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Exploration of the Key Characteristics of Mobile Learning in a Chinese Business Setting

By

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A Dissertation in Fulfilment of the Requirements for the Degree of

Doctor of Philosophy in Management

12 June 2019

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Abstract

In the last decade, there has been a dramatic increase globally in the use of mobile devices and mobile technologies. While mobile technologies have played a significant role in communications generally within business settings, the increasing use of mobile devices for employee's learning and development in workplace has caused much attention for researchers and human resource development (HRD) practitioners. This study aims to gain a greater understanding of the key characteristics of m-learning in a Chinese business setting, which is the world's largest market for mobile devices and mobile technologies.

A mixed methods research approach of quantitative and qualitative methods was employed, which involved an online survey of 665 responses and semi-structured interviews with 40 employees from four business organisations in China. A number of findings were discovered from both the quantitative and qualitative analyses. First, the conditions appear favourable for m-learning to flourish in Chinese business settings, in terms of the high mobile device penetration, heavy mobile usage, and the increasing adoption of m-learning at workplace. Second, this study finds that employees in the Chinese business setting have generally positive perceptions of using mobile devices for learning. Third, this study identifies 19 themes of personal benefits and 17 organisational benefits of m-learning perceived by the respondents, which can be classified into three central themes: "Autonomy", "Real-world Relevance" and "Collaboration and Networking". Fourth, this study highlights four concerns and three improvement areas of adopting m-learning in a Chinese business context. Fifth, while there are similarities between the characteristics of Chinese m-learning and the m-learning in the Western context, this study indicates a number of important differences; for example, the perceived importance levels of the affordances of m-learning, the ranking of the central themes regarding m-learning, and the perceived organisational benefits of m-learning. Based on the findings of this study, the key characteristics of m-learning in a Chinese business setting are identified and the relationship between Chinese m-learning and Western m-learning is discussed.

This study provides a number of insights and contributions to m-learning literature and m-learning practice, which can support proactive interventions for successfully implementing mobile learning in Chinese organisations. Limitations and opportunities for future research are also discussed.

Dedication

This dissertation is dedicated to my late grandparents, Quanxian Zhang and Fengxian Yan for their kindness, unwavering love, and the confidence they instilled in me to believe that I can do better. I also dedicate this study to the memory of my late father, Pengyi Zhang, and my late mother, Yaju Zhang, who unfortunately didn't stay in this world long enough to see this thesis completed. I miss you.

Acknowledgments

Throughout my PhD journey, I have received the support, encouragement and patience from a number of individuals. First, I would like to acknowledge my supervisor, Associate Professor Paul L. Nesbit, for his academic guidance for my research and help in my academic writing. Second, I would like to thank my mentor, Dr. Jane Maley, for not only providing me inputs and feedback in thesis writing but also providing me with moral support through difficult times. Third, I would like to thank Associate Professor Matt Bower, Associate Professor Denise Jepsen and Associate Professor Riza Casidy for their valuable feedback. Fourth, I would like to thank Professor Alison Pullen for her encouragement and moral support. Without you, it would be impossible to make the completion of this thesis.

To my colleagues at MGSM research hub, Joanna, Haresh, and Simran, thanks for your encouragement, company, and sharing my burden. To my family, thank you for all the help and constantly cheering over the past several years, even though you are physically half a globe away from me most of the time. To my friends, I lost most of you along the way, but I know you are still with me. Each of you helped me in your own way. Without you, I could not possibly fumble my way through all the difficulties, stress, frustration and discouragement I encountered on this painstaking journey.

Last but not least, I would like to thank my editor Dr. Bradley Smith for his editing service and kind encouragement.

I went on this journey because I believe that research can make a difference. A PhD is not the end but just another adventure. I am humbled, grateful and look forward to the next adventure.

List of Abbreviations

HRD: human resource development

T&D: training and development

WPA: WeChat public account

NAATI: Australian National Accreditation Authority for Translators and Interpreters

MNC: multi-national company

PDA: personal digital assistant

PC: personal computer

CAML: Context-aware mobile learning

FRAME: framework for rational analysis of mobile education

CNNIC: China internet network information centre

FMCG: fast-moving consumer goods

CPA: certified public accountant

SPSS: statistical package for the social sciences

LTO: long-term orientation

IC: information and consent

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Chapter One: Introduction

1.1 Introduction

The nature of organisations and business has changed considerably in the past decades. There is a stronger need to cope with greater market competition, increased job insecurity, more frequent job mobility, and rapid technological development in the workplace (Heerwagen, Kelly, & Kampschroer, 2016; Pimmer, Pachler, & Attwell, 2010). In order to survive and succeed in the increasingly competitive and dynamic business environment, organisations strive to deploy their available resources and capabilities effectively to promote employee learning and development (Phillips, 2005; Tam & Gray, 2016; Yoon & Kayes, 2016). While mobile technologies have played a significant role in communications generally within business settings, organisations are increasingly recognising the benefits of mobile learning (m-learning) to enhance organisational learning, with more organisations adopting mobile devices for learning in the workplace (Sharples, Arnedillo-Sánchez, Milrad, & Vavoula, 2009). Therefore, understanding how people engage and interact with their mobile devices in the process of learning in business settings is of growing importance and relevance to human resource development (HRD) practitioners within organisations as well as to academic researchers.

Mobile technologies are ubiquitous in today's society (Sarrab, Elbasir, & Alnaeli, 2016). As Clay Shirky (2010) argues, the social media tools and mobile phones we use are not alternatives to real life, they are now an integral part of it. The increasing use and technological enhancement of mobile devices with Internet capabilities and associated software applications (hereafter, apps) have dramatically increased the convenience and effectiveness of accessing information for teaching and learning. There are many benefits of using mobile devices for learning, including the relatively inexpensive and lightweight devices which can be accessed anywhere and anytime, decrease in training costs, and multi-media content delivery and creation options (Lac, Sukunesan, Cain, Vasa, & Mouzakis, 2014; Mehdipour & Zerehkafi, 2013). Under globalisation, with an increasingly diversified and mobile workforce, the adoption and implementation of m-learning is gaining wider acceptance at the global level (Berge & Muilenburg, 2013; Kululska-Hulme & Traxler, 2005; Saleh, 2015). M-learning has

been predicted to be the top trend in the learning and education field (Brink, 2011; El-Hussein & Cronje, 2010; McConatha, Penny, Schugar, & Bolton, 2013).

However, research into m-learning to date is still relatively young and has concentrated mainly on schooling contexts (Pimmer et al., 2010). At present, literature is inconclusive in defining m-learning and a theory or a framework for m-learning (Berge & Muilenburg, 2013; Kearney, Schuck, Burden, & Aubusson, 2012). A review of the literature also shows that the theoretical framework of m-learning development has been hampered by rapid changes in mobile technologies (Berge & Muilenburg, 2013). Meanwhile, there is relatively little systematic knowledge about how mobile devices can be used for organisational learning in business contexts, and only a handful of studies examining emerging theories and frameworks on workplaces in different cultures (Karimi, 2016; Pimmer & Pachler, 2013). As many researchers assert (Hao, Dennen, & Mei, 2017; Lac et al., 2014; Saleh, 2015), the use of m-learning for organisational and employee performance support is growing and requires urgent attention (Lac, 2018). Significant value could be gained by conducting empirical research to conceptualise and theorise m-learning in business settings.

With China having become a global powerhouse with economic and political influence in the world economy in recent years (Joshua, 2015; Liu & Pearson, 2014; Wang-Cowham, 2011), and as a result of its rapid economic growth, China is now facing a looming shortage of well-trained manpower (Bambacas & Kulik, 2013; Cai, Klyushina, & Timlon, 2009; Zhou, Liu, & Hong, 2012). Meanwhile, with 1.4 billion mobile subscriptions by 2017 (Statista.com), China has become the largest mobile market worldwide. About 95.1% of Internet users in China access the Internet through mobile phones (CNNIC) and 127 million Internet users access the Internet only through mobile phones[1]. There is much value that can be gained through leveraging mobile technologies for training the Chinese workforce and tapping into the phenomenal global growth in the m-learning market. However, m-learning is not just about owning the appropriate device and having sufficient Internet access: it is more important to understand the characteristics of m-learning to guide implementation of m-learning in the Chinese business context. As suggested by the literature, in the business environment, even though there are a growing need and interest in the field of m-learning, the research in this field is lacking (Jackson-Butler, 2016; Lac et al., 2014; Pimmer & Pachler, 2013). This is perhaps

[1] Source: China Internet Watch, May 30, 2016.

even more evident when it comes to China, as most studies have been conducted in an Anglo-American context. It is suggested that focused research on m-learning in the Chinese business environment is needed to identify the key characteristics of m-learning for the diverse Eastern business contexts, so as to take advantage of the growing opportunities that m-learning presents to the Chinese economy and its competitiveness in the global marketplace.

