MOBILE TECHNOLOGIES IN CHILDREN'S LANGUAGE AND LITERACY

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MOBILE TECHNOLOGIES IN CHILDREN'S LANGUAGE AND LITERACY: INNOVATIVE PEDAGOGY IN PRESCHOOL AND PRIMARY EDUCATION

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Introduction: Mobile Technologies in Language and Literacy Practice and Learning in Preschool and Primary School Children

Grace Oakley

I.1.   Purpose of This Book

The broad aim of this book, *Mobile Technologies in Children's Language and Literacy: Innovative Pedagogy in Preschool and Primary Education*, is to attempt to make a contribution to the advancement of theory and practice in relation to the use of mobile technologies for learning and teaching literacy, with a focus on children up to the age of 12. Although there are substantial bodies of literature about the teaching and learning of literacy, and a growing body of research on the use of mobile technologies for language and literacy learning (Oakley, Pegrum, Faulkner, & Striepe, 2012; Pegrum, Oakley, & Faulkner, 2013), there is a need for connections between mobile learning (m-learning) and children's literacy learning to be highlighted, examined, problematised, theorised and researched. Clearly, the ways in which mobile technologies might fundamentally change literacy definitions and practices cannot be ignored, and such transformations are also considered in this book.

   The chapters in this book explore how children from preschool to the end of their primary (elementary) school years develop and learn literacy, and the ways in which mobile technologies and associated digital cultures may contribute to, change, or even disrupt this learning. Also explored is the impact this 'mobile turn' may have on learning environments; student, parent and teacher roles and interactions; power relations; and social and material interactions, among other things. It is acknowledged that this book only goes so far; there is ample scope for more exploration and discussion than is possible within the confines of one book. Issues such as curriculum and society, and how educators might harness mobile technologies to equip literacy learners for the twenty-first century are

also touched on in this book, as are global issues including the information and communication technology (ICT) for development (ICT4D) movement, and the role of mobile technologies in improving equitable access to literacy opportunities for disadvantaged groups, such as girls and children of poverty. However, these issues deserve more attention by researchers in the future.

This introductory chapter endeavours to set the scene by providing a broad overview of research in the areas of mobile learning (m-learning), learning with mobile technologies and the literacy practices and learning of preschool and primary school children. Brief summaries of, and commentaries on, each of the chapters in the book are then offered.

I.2.   M-learning and Literacy Issues

I.2.1.   *Pervasiveness of Mobile Devices*

In recent years, there has been a rapid increase in the use of mobile devices such as smartphones and tablets by children, their families and their educators, both inside and outside early childhood education and care (ECEC) centres and primary (elementary) classrooms (Kabali et al., 2015; Marsh, 2016). The affordability of mobile devices has increased in many parts of the world, alongside their affordances, or the technological characteristics which affect how they might be used (Pegrum, 2014). There has also been a rapid increase in the range and quality of software or apps that can be run on these devices as well as improvements in connectivity. Mobile devices such as mobile phones and tablets have therefore become prevalent among adults and children alike, most notably in the developed world. In the USA, for example, the vast majority of children have used mobile devices before they reach the age of four, including children from low-income groups, and increasingly large numbers of children actually own a mobile device (Kabali et al., 2015). Mobile technologies now pervade many aspects of people's lives and are used for a wide variety of purposes including social, entertainment, healthcare, education and professional purposes. Having access to mobile technologies can facilitate learning 'on the move' (Park, 2011), learning across time and place (Kukulska-Hulme, 2010) and can enable innovative ways of participating in collaborative learning. This pervasiveness has changed the ways in which learning, teaching and literacy can be 'done', both inside and outside the classroom − indeed, it has opened up new 'in between' learning spaces, bridging the classroom and outside the classroom, formal and informal learning and teaching and learning (see Potter & McDougall, 2017; Schuck, Kearney, & Burden,2017). This has significant implications for literacy and may open up more 'third space literacies', as discussed by Potter and McDougall (2017).

I.2.2.   *M-learning and Literacy Learning in Children*

An increasing body of research exists on mobile learning and how it can support social, authentic, lifelong and contextual learning (Kearney, Schuck, Burden, &

Aubusson, 2012; Traxler, 2011), not to mention new ways of finding, generating and communicating knowledge. It should be acknowledged, however, that not all uses of mobile devices for learning are considered to be examples of 'm-learning', according to current m-learning theories, because merely using mobile technologies may not be construed as m-learning if the users themselves are not mobile (for example, if they are sitting at desks).

