the benefits and manage the challenges around mLearning implementation, a chain model is proposed.

This chapter discussed the benefits and challenges to mLearning for schools and the University, followed by how mLearning implementation in schools impacted on school–university partnerships. The five themes of community, cross-fertilisation, leadership, professional knowledge, and relationships, like links in a chain, emerged through the experiences encountered and shared by the University and two partner schools over a three-year research period. Establishing a successful school–university partnership required
each of these five links, which took time to establish. Hence, successful partnerships take
time to become sustainable.

Chapter 9, the final chapter, concludes this thesis and includes recommendations that
arise from the study.