1.2 Definition and Concept

Mobile learning (m-learning) has many different definitions and is known by many different names, such as U-Learning, personalised learning, learning while mobile, ubiquitous learning, anytime/anywhere learning, and handheld learning (Lac et al., 2014). In January 2005, an initial Google search of "mobile learning" and "definition" yielded 1,240 results (McConatha et al., 2013); the same search discovered 243,000 results in 2012; then 388,000 results in 2017; and in 2019, the number reached 433,000,000. Definitions of m-learning mainly emphasise mobility (El-Hussein & Cronje, 2010; Sharples, Corlett, & Westmancott, 2002), access (Parsons & Ryu, 2006), immediacy (Kynäslahti, 2003), situativity (Cheon, Lee, Crooks, & Song, 2012), ubiquity (Kukulska-Hulme et al., 2009), convenience (Kynäslahti, 2003), and contextuality (Crompton, 2013; Kearney et al., 2012; Koole, 2009). According to Sharples et al. (2009), mobile learning includes the characteristics of mobility in physical, conceptual, and social spaces. For the purpose of the present study, m-learning is defined as the use of mobile devices to support teaching and learning which takes place "anytime, anywhere" (Shippee & Keengwe, 2012). Mobile devices can be types of devices that exhibit characteristics including being portable, providing Internet connectivity, providing access to social interactions (texting etc.) and accessing tools to collect data (Chang, 2010). Typically, these mobile devices can be smartphones, tablets, and laptops with wireless Internet access.

1.3 Statement of the Problem

Although m-learning research in an industry context has been highlighted by academics and practitioners as a fertile area for further research to capitalise on the benefits and growing importance of m-learning to corporate business and individual learners (Lac, 2018; Ooi, Hew, & Lee, 2018), a lack of systematic research and empirical studies on m-learning in business or corporate settings is still apparent. M-learning researchers have been using theoretical notions borrowed from other fields, including computer learning, distant learning, traditional learning,

informal learning and e-learning; however, Traxler (2009) stresses that m-learning should be conceptualised distinctively and separately from other learning forms (Imtinan, 2014). Both in the Western and the Eastern business contexts, m-learning has been tested in trial implementations without having a solid theoretical stance of its own to inform the design of m-learning deployment. The theory building and conceptualisation of m-learning, especially in business settings, has not yet been seriously considered by researchers (Lac et al., 2014; Pimmer et al., 2010; Traxler & Koole, 2014). Many researchers argue (Chee, Yahaya, Ibrahim, & Hasan, 2017; Hoey, 2011; Kululska-Hulme & Traxler, 2005; Saleh, 2015; Traxler & Koole, 2014) that m-learning research is needed to investigate how emerging perspectives could contribute to the teaching and learning environments for different educational levels and settings. Contemporary research explores the technologies, pedagogies, and learning design of m-learning but does little to explore organisational issues and challenges in the adoption of m-learning theories in the workplace. Meanwhile, some of the existing research that has been conducted lacks the rigour of empirically designed studies (Berge & Muilenburg, 2013; Brown & Mbati, 2015; Lac et al., 2014; Traxler & Koole, 2014) and fails to take cultural context into account. As Traxler and Koole (2014) address, "in the field of m-learning, we must become aware of the origins and effects of our theories on praxis: how do our local values affect selection, development, implementation, and the human-culture-machine relationship?" (p. 290). In reviewing theoretical approaches for the analysis of m-learning in the literature, it is evident that the standpoint of most theorists is inherently from an Anglo-American perspective, and that these scholars have implicitly assumed that Western/European theories of m-learning necessarily provide the sole or best account of a culture's or an organisation's m-learning (Traxler & Koole, 2014). However, there are very few research projects conducted to understand the characteristics of m-learning in an Eastern business context. Given the unique culture based on deep-seated Confucian values and the ubiquitous use of mobile devices and mobile technologies in today's Chinese business environment, it is important to identify the m-learning characteristics for a Chinese business setting.

1.4 Purpose of the Study

This study is motivated by the growing importance of m-learning to organisations and employees, the limitations of empirical m-learning research on a business context, and the relationship between Chinese m-learning and Western m-learning. The purpose of this study includes gaining a greater understanding of the characteristics of m-learning associated with

m-learning usage, perceptions, benefits and key issues in the Chinese business context, and their relationship with the characteristics suggested by Western researchers. To characterize m-learning in a Chinese business environment, a mixed methods research approach of quantitative and qualitative methods is employed. The important stakeholders (key users) including employees and their managers from selected Chinese organisations were invited to participate in the data collection, and m-learning characteristics investigated by using the experience, intentions, perceptions, concerns, and expectations of these users in their organisations. The identified characteristics are further analysed, categorised and matched with previous research findings from the Western literature. The findings from the present study provide guidance and recommendations to organisations and HRD practitioners to make successful adoption and implementation of m-learning in Chinese business environments. Meanwhile, the present study also contributes to current m-learning literature and provides a conceptual foundation for future research on m-learning in similar Chinese businesses settings as well as in other Eastern cultural contexts.

1.5 Research Questions

According to the research purpose, this study focusses on theorising m-learning in a Chinese business context by identifying the key characteristics of m-learning in this context. Therefore, the following five research questions are framed in order to achieve the research objectives:

RQ 1 What is the current status of using mobile devices for learning purposes in a Chinese business setting? (Description of mobile usage and m-learning facts of the Chinese organisations.)

RQ 2 What are the employees' perceptions of m-learning in the Chinese business context? (Employees' acceptance of and attitude toward using mobile devices for learning.)

RQ 3 From the employees' perspectives, what are the benefits that m-learning could bring to individuals and organisations?

RQ 4 What issues need to be addressed or highlighted to enhance the successful adoption of m-learning in the Chinese business context?

RQ 5 What are the similarities and differences between the characteristics of Chinese m-learning and Western m-learning?

1.6 Significance of the Study

There is a need to re-conceptualize learning for the mobile age, to recognize the essential role of mobility and communication in the process of learning and development, and also to indicate the importance of context in establishing meaning and the transformable effect of digital networks to support learning and development (Naismith, Lonsdale, Vavoula, & Sharples, 2004). The outcomes of the present research will contribute conceptually to knowledge of the m-learning field; and in practical application, it will help to reshape the way mobile technologies are being used in human resource development (HRD) and organisational learning in China. Firstly, this study provides an empirical basis to theorise and extend our understanding of the key characteristics of m-learning in a Chinese business setting and how these characteristics may be different from research findings from studies conducted in the Western context. Secondly, the results of this study provide guidelines for instructional designers and HRD practitioners when designing and implementing m-learning activities in organisations and blending these activities with existing training and development (T&D) practices. Thirdly, the implications of this study may also provide inputs for the developers of m-learning apps to re-design content and curriculum to enhance, enrich and extend learning and development in the Eastern business context.

Key stakeholders can benefit from this study, in particular:

- Employees can be engaged in m-learning processes anywhere, anytime, and utilise their idle time during organisational and personal activities;
- HR or Training Managers will be able to make decisions and direct resources to support employees' learning activities through mobile devices;
- Vendors of m-learning resources can provide effective and efficient learning apps or resources to employees and HRD practitioners.

By promoting and implementing m-learning and adopting up-to-date mobile technology in employee learning, organisations can develop more highly competent employees, which is essential to enhance organisational competitiveness. A good understanding of the characteristics of m-learning in a Chinese business context can work as a blueprint for m-learning project implementation and testing not only in China but in other Confucian culture-rooted countries in the Asia and Pacific region.

1.7 Research Approach

According to the research purpose and research questions of this study, a mixed methods research approach was employed as the research design to collect quantitative and qualitative data. A mixed methods design enables researchers to gather and examine data, incorporate findings, and draw conclusions based upon both quantitative and qualitative methods in a single study to understand the research problem (Anderson, 2009; Creswell, 2014). The intention of using the mixed methods research design was to bring together different strengths and non-overlapping weaknesses of quantitative methods (large sample size, trends and generalization) with those qualitative methods (small sample, detailed and in-depth), and thus improve confidence in the study results (Anderson, 2009; Creswell, 2014; Patton, 2002; Strang, 2015).