Much of the existing research on m-learning and literacy is concerned with older students and adults, rather than children in preschool and primary school settings, and there is certainly a need for more research and theorising on the relationships between mobile learning and literacy learning in children in their early years and primary school years. For young children in preschool settings and primary classrooms, there are many considerations and constraints that need to be taken into account when designing learning using mobile technologies, such as limited access to mobile technologies in some settings, restricted freedom of young children to move around different physical spaces and physical safety and cyber safety concerns (Oakley, 2017). Furthermore, in many learning situations, young children need considerably more face-to-face scaffolding than older students, and in early childhood settings there are distinct pedagogical approaches such as play-based learning which may render some aspects of existing m-learning theory and research less applicable − new or modified theoretical perspectives and frameworks may need to be developed. For example, notions of flexibility in the use of time and space are central to m-learning (Kearney et al., 2012). It is not difficult to see how opportunities for flexibility in these dimensions may be curtailed somewhat in the context of young children.

This book brings together thinking and insights from academics and expert practitioners from around the world, whose chapters should prompt readers to consider innovative practices and pedagogies using mobile technologies in the context of early childhood and primary language and literacy learning and teaching. It is also an aim of this book to stimulate discussion about curriculum design, home−school relationships and the very nature of texts and how they are constructed and used. The book necessarily engages with the ever-changing nature of literacy and how this interfaces with culture/s and technologies.

I.3.　Defining Literacy

Conceptions of what literacy is and what it is for, and how it is done, are shifting. As Mills (2016) has pointed out, there are many ways of looking at literacy; she has described social-cultural, critical, multimodal, socio-spacial, socio-material and sensory literacies. Consideration of multiple and expansive literacy theories seems crucial when discussing mobile technologies and how they might be used by children, educators, families and the communities that they inhabit. The chapters in this book connect with several of these lenses on literacy. Particularly interesting in the context of doing literacy with mobile technologies are the socio-spacial and socio-material lenses on literacy. The socio-spacial lens draws attention to literacy as being situated in social spaces,

while the socio-material lens encourages us to think about the materiality of literacy practice – how material objects like books, tablets, phones and even people's bodies cannot be ignored as they are integral to making meaning (Mills, 2016). It is also worth emphasising that the construction and communication of multimodal texts (Walsh, 2017) can be facilitated yet complicated in the context of mobile technologies.

Clearly, digital literacies are highly relevant when thinking about the role of mobile technologies in young children's literacy learning. Although there are many ways of defining digital literacy, some of which emphasise knowing how to use digital technology, a narrower definition of digital literacies is taken by most authors in this book, in line with that of Levy, Yamada-Rice, and Marsh (2013, p. 333), where the term is used 'to refer to reading, writing and meaning-making mediated through new technologies'.

In an attempt to overcome the conceptual difficulties associated with multiple and shifting definitions of literacy, Potter and McDougall (2017) have posited the term 'dynamic literacy', which is an umbrella term that encompasses many other literacies and presumably has the capacity to incorporate others as they come along. In Chapter 1 of this book, the authors frame literacy as dynamic.

I.4.   Defining Mobile Technologies

Simply put, mobile technologies involve hardware (*devices* like smartphones and tablets), software (such as apps and web-based platforms) and also the technologies that enable connectivity such as 4G, Bluetooth and wifi. However, it is beyond the scope of this book to delve further into the intricacies of the technologies themselves. It does seem necessary to clarify what is meant by mobile devices although, as UNESCO (2013) has stated, it would be unwise to try and provide a definitive definition due to rapid changes in technologies and what they can be used for. Thus, following UNESCO's lead, a broad definition is taken in this book: "UNESCO chooses to embrace a broad definition of mobile devices, recognizing simply that they are digital, easily portable, usually owned and controlled by an individual rather than an institution, can access the internet, have multimedia capabilities, and can facilitate a large number of tasks, particularly those related to communication (UNESCO, 2013, p. 6)". Mobile devices obviously include smartphones and tablet computers but may also include other portable, networked devices such as e-readers, wearables and some robotic devices. Smaller and more mobile laptops are becoming available, especially 2-in-1 devices which serve as both laptops and tablets. Mobile devices can connect to the Internet and to each other via cellular connections, Bluetooth, wifi and other technologies. With GPS, they are also location aware and able to provide contextual information that is relevant to the location. They often have built-in a gyroscope and accelerometer to detect the direction and speed of the user's movement, not to mention a host of other tools such as a camera, audio recorder and the ability to run a wide range of apps, including Augmented Reality apps which can superimpose a layer of digital information onto the real

world. Mobile devices often have haptic features such as touchscreen and vibrate, which can be very appealing to young children and change the ways in which they create and interact with texts (Piotrowski & Krcmar, 2017).