Moreover, this study in particular adopted an explanatory sequential mixed method, where the quantitative method was initially employed then the qualitative method was applied to further explain the findings of the quantitative method in more detail. Since little is known about m-learning in Chinese business settings, the quantitative survey instrument was adapted to inference the usage, behaviour and adoption of m-learning in the population being studied; while qualitative interview data was used to generate more robust findings on the perceptions of m-learning in terms of perceived benefits, concerns and improvement areas. In relation to the quantitative data, an online survey was conducted, and 665 valid sets of questionnaires from four Chinese organisations, located in four cities in China, were collected. The survey was supported by *Survey Star (问卷星)*, a leading provider in China of online and mobile survey management, data processing and tabulation services to researchers. Quantitative data were analysed using Excel and SPSS 15.5, using descriptive statistics, frequencies, independent samples t-test, Post Hoc and linear regression for variables. As related to the qualitative data, 40 semi-structured interviews were conducted in these four organisations. Interviews were conducted in Chinese; and interview data were recorded, translated (into English), transcribed and then coded using inductive analysis and Nvivo 11.4.3 software, from which the patterns, themes and categories of analysis were derived. Details on quantitative and qualitative data analyses are provided in Chapter Four and Chapter Five.

1.8 Organisation of Thesis

This thesis is comprised of six chapters. Chapter One includes the background, problem,

purpose of the study, research questions, significance, and research approach. Chapter Two presents a literature review and background information relevant to this study. The chapter first presents the definition of m-learning, followed by the activities and affordance of m-learning, then the theoretical perspectives on m-learning, and finally m-learning in business settings and m-learning in China. Chapter Three discusses the research methodology used for this study, including an overview of the research design, an extensive description of the populations and participants, data collection procedure, data analysis, validity, reliability and ethical assurances. Analyses and results from quantitative data are provided in Chapter Four and qualitative results and analysis are provided in Chapter Five. Chapter Six provides an overview of the research findings combined with detailed discussion on the findings by reference to the literature. The research questions are answered and guide the arrangement of research findings and discussion. Chapter Six also provides a conclusion for the study and a discussion of the limitations, implications and recommendations for future research.

1.9 Chapter Summary

The massive growth in recent years in the mobile device and mobile technology market has caused heightened interest in m-learning. Despite the use of mobile devices in the context of learning in business organisations being an increasingly popular phenomenon worldwide, limited rigorous research has been done in this field, even though similar m-learning research in the education sector has been reported much earlier. In Chinese business environments, with rapid economic development and high mobile penetration, m-learning appears to be ubiquitous. However, to date, there is little research conducted exploring or conceptualising the characteristics of m-learning in a business setting in China. By using a mixed methods research approach of quantitative and qualitative methods, the present research provides an empirically based investigation in an effort to conceptualise m-learning for a Chinese business setting. The outcomes of the study contribute conceptually to advancing the body of knowledge in the field of m-learning and provide practical implications to help in reshaping the way mobile technologies are used in organisational training and development in Eastern business contexts.

Chapter Two: Literature Review

2.1 Introduction

M-learning is a highly popular multidisciplinary study field around the world. It has attracted a great deal of attention from researchers in various disciplines who have realized the potential to apply mobile technologies to enhance learning (Brown & Mbati, 2015; Churchill, Pegrum, & Churchill, 2018; Keskin & Metcalf, 2011; McCarty, Sato, & Obari, 2017; McConatha et al., 2013). As with any emerging paradigm, the domain of m-learning has been variously described (Ally, 2009). A review of the extant m-learning research literature shows that m-learning has many different definitions and is known by many different names such as M-learning, U-learning, personalized learning, learning while mobile, ubiquitous learning, and handheld learning (Lac et al., 2014). Researchers in this field have borrowed theoretical stances from other disciplines, such as Education, Engineering, Information Systems and Human-computer Interaction, with already established theoretical bases (Kululska-Hulme & Traxler, 2005). However, the development of m-learning theory is also under way, as a number of researchers have proposed theories and conceptualizations of m-learning in the form of frameworks and models (Keskin & Metcalf, 2011; Ozhamar-Keskin & Ozturk, 2015).

This chapter provides a literature review on the m-learning domain, and has been organized according to the following sections. Definitions of m-learning are discussed in Section 2.2. Section 2.3 contains discussion of the affordances of mobile devices and m-learning. In Section 2.4, a review of theoretical perspectives is presented. Section 2.5 presents a detailed account of m-learning models and frameworks from the extant literature. Section 2.6 examines the practices of m-learning in teaching and educational environments. Section 2.7 investigates the m-learning studies in business environments; followed by, in Section 2.8, an overview of m-learning in China. Section 2.9 investigates the cultural influences on adopting m-learning in Chinese business contexts, especially the influences of heritage Confucian culture. Section 2.10 provides a summary of this chapter.

2.2 Definition of M-learning

M-learning does not have one unified definition; instead, researchers, academicians and

practitioners have attempted to define it through the lenses of different perspectives (Brown & Mbati, 2015; Lac et al., 2014; Rossing, Miller, Cecil, & Stamper, 2012). In January 2005, an initial Google search of "mobile learning" and "definition" yielded 1,240 results (McConatha et al., 2013); while the same search discovered 243,000 results in 2012; then 388,000 results in 2017; and in 2019, the number reached 433,000,000. Definitions of m-learning emphasize mobility (Sharples et al., 2009), access (Parsons & Ryu, 2006), immediacy (Kynäslahti, 2003), situativity (Cheon, Lee, Crooks, & Song, 2012), ubiquity (Kukulska-Hulme et al., 2009), convenience (Kynäslahti, 2003), and contextuality (Kearney, Schuck, Burden, & Aubusson, 2012). According to Sharples et al. (2009), mobile learning includes the characteristics of mobility in physical, conceptual, and social spaces. Table 2.1 summarises some of the mobile learning definitions and perspectives from the relevant literature that have been used over time.

Table 2.1 Definitions of M-learning in the literature

Author (Year)	Definitions / Perspectives
Quinn (2000)	M-learning is electronic learning through mobile computational devices: Palms, Windows CE machines, even a digital cell phone.
Vavoula and Sharples (2002)	Learning is mobile in terms of space (i.e. at the workplace, at home, and at places of leisure); it is mobile between different areas of life (i.e. in relate to work demands, self-improvement, or leisure); and it is mobile with respect to time.
O'Malley et al. (2003)	M-learning is any sort of learning that happens when the learner is not at a fixed predetermined location, or learning that happens when the learner tales advantage of learning opportunities offered by mobile technologies.
Geddes (2004)	Mobile learning is the acquisition of any knowledge or skill through the use of handheld technology, anywhere and anytime.
Keegan (2005)	Mobile learning is the provision of education and training on PDAs/palmtops/handhelds and mobile phones.
Traxler (2005)	Mobile learning can be defined as any educational provision where the sole or dominant technologies are handheld or palmtop devices.
Sharples et al. (2007)	Mobile learning is the processes of coming to know through conversations across multiple contexts among people using personal interactive technologies.
Peters (2007)	M-learning is the learning that is enabled or supported by mobile technologies.
Koole (2009)	Mobile learning is a process resulting from the convergence of mobile technologies, human learning capacities, and social interaction.
Ally (2009)	Mobile learning is the process of using a mobile device to access and study learning materials and to communicate with fellow students, instructors or institution.
Valk, Rashid, and Elder (2010)	Mobile learning is learning that is mediated through a mobile device.
Pachler et al. (2010)	Mobile learning is not about delivering content to mobile devices but, instead, about the processes of coming to know and being able to operate successfully in, and across, new and ever-changing contexts and learning spaces. And, it is about understanding and knowing how to utilize our everyday life-worlds as learning spaces.
Cochrane (2010)	Mobile learning involves the use of wireless-enabled mobile digital devices within and between pedagogically designed learning environments or contexts.
El-Hussein and Cronje (2010)	Mobile learning is based on the mobility of technology, mobility of learners, and mobility of learning that augments the higher educational landscape.
Crompton et al. (2013)	Mobile learning is learning across multiple contexts through social and content interaction using personal electronic devices.
Mbati (2015)	Learning provides opportunities for personalised and contextual learning through the affordances of mobile technologies. These affordances allow for contextual and situated learning, the merging of formal and informal learning, personal publishing and sharing. In addition, mobile devices that support software that allows for seamless and ubiquitous learning.
McQuiggan et al. (2015)	Mobile learning is the experience and opportunity afforded by the evolution of educational technologies
Dar and Bha (2016)	Mobile learning is the learning to seek knowledge while on the move via the wireless networked devices.