I.5. M-learning Definitions and Theory

UNESCO (2013, p. 6) has suggested that: "Mobile learning involves the use of mobile technology, either alone or in combination with other information and communication technology (ICT), to enable learning anytime anywhere. Learning can unfold in a variety of ways: people can use mobile devices to access educational resources, connect with others, or create content, both inside and outside the classroom." Since this definition was offered, the notion of 'with anyone' has been added to discussions to reflect the fact that mobile technologies have enabled learners to connect with each other and engage in social learning. It is posited that in the not too distant future, the term m-learning may become superfluous because it is likely that learning with mobile technologies and all this entails will become widespread and normal − an accepted and taken-for-granted part of learning − so much so that Kukulska-Hulme (2010, p. 5) has argued that we could soon be thinking of m-learning as 'just learning'. However, there is an argument that there are some distinct characteristics of m-learning that may contribute to transformation of learning and where, when, how, why and with whom it takes place.

To date, several definitions of m-learning have been offered, all of which have their strengths and limitations. Like definitions and theories of literacy, definitions and theories of m-learning have evolved, and are still evolving, to take into account new technologies and practices. Early definitions of m-learning tended to be somewhat technocentric, with much emphasis on the device itself, rather than the learning processes or the social interactions, learning spaces or new ways of thinking. For example, Traxler (2005, n.p.) defined mobile learning as 'any educational provision where the sole or dominant technologies are handheld and palmtop devices'. He later suggested that mobile learning involves: 'the personalised, connected, and interactive use of handheld computers' (Traxler, 2007, p. 3). Sharples, Taylor, and Vavoula (2007, p. 4) suggested that mobile learning is: 'the processes of coming to know through conversations across multiple contexts amongst people and personal interactive technologies'. Here, the idea of m-learning being a *process* is introduced, and the importance of conversations and context are highlighted.

Similarly, Koole (2009, p. 26) defined m-learning as 'a process resulting from the convergence of mobile technologies, human learning capacities, and social interaction'. Later definitions place more focus on the mobile *learner*, rather than the mobile device itself (Cochrane, 2013; Kukulska-Hulme, 2016), and the mobile learning experiences or tasks that students engage with (Pegrum, 2016).

Traxler (2011, pp. 6−7) summarised how mobile technologies might present teaching and learning opportunities, such as: *contingent learning*, which involves students being able to react to the environment that they are in and respond to the contingencies that arise at the time; *situated learning*, which is learning that

occurs in the place or context in which the knowledge is meaningful and useful to the activity or situation at hand; *authentic learning*, where learning experiences and tasks and goals are meaningful to the students − often this means there is some 'real life' relevance; *context aware learning* involves being able to access information that is relevant to the specific location, for example, being able to find out about the history or access data about a particular place; and *personalised learning*, 'where learning is customised for the interests, preferences and abilities of individual learners or groups of learners (Traxler, 2011, p. 7). These types of mobile learning can overlap. As well as the types of learning outlined above, Traxler (2011) has noted that mobile technologies can facilitate game-based learning and new ways of assessing student learning.

Park (2011) proposed a pedagogical framework for mobile learning that highlighted *transactional distance* and *social learning* as two key elements. In this pedagogical framework, Park built on Moore's (1997, 2007) important work on Transactional Distance (TD) theory. TD could be described as the 'cognitive space' or psychological distance (Shearer, 2007) between those involved (learners and teachers) in the process. Moore defined TD as: the: 'interplay of teachers and learners in environments that have the special characteristics of their being spatially separate from one another' (Moore, 2007, p. 91). The social nature of learning, or the second dimension in Park's framework, is the extent to which a learning activity involves interaction with others. The attention here is not on the mobile technology but on space, time and social interaction.

Park's model has four quadrants. These reflect four categories of mobile learning: high transactional distance socialised m-learning (HS), high transactional distance individualised m-learning (HI), low transactional distance socialised m-learning (LS) and low transactional distance individualised m-learning (LI) (Park, 2011, n.p.). It might be argued that activities that allow movement between the different types of learning may make the most of what mobile learning has to offer, while honouring the multiple environments that children inhabit and allowing educators to meet the needs of individual students within specific learning situations, drawing in an appropriate mix of resources and pedagogical strategies.