ADL (2017)	Mobile learning is that leveraging ubiquitous mobile technology for the adoption or augmentation of knowledge, behaviours, or skills through education, training, or performance support.

A definition of m-learning is under constant change, and any single definition would be inadequate (Berge & Muilenburg, 2013; Brown & Mbati, 2015; Chee et al., 2017). Each definition of m-learning has its focus and underpinning theoretical approach. There are three main phases that m-learning has undergone: a focus on the devices and technology in the mid-1990s to early 2000s; a concentration on learning spaces and mobility of learning in the early 2000s; and since then, the still current focus on social/cultural practices enacted through use of mobile technologies (Calton, 2016; El-Hussein & Cronje, 2010).

Early definitions, focused on technological attributes of mobile devices (Techno-Centric) (Kululska-Hulme & Traxler, 2005); namely, that it is learning delivered or supported solely or mainly by handheld and mobile technologies such as personal digital assistants (PDAs), smartphones, tablet or wireless laptop PCs (Chee et al., 2017). According to O'Malley et al. (2003), m-learning is, "Any sort of learning that happens when the learner is not at a fixed predetermined location, or learning that happens when the learner takes advantage of learning opportunities offered by mobile technologies" (p. 6). Similarly, Peters (2007) defines m-learning as the learning that is enabled or supported by mobile technologies. Alternatively, early definitions focused on the mobility of the technology, describing m-learning as "electronic learning through mobile computational devices: Palms, Windows CE machines, even your digital cell phone" (Quinn, 2000). M-learning has been described as an evolving trend within e-learning and distance education (Berge & Muilenburg, 2013). While some researchers in the field define m-learning as a subset of e-learning (Quinn, 2000), others defend m-learning as different from open and distant learning in that it is an interdisciplinary field which created a paradigm shift in education (Ozhamar-Keskin & Ozturk, 2015). As El-Hussein and Cronje (2010) define it, m-learning is any type of learning that takes place in learning environments and spaces that takes account of the mobility of technology, mobility of learners and mobility of learning; which clearly distinguishes m-learning from traditional e-learning.

Some researchers have defined m-learning as a learning process that combines the advantages of mobile technology devices and ubiquitous communications technology. For instance, Geddes (2004) described m-learning as "the acquisition of any knowledge and skill through the use of mobile technology, anywhere, anytime, which results in an alteration in behaviour" (p. 1). Furthermore, some researchers have focused their definitions on the technology being applied (Alexander, 2004; Wang et al., 2009). Still others have considered the blend of the

location and the technology to be the instrumental factor in defining m-learning (Motiwalla, 2007; Traxler, 2007). In their definition, Sharples et al. (2007) focused on the nature of mobile devices. Some researchers have also described m-learning as only receiving instruction through mobile computing devices (Al-Fahad, 2009; Stockwell, 2008). In addition, m-learning is defined by Valk, Rashid, and Elder (2010) as "learning that is mediated through a mobile device" (p. 2). These definitions, however, are constraining, techno-centric, and tied to current technological instantiations. Some researchers, such as Chapel (2008) and Traxler (2010), argue that focusing only on the device ignores other important aspects of the learning environment. Nevertheless, the definition of m-learning should focus on the mobility of learners rather than concentrating on the device (Sharples et al., 2007).

The later definitions of m-learning put emphasis on mobility in three interdependent yet distinctive aspects of learning: the learner, the process of learning, and technology. This view thus tends to be more learner-centred. It asserts that mobile technology should be present to enable mobility; the learner should not be confined by time and location while learning; and the learning itself should be arranged to suit the actual setting where the learner is physically located at the moment of learning and the device that is used for learning (Cochrane, 2011; Crompton, 2013; McQuiggan, McQuiggan, Sabourin, & Kosturko, 2015a). El-Hussein and Cronje (2010) discussed these three components as follows. Mobility of the technology refers to the mobile nature of installed software and hardware that allow constant wireless Internet connectivity. Mobility of the learner refers to learners who are no longer physically attached to one or more learning sites (El-Hussein & Cronje, 2010): they can learn at the same time as other students as long as the mobile devices are available. Finally, mobility of learning is the result of mobility of both the technology and the learners (El-Hussein & Cronje, 2010). A definition according to Hamm, Drysdale and Moore (2014) must consider the aspects of the user's connection with technology, the education process of the mobile device, and the mobility of the user and the device. McQuiggan, MaQuiggan, Kosturko and Sabourin (2015) specify that "mobile learning is the experience and opportunity afforded by the evolution of educational technologies" (p. 8). Therefore, according to Imtinan (2014), the popularity of m-learning is not merely due to more advanced technology and extensive use of mobile devices; rather, the concept of mobility and learning has suggested the possibility of using mobile technologies in learning environments.

More recently, the definition of m-learning has been influenced by the socio-cultural

perspectives. For example, Pachler et al. (2010, p. 6) consider that m-learning is not primarily about technology but about the processes of coming to know and being able to operate successfully in, and across, new and ever-changing contexts and learning spaces. Sharples, Taylor and Vavoula (2007) also view m-learning as "the processes of coming to know through conversations across multiple contexts among people and personal interactive technologies" (p. 47). Importantly, these definitions privilege cognitive and social aspects over technical considerations as well as over perspectives that foreground content provision and transmission (Vavoula, Pachler, & Kukulska-Hulme, 2009). Instead, the emphasis, is on context and social aspects. It is argued here that mobile devices, their characteristics and potential for learning enable the users to reflect and re-interpret their everyday life contexts as potential resources for learning (Traxler & Koole, 2014; Vavoula et al., 2009). Taking into consideration both technical characteristics of mobile devices as well as social and personal learning processes, a socio-cultural perspective further emphasises collaboration, access to information, and deeper contextualisation of learning, which perspective has had a strong influence on the current theoretical and pedagogical studies of m-learning.

Literature suggests that the popularity of mobile learning is not merely due to more advanced technology and extensive use of mobile devices but, rather, that the concept of mobility and learning has suggested the possibility of using mobile technologies in learning environments. Vavoula and Sharples et al. (2002) discuss learning as a dynamic process, because individuals learn, and they are capable of learning, even when not in formal academic settings. Laurillard (2007) mentions that the very concept of mobility has been built into learning environments since the advent of printed books, pencils and notebooks; that learning has been mobile in different spheres of life; and that it is the technology that is ever-changing. Today, a mobile device combines the benefits of a book (eBooks and other electronically published material), a pencil (word processing capabilities), notebooks (note-taking software applications), and numerous other features for the learner to enjoy the greater benefits of mobility.

The literature shows that mobile learning has scope for individuals, and for collaborative and situated learning. It is a ubiquitous learning solution which inherently combines the benefits of existing learning domains such as e-learning, in-person learning and contextual learning (Frohberg, Göth, and Schwabe 2009; Sharples, Taylor, and Vavoula 2005). In general, learning occurs at different times during the day; and it is mobile in terms of space as it happens in the workplace, at home and at places of leisure. Furthermore, learning is 'just-in-time', as

discussed by Kambil and Eselius (2000), no matter what you do or where you are. It is mobile between different areas of life such as for work demands or self-improvement. Learning is continuous improvement gained through the life-long practice of knowledge and skills. Mobile learning cannot be separated from face-to-face learning and e-learning (Sharples, Taylor, and Vavoula 2005; Vavoula and Sharples 2002). Mobility empowers the learning process by redefining traditional and formal learning to informal, contextual and lifelong learning.

A review of the literature for the present study reveals that the concept of m-learning has a variety of definitions, which indicates that m-learning is still in a developing phase (Motiwalla, 2007; Peng, Su, Chou, & Tsai, 2009). M-learning is not just the miniaturization and convenience of portable computing, but is transforming how we conceptualize and interact with computing and our environment, communicate, and create and manipulate information (Cochrane, 2011; Pachler, Bachmair, & Cook, 2010). M-learning is about ubiquitous social connectivity, instant information assess, and enhancing how we view the world through digital augmentation (Cochrane, 2011). It is empowering for learners, who can become content and content generators within authentic learning environments rather than simple consumers of transmitted content in classrooms (Cochrane, 2011). In this study, m-learning is defined as the use of mobile devices to support teaching and learning which takes place "anytime, anywhere" (Shippee & Keengwe, 2012). Mobile devices can be types of devices that exhibit characteristics including being portable, providing Internet connectivity, providing access to social interactions (texting etc.) and accessing tools to collect data (Chang, 2010). Typically, these mobile devices can be smartphones, tablets, and laptops with wireless Internet access.