Another framework for mobile learning that has considerable potential for guiding early childhood and primary literacy educators in planning and implementing mobile learning for literacy learning is the *Mobile Pedagogical Framework* (MPF), developed by Kearney et al. (2012). This framework highlights the importance of personalisation, authenticity and collaboration as three key aspects of learning that can be facilitated through the use of mobile technologies, with learners being untethered from space and time constraints associated with timetabled, classroom learning. Authenticity means that learning experiences are meaningful and have real life relevance to learners − for example, students may be in a museum when engaging with historical texts, or visiting a farm and preparing a presentation on farm animals using their mobile device. Collaboration may involve conversation, which may not be face-to-face conversation but some kind of online discussion/interaction. It also involves data sharing, which includes the sharing of artefacts such as photographs, texts and so

on. Personalisation is about using the affordances of the device to promote choice, agency and self-regulation in learners. Mobile technologies can facilitate the customisation or tailoring of learning activities, tools and resources to meet the individual needs and interests of learners.

Kearney and colleagues have further developed the MPF into the *iPAC framework*, which retains the central concepts of personalisation, authenticity, collaboration (PAC) and the space-time flexibility. The notion of 'signature' pedagogies around PAC is a feature of this framework, which can be seen in full at the Mobile Learning Toolkit website at http://www.mobilelearningtoolkit.com/ipac-framework.html. This differs from the MPF in that the PAC elements are refined. Authenticity is defined in terms of setting, task and tool. Personalisation replaces customisation as one of the three central concepts, and customisation is relegated to an aspect of personalisation, along with agency. Collaboration means working with networks of people. 'The networking capability of mobile devices creates shared, socially interactive environments allowing students to easily communicate multi-modally with peers, teachers and other experts, and to exchange information. Learners consume, produce and exchange an array of "content", sharing information and artefacts across time and place (n.p.) (see Figure I.1)'.

A concept that draws attention to the power of mobile technologies to bridge or blur boundaries or distances in learning is *seamless learning* (Looi et al., 2010). Looi et al. state that 'seamless learning environments bridges private and public learning spaces where learning happens as both individual and collective efforts and across different contexts (such as in-school versus after-school, formal versus informal)' (p. 156). Building on this, Wong (2012) has provided *10 dimensions of mobile seamless learning*: (MSL1) encompassing formal and
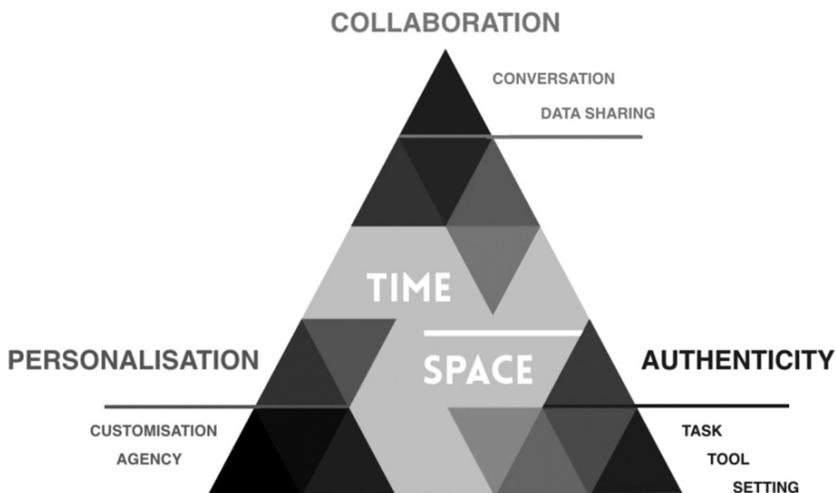

Figure I.1:   The iPAC Framework. *Source*: Kearney *et al.*(2012).

informal learning, (MSL2) encompassing personalised and social learning, (MSL3) across time, (MSL4) across locations, (MSL5) ubiquitous knowledge access, (MSL6) encompassing physical and digital worlds, (MSL7) combined use of multiple device types, (MSL8) seamless switching between multiple learning tasks, (MSL9) knowledge synthesis and (MSL10) encompassing multiple pedagogical or learning activity models. Many of the dimensions may be applicable to language and literacy learning and practice in primary school students, but perhaps less so for children in their earlier years.