2.3 Affordances of Mobile Devices and M-learning

The term "affordance" was originally created by the psychologist, James J. Gibson, to refer to all transactions that are possible between an individual and their environment. This word has since been used in a variety of fields, especially in psychology, industrial design and human-computer interaction (Jones, 2003; Norman, 1999). According to Norman (1988), an affordance is the design aspect of an object which suggests how the object should be used: a visual clue to its function and use. Technology affordance refers to an action potential; that is, to what an individual or organization with a particular purpose can do with a technology or information system.

2.3.1 Affordances and Activities of Mobile Devices

The affordances of mobile devices can be identified at the intersection between a learner's use of, and the feature of design within, a mobile device: the built-in human-computer interaction (Berge & Muilenburg, 2013). Various studies have indicated that mobile technologies promote interaction, collaboration and sharing (Liaw, Hatala, & Huang, 2010; McConatha et al., 2013; Rossing et al., 2012). Table 2.2 shows a set of activities and affordance of mobile devices taken from the literature; with sources of these concepts explored in the discussion following.

Table 2.2 Activities and affordance of Mobile Devices

Mobile Device Affordance and Activities/Possibilities	
Portability **(Naismith et al., 2004; Quinn, 2000)**	▪ Any of those below, anytime, anywhere ▪ Data transfer (iDeop, Bluetooth, etc) ▪ Entertainment (Game/Movie/Radio/Music)
Connectivity **(Siemens, 2005)**	▪ Access to Internet ▪ Access to Internet-supported apps (M-banking etc.) ▪ Access to information
Communication **(Sharples, 2000)**	▪ Making phone calls ▪ Checking emails ▪ Instant Messaging ▪ Meeting/conference
Collaboration **(Caballe, Xhafa, & Barolli, 2010; Quinn, 2000)**	▪ Social networking ▪ Feedback/Discussion
Learning Modules **(Sharples, Taylor, & Vavoula, 2005)**	▪ Just-in-time learning/Micro Learning ▪ Using search engines ▪ Lifetime learning
User-Generated Content **(ADL, 2017; Rikala, 2015)**	▪ Taking notes ▪ Translation ▪ Taking Photos/Videos/Audio
Contextual and Outdoor environment (Brown & Mbati, 2015; Chen, Kao, & Sheu, 2005; Koole, 2009)	▪ GPS ▪ Location-specific content: sports/health tracking ▪ Time ▪ Weather
e-Reading **(ADL, 2017)**	▪ E-News ▪ E-books/magazine/articles

Recent studies also reflect the affordances summarised in the literature and provide a breakdown of time spent with the activities through mobile devices. A study conducted by Flurry (2016) shows that consumers in U.S. spend over 5 hours a day on mobile devices, and that about 86% of that time was taken up by smartphones. Flurry's data also reveal that 33% of time spent is in social and communication apps, 14% in entertainment apps, and 8% in browser apps. Flurry's (2016) study aligns more closely with the eMarketer study on mobile activities and usage: according to eMarketer's Mobile Usage Report (Nov. 2015), mobile users spend 4 hours and 5 minutes per day on mobile phone in the U.S., 22% of mobile phone time is taken up by texting, 22% by phone calls, 22% by entertainment, 10% by social media, 10% by email, 8% by functional use, and 5% by taking photos. Statista, one of the biggest statistics

portals, also revealed the most popular mobile activities in the second half of 2017. “Email”, “Social media”, “Watching videos”, “Reading news” and “online shopping” are the top 5 mobile activities worldwide in their report. Based on a survey of almost 45,000 U.S. online adults, Forrester’s State of Consumer & Technology report (2016) reveals that 93% of these respondents access the Internet on at least a weekly basis from their devices, which makes “Internet access” the clear leader in mobile activities, a position it holds across all generations. Next up is “taking photos and videos”, with more than 70% users engaging in this at least weekly; while close behind is “texting” with 68% respondents sending/checking text messages at least once a week. These reported popular activities through mobile devices highlight four areas of mobile affordance in the relevant literature: communication, collaboration, connectivity and portability (entertainment).

However, the concept of “affordance” can be problematic, which has drifted so far from its origins that it is now too ambiguous to be analytically valuable (Oliver, 2005; Wright & Parchoma, 2011). Oliver’s (2005) extensive examination of the logical and analytical shortcomings of the term “affordance” concludes that the term is highly problematic in both its origin and in its application. The term originates in Gibson’s work on perception (Gibson 1977, 1979), wherein it is proposed that affordances are latent in the environment, objectively measurable and independent of the individual’s ability to recognise them, but are always in relation to the actor. However, the nature of this relationship is never fully explained by Gibson and the concept of trying to understand all possible affordances leads to a logical impasse such that trying to measure affordances “becomes speculative rather than analytic” (Oliver 2005).

2.3.2 Affordances of M-learning

With the ubiquity of using mobile devices and mobile technologies in our lives, many studies also support that the affordances of mobile devices can help in learning and teaching. McConatha (2014) predicts that the ongoing development of technological innovation and emerging mobile pedagogy will transform educational opportunities (Crompton, 2013). Research shows that students enjoy using their mobile devices as personal learning tools because they provide the means to control their learning environments. Sam’s (2013) study reveals that students appreciate the flexibility these devices afford them: they can learn at any place and time, allowing access to instruction appropriate to their schedule and pace of learning (Brown & Mbati, 2015). The learning environment that incorporates mobile devices is informal and flexible, supports social learning and collaboration, and does not depend on a specific

geographic location or time. Gikas and Grant (2013) assert that this approach has the possibility of helping to create new opportunities in the development of instructional strategies, which could possibly expedite more pertinent and appealing learning opportunities. As m-learning has continued to develop, the multiple affordances these devices offer to further extend learner-centred pedagogies have become evident (Crompton, 2013). Contemporary researchers have described the development of a participatory culture as paramount for the success of future generations (Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006). This participatory culture can be defined as one in which people are: comfortable with artistic expression and civic engagement; supported in creating and sharing with others; engaged in informal mentorship sharing and passing information and experiences as novices and experts; appreciated as a contributor; and socially connected (Jenkins et al., 2006). Twenty-first century learners are part of this participatory culture, and the widespread use of mobile devices has potential to inform the way in which content is delivered and curated to them.

Many researchers have discussed the affordances of mobile devices for learning. Cochrane et al. (2009) studied how mobile technologies can be integrated into the tertiary education context, and identified six affordances of smartphones for tertiary education based upon a social constructivist pedagogy:

1. Video streaming: record and share live events;
2. Geo-tagging: geolocate photos and events on Google maps;
3. Micro-blogging: post short updates and collaborate using micro-blogging services;
4. Text notifications: course notices and support through mobile message;
5. Direct screen sharing: video output to video projector;
6. Social networking: collaborate in groups using social networking tools (Cochrane, Bateman, & Flitta, 2009).

Based on an activity theory approach, Liaw, Hatala and Huang (2010) outline five affordances of mobile technology that could provide educational opportunities:

1. Portability, as mobile devices can be used in different locations at any time;
2. Social interactivity, as tools can be used to collaborate with others;
3. Context Sensitivity, as devices can access data and information;
4. Connectivity, as devices enable connection to network; and
5. Individuality, as devices provide opportunities for individual exploration (Liaw et al., 2010).

Traxler (2011) describes eight aspects in which m-learning offers new learning opportunities to enhance, extend and enrich the concept and activity of learning:

1. Contingent learning, allowing learners to respond and react to the environment and changing experiences;
2. Situated learning, in which learning takes place in the surroundings applicable to the learning;
3. Authentic learning, with the tasks are directly related to the immediate learning goals;
4. Context-aware learning, in which learning is informed by the history and the environment;
5. Personalised learning, customized for each unique learner in terms of abilities, interests, and preferences;
6. User-generated context learning, where learning content is generated and published informally by other users;
7. Game-based learning, a type of game play that has defined learning outcomes;
8. Assessment, using mobile technologies on assessment in practice settings.

After scanning and reviewing the literature, Imtinan et. al. (2013) conclude with 10 common characteristics that are provided by m-learning, which have been incorporated and researched in most of the m-learning conceptualisations, models and frameworks in the literature:

1. Usability, which refers to the ease of using mobile devices for learning in respect to screen size, battery life, size and user interface etc.
2. Collaboration, which relates to the level of communication and interaction between the learners and the teacher as well as among other learners.
3. Context, which refers to the physical environment of the learner or where the learning takes place.
4. Control, which refers to the amount of power and autonomy a teacher or a learner has over the learning process for smooth continuity and best outcomes.
5. Connectivity, which relates to how effectively mobile devices can connect to the information or learning material wirelessly.
6. Mobility, which refers to the ease of accessing learning material and collaborating with peers regardless of time and space.
7. Blending, which is a learning solution that combines the benefits of various learning approaches such as m-learning, e-learning, face-to-face learning and contextual learning.

8. Content, which refers to the learning resources for learners in a format compatible with mobile devices.
9. IT or Technical Support, which reflects the extensive IT or technical support to make the m-learning implementation successful and reliable in different educational contexts.
10. Cost, which means that m-learning design and implementation may reduce or increase the learning investment for institutions and learners compare with traditional learning methods.

By reviewing and acknowledging the previous studies and past experiences, Brown and Mbati (2015) summarize 11 pedagogical affordances that m-learning provide for open and distance learning:

1. Administrative support and motivational messages through SMS, which is a very simple but very powerful tool to communicate easily and just-in-time with large groups of learners or even individually.
2. Quizzes on very basic phones, where multiple-choice questions have been implemented in m-learning environments as a learning enhancement strategy.
3. Audio-visual affordances, which makes mobile devices powerful learning agents due to their rich and user-friendly audio-visual functionalities.
4. Audio-rich language learning, i.e. the key to effective language learning lies in listening and speaking the language – and pronunciation plays a significant role.
5. Location awareness and GPS, which can provide a personalized, location-based and interactive learning environment.
6. Contextual and situated learning, which allow the learner to record the contextual activities and interact with the surroundings.
7. Simulations and serious games, which can be used to facilitate collaborative and problem-based learning while increasing learner motivation and performance.
8. Augmented reality and immersive presence, where the virtual interaction is synchronous and can be used to stimulate collaborative and interactive learning.
9. Integrating formal and informal learning, since learning is interwoven with everyday activities that take place in an everyday environment.
10. Personalized learning and personal learning environments, which allow learners to personalize their learning based on their characteristics and preferences, as well as the tools and applications available to them without time and space limitations.

11. Personal publishing and sharing, when content creation and the personal publishing of content has become part of the daily lives of learners.

More recently, Parson et al. (2016) capture six m-learning affordances from reviewing the relevant literature, in their paper, "Exploring mobile affordances in the digital classroom":

1. Portability (for movement during learning activities);
2. Data gathering (to gather, manage or store information);
3. Communication (for communication and/or collaboration);
4. Interaction with the interface (to visualise and present digital content);
5. Contextual, active learning (for active learning interacting with a context);
6. Outdoor environment (to support learning outside the classroom).

This review of relevant literature indicates that the opportunities and affordances offered by m-learning are immense. As McConatha (2014) predicts, the ongoing development of technological innovation and emerging mobile pedagogy will continuously transform educational opportunities at all levels. Mobile technologies can be integrated in various ways in and outside the classroom to enhance and extend learning, and can also promote innovative learning and teaching practices in different educational contexts (Rikala, 2015). Table 2.3 summarises 16 affordances of m-learning which have been commonly discussed in the relevant literature, and the supportive studies for each affordance.

Table 2.3 Summary of Affordances of M-learning

	Affordances/Opportunities	Authors
Portability/Mobility/Usability	*Refers to the ease of using mobile devices (in respect to screen size, battery life, size and user interface) for learning anytime, anywhere*	Liaw, Hatala and Huang (2010), Imtinan et al. (2013), Koole (2009), Naismith et al. (2004), Brown (2009), Low (2007), Parson et al. (2016)
Connectivity	*Refers to mobile devices being able to effectively connect to the information or learning material wirelessly*	Koole (2009), Traxler (2005), Imtinan et al. (2013), Liaw, Hatala and Huang (2010)
Communication	*Relates to the effective interpersonal communication with others through mobile technology*	Mifsud (2002), Parsons et al. (2009), Barker et al. (2005), Motiwalla (2007), Kearney et al. (2012), Koole (2009), Rodríguez et al. (2017), Caballe (2010), Parson et al. (2016)
Collaboration and Interactivity	*Refers to how m-learning supports interaction and teamwork with others through the m-learning activities*	Sharple et al (2007), Liaw, Hatala and Huang (2010), Koole (2009), Pachler et al. (2010), Parson et al. (2016)
Personal Publishing and Sharing	*Relates to m-learning support content creation and the personal publishing of content*	Brown & Mbati (2015), Attewell & Savill-Smith (2014), Downes (2007), Goerke et al. (2007), Wagner (2005)
Context and Situated	*Relates to m-learning allowing the learner to interact with the surroundings and contextual activities*	Wong and Looi (2011), Geddes (2004), Spikol et al. (2009), Masters (2005), Wali et al. (2008)
Authenticity	*Refers to m-learning being interwoven with real and practical activities that take place in everyday environments*	Kearney et al. (2012), Sharples et al. (2007), Gikas & Grant (2013), Harrington et al. (2009)
Personalisation	*Refers to m-learning allowing learners to personalize their learning based on their characteristics and preferences, as well as the tools and applications available to them*	Pedersen et al. (2013), Murphy & Williams (2011), Kearney et al. (2012)
Individuality	*Relates to m-learning providing opportunities for individual exploration and allowing persons to learn in their own ways*	Traxler (2007), Berge (2013), Liaw et al. (2010), Naismith (2004)
Control /Administrative Support	*Refers to the amount of power and autonomy a teacher or a learner has on the learning process for smooth continuity and best outcomes*	Sharples et al. (2005), Frohberg et al. (2009), Imtinan et al. (2013), Brown (2004), Mostert (2010), Naidoo (2011), Merphy & Williams (2011), Berge (2013)
Content	*Refers to the learning resources for m-learning being linked with personal needs/choice and the content being in a format compatible with mobile devices (screen size and fragmented learning).*	Low (2007), Frohberg et al. (2009), Wains & Mahmood (2008), Berge (2013)
Cost	*Refers to m-learning possibly reducing the learning investment for institutions and learners compared with traditional learning methods*	Dyson et al. (2009), Grousopoulou (2009), Ally (2009), Lundin et al. (2010), Imtinan et al. (2013)
Social network	*Relates to m-learning potentially helping users in building and maintaining their social network with other users through the m-learning activities supported by social media tools*	Pachler et al. (2010), Pachler (2012), Ray and Saeed (2015), Norman et al. (2015), Hylen (2015)
Blending	*Refers to a learning solution combining the benefits of various learning approaches and supporting multi-task learning*	Wan & Howard (2007), Ally (2009), Peter (2007), Naismith et al. (2004), Imtinan et al. (2013), Chen and Yan (2016), Pedro et al. (2018)
Audio-visual	*Relates to the rich and user-friendly audio-visual functionalities through m-learning*	Simonsen et al. (2013), Chen et al. (2010), Rikala (2015), Maniar et al. (2008)
Location Awareness and GPS	*Refers to mobile technology providing a personalized, location-based and interactive learning environment*	Brown & Mbati (2015), ADL (2011), Traxler (2007), Ally 92009), Kukulska-Hulme (2009), Parson et al. (2016)

To explore the "essence" or the "fundamental constituents" (Tesch, 1987) of these affordances of m-learning and represent them at a higher level of abstraction, through reviewing and comparing the nature of these 16 affordances of m-learning, three broader themes (central

themes) can be identified that highlight common and related characteristics (Table 2.4).

Table 2.4 Central Themes of M-learning Affordance

Affordances	Central Themes
Portability/Mobility/Usability	**Autonomy** The freedom and the capacity of the learner to exert power and ownership over their learning preferences and experience.
Personalisation	
Individuality	
Control /Administrative Support	
Content	
Cost	
Blending	
Audio-visual	
Connectivity	**Real-world Relevance** The learning activities have actual, real-time and real-world relevance, which can help learners to achieve their goals in their real situations.
Context and Situated	
Authenticity	
Location Awareness and GPS	
Communication	**Collaboration and Networking** Connecting and interacting with a variety of people, sharing ideas, information, experience and building or maintaining social networks.
Collaboration and Interactivity	
Personal Publish and Sharing	
Social network	

As Table 2.4 demonstrates, there are eight affordances of m-learning which highlight the characteristic of the freedom and the capacity of the learner to exert power and ownership over their learning preferences and experience. The affordance of "Portability/Mobility/Usability" highlights the freedom of using mobile device for learning; "Personalisation", "Individuality", "Control /Administrative Support", and "Content" highlight personal preference and the power over their experience of learning; the affordance of "Blending" reflects the choice by the learner of preferred learning approach or method; the "Audio-visual" affordance supports personal preference and learning styles in accessing information; the affordance "Cost" relates to the lower cost of m-learning which broadens access to and choice of learning activities, and thus enhances personal control. In summary, these affordances are associated with the central theme of "Autonomy" and relate to enabling the freedom and capacity of the learner to exert power and ownership over their learning preferences and experience.