It is important to mention the concept of *ubiquitous learning* or u-learning, which can be defined as follows: '[U]biquitous learning (u-learning) involves learning in an environment where "all students have access to a variety of digital devices and services, including computers connected to the Internet and mobile computing devices, whenever and wherever they need them' (van't Hooft, Swan, Cook, & Lin, 2007, p. 6). Here, technology is seen as almost invisible because it is pervasive and ubiquitous in people's everyday lives. This concept overlaps considerably with the concept of seamless learning.

There are many other perspectives, theories and frameworks relating to m-learning that have not been discussed here because of space limitations. Nevertheless, it is hoped that the key concepts and frameworks presented will be sufficient to enable readers of this book to think about implications for literacy practice and pedagogy in relation to children in early childhood settings and primary school.

I.6.   Implications for Teacher Professional Learning?

Within this context of constant technological change and concomitant redefinitions of literacy, traditional models of professional learning for literacy educators may no longer be adequate. More and more educators are engaging in networked professional learning and sharing via social media to find out about and contribute to emerging practices (Krutka & Carpenter, 2016). While this may be an increasingly necessary part of the professional learning mix, educators need to be able to sift through and critically evaluate the myriad ideas (some of which are created by commercial entities) presented online. To be able to do this, having a command of relevant theory and research seems critical (Oakley, 2018). It would be true to say there is almost an oversupply of online information for early childhood and primary educators on how to use mobile technologies such as iPads in the classroom. Unfortunately, the quality of the information available is varied with much of the information being somewhat superficial, in the form of '7 ways to use iPads' or '10 ten tips for flipping classrooms and mobile learning', on blogs and sites such as virtual pin board sites (Oakley, 2018). This kind of information can certainly inspire educators to innovate and connect with each other in communities of practice (Wenger, 1998), but there is some danger that, in some cases, it may lead to superficial and incoherent professional learning for teachers, resulting in fragmented pedagogical practices and, potentially, superficial learning for children. Some ideas spread

extremely quickly online and become extraordinarily popular, and resultant learning could be termed 'viral learning' (Oakley & Pegrum, 2015). Here, there may not be time for ideas to be fully assessed and critiqued, let alone rigorously researched, before they are taken on board by practitioners. Although there may certainly be benefits associated with the kind of professional learning associated with rapid spread and uptake of new ideas, there may also be risks to children's learning if gimmicky practices that have not been adequately thought about and evaluated are being implemented at scale. An aim of the book is to help foster coherent and effective pedagogical approaches in the classroom and preschool, through attention to theory and research, without giving the impression that there is 'one best way' to do things.

I.7.   Overview of the Chapters in this Book

It is gratifying to have the work of distinguished scholars and practitioners from around the world represented in this book. The contributing authors have brought their expertise and particular perspectives to bear on how mobile technologies and literacy practices and learning in children might interconnect. Although the authors do not always explicitly refer to the m-learning theories outlined earlier, readers will certainly be able to reflect on these while reading the chapters.

Chapter 1, by Sara Sintonen, Kristiina Kumpulainen and Jenni Vartiainen (Finland) discusses young children's imaginative play and literacy practices as mediated by digital technologies and media. Drawing on socio-cultural theory and the notion of dynamic literacies, the chapter considers how digital technologies including mobile technologies can interact with, and potentially expand children's imaginative play, linking to dynamic literacy practices. In this chapter, children are viewed as active agents in their own learning. Sintonen and her colleagues propose several pedagogical principles that can be applied to using mobile technologies in play-based early childhood education in support of young children's creative thinking, storytelling and dynamic literacy practices, both indoors and outdoors.

Chapter 2, by Kathy Rushton and Jon Callow (Australia), focuses on the interconnections between the arts and literacy, and how the use of mobile technologies can be used to build and transform literacy learning in and through the arts. In this chapter, literacy and the arts are viewed as socio-cultural practices. Rushton and Callow present a gallery of resources and practices to support authentic and engaging learning experiences for children, that encourage collaboration, agency and creativity in children.

Chapter 3, by Chris Walsh and Claire Campbell (Australia), considers the relatively new literacy of coding. The idea that coding is a literacy that all children will need to learn in order to function and succeed in the future has been posed by several commentators, such as Vee (2017), who suggests that coding is becoming an increasingly important literacy as a reading-writing tool. However,

this idea has not yet been widely accepted by practitioners. In this chapter, Walsh and Campbell explore the idea that coding is a literacy and discuss how young children might be scaffolded to learn simple coding concepts in meaningful, play-based ways. They then describe how mobile technologies can support this endeavour.