There are four affordances of m-learning which enable learners to engage with learning activities which have actual, real-time, and real-world relevance. The affordance, "Context and Situated", explicitly highlights the actual, real-time, and real-world relevance of learning via mobile devices; and the "Connectivity" affordance reflects that mobile devices can effectively connect to the information or learning material wirelessly, which helps users with their real and immediate tasks. The "Location awareness and GPS" affordance can support learners in benefitting from awareness of their surrounding environment, which enhances real-time real-world relevance of learning. In summary, these four affordances are associated with the central theme of "Real-world Relevance", which highlights the actual, real-time, and real-world relevance of m-learning.

The remaining four affordances are related to the central theme of connecting and interacting with a variety of people, sharing ideas, information, experience and building or maintaining social networks (Collaboration and Networking). The affordances of "Communication" and "Collaboration and Interactivity" highlight the ease with which ideas and information can be exchanged with others through mobile devices and social media. Important actions of knowledge exchange through mobile devices include interaction with trainers or other learners and "Personal publishing and sharing" of progress and insights among learners. The knowledge-exchange activities also support learners in building and maintaining "Social networks" among the users. In summary, these four affordances are associated with the central theme, "Collaboration and Networking", which highlights the feature of m-learning that people are able to connect and interact with a variety of people, and share ideas, information and experience.

Therefore, to sum up, according to the previous research, m-learning has 16 affordances to enhance, extend and enrich the concept and activity of learning. These 16 affordances can be categorised into three thematic areas: "Autonomy", "Real-world Relevance", and "Collaboration and Networking". The central themes of m-learning affordance provide general descriptions and overall tendencies of m-learning characteristics. It is noted that these three central themes have also been incorporated and highlighted as core components of the theoretical frameworks and models of m-learning by many researchers in their studies, for example, Koole (2009) and Kearney et al. (2012), which will be discussed in the following section (Section 2.5).

2.3.3 Challenges and negative aspects of m-learning

Although mobile devices provide new opportunities and prospects for teaching and learning, they also bring challenges and possible negative influences to both educators and learners (Traxler & Koole, 2014). Messinger-Willma and Marino (2010) identity three categories of challenges: situational, institutional and dispositional. Situational challenges include lack of funding, time and expertise; institutional challenges include the lack of technology support for professional and professional development; and the dispositional challenge is teacher reluctance and/or attitudes toward technology-supported learning. In addition to these categories, a discussion of ethical concerns about the use of mobile technologies in learning environments is pertinent. Other sources corroborate these categories. Technological issues

such as expensive and unstable infrastructures, including wireless networks (Keller, 2011). Mobile users have reported obstructions to use, noting small keyboards and screen size, platform and connectivity inconsistency, limited battery life and storage capacity, and applications that were ineffective (Gikas & Grant, 2013).

Aubusson, Schuck and Burden (2009) outline some concerns in applying mobile technologies into learning: 1) cyberbullying; 2) the potential for public dissemination of information originally intended for a limited audience; 3) the ease and speed with which digital materials can be shared; 4) the risk of unethical use of archived materials; and 5) levels of parental and student consent to recording classroom activity. In addition to these challenges, Huang (2016) addresses five disadvantages and barriers of using mobile devices for learning: 1) inherent technological disadvantages with mobile devices; 2) network and service related disadvantage; 3) distraction issues; 4) privacy concerns; and 5) too much personalisation. These apprehensions are disconcerting to instructors because they lack control over student actions using mobile technology as they learn in extended classroom environments (Berge & Muilenburg, 2013).

It is clear from the literature reviewed that mobile devices increase engagement and have other benefits for learning such as improved participation and collaboration, which provide new opportunities and prospects to teaching and learning. However, mobile device incorporation into learning environments also presents challenges and possible negative influences to both educators and learners. To successfully leverage mobile devices and mobile technologies into a learning context, it is important to recognise the variety and distinctiveness of the affordances of mobile devices and m-learning.

2.4 Theoretical Perspectives on M-learning

Just as there are many definitions of m-learning, there is no consensus in the field of m-learning regarding foundational theories, and researchers have been experimenting with multi-disciplinary theoretical foundations for a variety of m-learning research projects across the world (Traxler, 2007; Traxler & Koole, 2014). As noted by Traxler (2007), the field of m-learning has not adequately addressed a conceptual and theoretical framework to provide authority and credibility to the studies performed. This idea is supported through an earlier description of the very same problem two years earlier, where Sharples (2005) states, “what

we lack, however, is an innovative and enhancing educational framework for the mobile age" (p. 147). It is, therefore, the intent of this literature review to examine the current state of knowledge regarding the conceptual frameworks and theories applied to m-learning.

A review of the literature suggests that a number of classic pedagogical theories and new emerging learning perspectives have been adopted to offer comprehensive or fresh insights into learning in the digital age, which could potentially provide exemplars for the development of a m-learning theory (Benjamin, 2016). Table 2.5, summarises the theoretical perspectives that are connected with m-learning in the literature. These theoretical approaches outline the interwoven constructs of m-learning: pedagogy, technological affordances, context and social interaction (Crompton, 2013). These theoretical approaches are only covering Western philosophies and that Confucianism will be discussed at the end of the chapter separately.

Table 2.5 Learning Theories/Perspectives and Their Relevance to M-learning

	Theories/Perspectives	Definitions of Learning (M-learning)	Key points related to M-learning
Classic Learning Theories and Perspectives	Behaviourist Learning	Learning is thought to be best facilitated through the appropriate reinforcement of an association between a particular response and stimulus (Smith & Ragan, 2005).	Information and content delivery in mobile learning
	Cognitivist Learning	Learning is the acquisition or reorganisation of the cognitive structures through which humans process and store information (Good & Brophy, 1990). In cognitivist learning, knowledge acquisition is described as a mental activity that entails internal coding and structuring by the learner and therefore, the leaner is comprehended as an active participant in the learning process (Ertmer & Newby, 1993).	Learner inquiry and discovery, leaner autonomy, and self-motivation in mobile learning
	Constructive Learning	Learning is an activity process in which learners construct new idea or concepts based on their current and past knowledge (Bruner, 1966). Social constructivism refers to learning as the result of the active participation in a "community" where new meaning is co-constructed by the learner and "community", and knowledge is the result of consensus (Gruender, 1996; Brown, 2006).	Context and content-dependent mobile learning; Collaboration and interaction in mobile learning
	Situated Learning	Learning is not merely the acquisition of knowledge by individuals, but instead a process of social participation (Brown et all, 1989).	Social Context and Social participant dependent mobile learning
	Activity Theory	Learning occurs with three features-involving a subject (the learners), an object (the task or activity) and tool or mediating artefacts, and human behaviour is situated within a social context that influences their actions (Engestrom, 1987; Vygotsky, 1987).	User actions in social context dependent mobile learning
	Sociocultural Theory	Learning occurs first through interpersonal (interaction with social environment) than intrapersonal (internalization) (Vygotski, 1978) ways.	Social Context and Social participant dependent mobile learning
	Collaborative Learning	Learning is promoted, facilitated and enhanced by interaction and collaborations between learners (Smith & MacGregor, 1992).	Collaboration and interaction dependent mobile learning
	Informal and lifelong learning	Learning is a process occurs autonomously and casually without being tied to highly directive curricula or instruction (Conlon, 2004). Learning happens all of the time and is influenced both by our environment and the particular situations we are faced with (Naismith et al., 2004).	Lifelong information and interaction with learning content in informal mobile learning setting
Emerging Learning Theories and Perspectives	Connectivism	Learning is a process of connecting specialized nodes or information sources (Siemens, 2004).	Diversity of information sources in mobile learning
	Navigationism	Learning is a process of connecting specialized nodes or information sources (Brown, 2005).	Complex of information sources in mobile learning
	Conversational learning	Learning is in terms of conversations between different systems of knowledge (Sharples, 2002).	Interaction and communication dependent mobile learning
	Context awareness learning	Context awareness means gathering information from the environment to provide a measure of what is currently going on around user and the device (Naismith et all, 2004).	Context aware in mobile learning
	Rhizomatic Learning	Rhizomatic learning views ideas as multiple, interconnected, self-replicating and having no beginning and end (Brown and Mbati, 2015). According to Dave Cormier, rhizomatic learning views "community as curriculum", learning is constructed and negotiated in real time by the contributions of those engaged in the learning process (Corniern 2008).	Diversity, open-ended and negotiated information sources in social network trough mobile learning; Community as curriculum
	Heutagogy	Heutagogy is the study of self-determined learning. In the heutagogical world, the learner shares content and resources in a self-determined manner (Ashton and Newman, 2006).	Self-determined resource and content that delivery in mobile learning
	Surface Learning	Learners focus on memorising the main elements, and have almost no use for or expression of meta-cognitive skills (Aharony, 2006).	The intention of learning is to find the quickest way to accomplish the task through m-learning
	Fragmented Learning	Fragmented learning is a process of learning fragmented knowledge according to learners' needs, interests, and ways of thinking without limitation of time and space (Jiang, 2018). In short, fragmented learning means that learners can use their fragmented time for learning fragmentated content (Xu & He, 2016).	The learning happens anytime and anywhere through mobile technologies, which influent people's learning and living.