Chapter 4, by Mohamed Melwani, Lee Yong Tay and Cher Ping Lim (Singapore and Hong Kong), discusses the case of a school in Singapore to demonstrate how the process of digital storytelling can expand and deepen children's literacy repertoires as well as their twenty-first century competencies through activities involving acquisition, inquiry, practice, production, discussion and collaboration. Melwani et al. argue that, in the ecology of digital and non-digital tools used to create and share digital stories, mobile technologies are becoming increasingly useful. A learning design framework consisting of Laurillard's 'conversational framework' (Laurillard, 2012), as well as Puentedura's (2014) Substitution, Augmentation, Modification and Redefinition (SAMR) framework is used by the authors to examine the technology-infused teaching and learning activities in the school.

Chapter 5, by Hutchison and Beschorner (USA), discusses the role of digital technologies, including mobile devices, in enabling transformation in the creation and sharing of multimodal texts. Fundamental changes in the ways in which young children 'do' literacy are signposted − and the authors acknowledge the importance of the home, the community and various environments in stimulating and supporting these changes. In this chapter, the authors describe how an increase in authenticity can enhance children's motivation to write. They also share their research on instructional planning with mobile technologies and multimodal text, namely the Technology Integration Planning Cycle for Literacy Language Arts.

Chapter 6, by Jan Clarke, (Australia), outlines a range of practices in use in Independent schools in Western Australia, using mobile technologies, which aim to promote the development of literacy across the curriculum. It is known that the use of mobile technologies helps learners and educators cross and minimise boundaries of time, space (Looi et al., 2010) and culture, and Clarke illustrates how they can also be used to cross curriculum boundaries for children across the year groups in primary schools.

Chapter 7, by Lisa Kervin, Annette Woods, Barbara Comber and Aspa Baroutsis (Australia) is concerned with critical literacy and how affording children agency with regards to materials, spaces and interactions with adults can assist them in becoming critical consumers and creators of digital texts. The authors argue that critical literacy involves 'repositioning students as researchers of language, respecting minority language practices and problematising texts' (p. 119). Moreover, the authors explore how mobile technologies can alter socio-spacial power relations that exist in schools, which are institutions that can either constrain or enable the ways in which literacy learning proceeds

through the structures, procedures and relationships that they uphold. The authors draw on data collected as part of a larger study on learning to write in the early years of school and examine some instances of 'disruption', where teachers and children were engaged in practices outside normal routines.

In Chapter 8, Natalia Kucirkova (UK) examines the role of mobile technologies in personalising literacy learning in primary school children. As in several of the other chapters in this book, the concept of agency is highlighted. It is acknowledged by the author that children's learning experiences are mediated by adults and that there are various constraints (such as time and technologies available) that impact on personalisation of learning using mobile technologies. Drawing on research carried out in one UK primary school, Kucirkova outlines her 5As of personalisation – five variables with agency at the core. In this chapter, Kucirkova makes the important point that adults who mediate children's technology use for literacy practice and learning need to find ways to create opportunities for children's agency, instead of imposing barriers.

Chapter 9, written by Grace Oakley and Umera Imtinan (Australia), concerns the use of mobile technologies in low- and middle-income (LMI) countries. The authors describe and critique a range of programmes and interventions that have been implemented in many of these less economically advantaged countries with the aim of raising literacy levels. In this chapter, the programmes are discussed with reference to mobile learning and literacy theory and research. It is concluded by Oakley and Imtinan that the use of mobile technologies to improve literacy opportunities for children in LMI countries has considerable potential but that there are limitations in pedagogical design and implementation practices, not to mention restricted views of what literacy is and might be for children in these locations, which hamper such efforts.

I.8.   Concluding Comments

It has been the intention in this chapter to provide an introduction to key concepts and theoretical frameworks underpinning this book and to briefly describe the contents and aims of the individual chapters. Without a doubt, some of the concepts and insights in this book will all too quickly become outmoded because of rapid developments in technologies and practices. However, it is hoped that they will still be useful and important stepping stones to future work. It is not the intention of this book to be an authority on how to 'do' or teach literacy in the context of mobile technologies; rather, to stimulate innovation and professional discourse and to promote a mindset that embraces multiplicity and dynamism. It is clear from the chapters in this book that promoting agency and authenticity in children's literacy learning are particularly valued by educators, and attempts to reconceptualise and retain play-based learning in the context of mobile technologies is also a priority for early childhood educators and researchers.

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