(Keskin & Metcalf, 2011)

2.4.1 Classic Learning Theories

The theories and approaches applied in the reviewed literature most often originate from classic and well-established theories of learning, such as Behaviourism (Skinner, 2003), Cognitivism (Ertmer & Newby, 1993; Roberson & Park, 1974), Constructivism (Brown, 2006; Wang, 2009), Situated learning (Brown, 2006), Collaborative learning (Smith & MacGregor, 1992), Social-cultural theory (Vygotsky, 1978; Wertsch, 1991) and Activity theory (Vygotsky, 1987). Though a few calls have been made for developing a distinctive theory for m-learning, more researchers are exploring relationship between the existing classic pedagogies and how they can be applied and observed in m-learning.

2.4.1.1 Behaviourist Learning

Started in the early 20th century, Behaviourist theory from Skinner and Pavlov was major pedagogies around the 1950's which assume learner is passive and responds to environmental stimulus (Zaibon & Shiratuddin, 2010). Behaviourism was centrally concerned to highlight active learning-by-doing with immediate feedback on success, good analysis of learning outcomes, positioning of studying goals, educational methods and tactics used to determine and assess learning outcomes (Alshalabi, Hamada, & Elleithy, 2013). Because of the quick feedback or reinforcement that can be facilitated through mobile devices, behaviourist theory is relevant in m-learning research (Orr, 2010; Yılmaz & Orhan, 2010).

As Benjamin (2016) asserts, mobile devices in particular can enhance the behaviourist learning process. Within the behaviourist learning paradigm, learning is thought to be best facilitated through the reinforcement of an association between a particular stimulus and a response (drill and feedback) (Benjamin, 2016). Naismith et al. (2004), in their report on a literature review of mobile technologies and learning, argue that mobile devices are used to present learning materials/content-specific questions (stimulus), obtain responses from learners (response), and provide appropriate feedback (reinforcement) – provide "drill and feedback" activities; which fits well within the behaviourist learning paradigm. Feedback from the online system or other users then provides the reinforcement. This type of learning adopts a transmission model: learning takes place through the transmission of information from the tutor (the facilitator or other m-learning users) to the learner (McQuiggan, McQuiggan, Sabourin, & Kosturko, 2015b; Naismith et al., 2004). However, behaviourist learning theory has received much criticism because it ignores the cognitive processes and concentrates only on visible behaviour.

Therefore, behavioural principles can't explain the acquisition of higher level skills which require a depth of processing (Rikala, 2015). Nevertheless, despite a move away from the behaviourist perspective within the field of learning theory, many technological learning systems and web-based learning systems still rely heavily on the behaviouristic approach (Naismith et al., 2004).

2.4.1.2 Cognitivist Learning

The cognitivist theory replaced the behaviourism in the 1960s as the leading paradigm of learning (Zaibon & Shiratuddin, 2010). In contrast to behaviourism, the cognitivist theory focuses especially on the learner's inner mental activities (Rikala, 2015). Cognitivists concentrate on how information is obtained, structured, saved, and restored by the human mind, which represents the process of thinking that happens while someone is in action of learning (Alshalabi et al., 2013). In cognitivist learning, knowledge acquisition is described as a mental activity that entails internal coding and structuring by the learner and, therefore, the learner is comprehended as an active participant in the learning process (Ertmer & Newby, 1993). Cognitivists believe that learning results from organizing and processing information effectively. Jean Piaget was one of the most influential cognitive psychologists; according to Piaget (1936), experiences are necessary for development. Chomsky (1967) was also a pioneer of the cognitivist learning. He claimed that information processing in particular should be described and understood to better comprehend learning. Hence, the cognitivist learning is concerned with learning inputs, outputs, and an accurate depiction of the internal processing of the human mind (Rikala, 2015).

The cognitivist theory is relevant to m-learning because cognitivism focuses on revealing the various processes involved in knowledge acquisition and m-learning can support learning process in various ways (Al-Hunaiyyan, Bimba, Idris, & Al-Sharhan, 2017). In the m-learning environment, learners have the freedom and the capacity to exert power and ownership over their learning preferences and experience. Huffman and Hanhn (2015) pointed out that m-learning can cater to individual differences by determining a learner's preference and providing appropriate learning activities based on the learner's style, pace and method, thereby providing strategies and support learners learning, aid learners in attaining their goals (Huffman & Hahn, 2015). Therefore, the cognitivist theory well conforms to the central theme of m-learning affordances - "Autonomy"(see section 2.3) and underpins the validation and effectiveness of m-learning. The strength of this theory is that learners are trained to do a task in similar way to

allow consistency, which makes the learners solve a problem using their own possible solutions. However, the weakness is when the learners are able to accomplish a task, but not through the best suited way to the learners (Zaibon & Shiratuddin, 2010). The cognitivist learning theory is still an influential force in delineating how humans think, learn, transmit information, and solve problems (Leonard, 2002; Rikala, 2015; Zaibon & Shiratuddin, 2010). As Kang (2004) asserts, cognitivist theory has been widely used and has impacted the learning environment.

2.4.1.3 Constructivist Learning

Constructivist learning theory is now one of the major pedagogies used in education and learning (Alshalabi et al., 2013). In the constructivist approach, learning is an active process in which learners construct new ideas or concepts based on both their current and previous knowledge (Benjamin, 2016). Learners are encouraged to be active constructors of knowledge in authentic problems (Wang, 2009), which are provided by mobile devices in a variety of learning environments (Peng et al., 2009). Ertmer (1993) described constructivism as a learning theory where learning forms through individual experiences; which is analogous to Boghossian's definition which asserts that learners build and find meaning in their subjective experiences, resulting in knowledge (Boghossian, 2006). Educational researchers (Berge & Muilenburg, 2013; Brown, 2006) argue that learners learn best when given the opportunity to learn skills and theories in the context in which they are used, then construct their interpretations of a subject and communicate those understandings to others (Berge & Muilenburg, 2013; Naismith et al., 2004). M-learning is supported by constructivist methods as it enables immersive experiences in gaming environments or simulations (Orr, 2010). This realistic context and immersive experience reflect the central theme of m-learning affordances - "Real-world Relevance" (see section 2.3). Mobile devices provide a unique opportunity for learners to be embedded in a realistic context at the same time as having access to supporting tools (Benjamin, 2016). Each learner carries a networked device which allow them to become part of the dynamic system they are learning about.

Social constructive theory, which is gaining attention as a m-learning theoretical underpinning, provides an opportunity for the combining of affordances of mobile devices and communities of practices (Brown & Mbati, 2015). According to Brown (2006), social constructivism refers to learning as the result of the active participation in a "community", where new meanings are co-constructed by the learner and his/her "community", and knowledge is the result of consensus. Under social construction theory, learners are encouraged to be active constructors

of knowledge, with the mobile devices now embedding knowledge in a realistic context at the same time as offering access to supporting tools. As many researchers (Cobcroft, Towers, Smith, & Bruns, 2006; Naismith et al., 2004) argue, learning will increasingly occur in contexts outside the classroom, where the importance of community contexts becomes paramount.

2.4.1.4 Situated Learning

Developed by Lave et al (1991), the situated learning paradigm holds that learning is not merely the acquisition of knowledge by individuals, but instead a process of participation in context (Cobcroft et al., 2006). Through a situated-learning perspective, learning takes place within activities, settings and cultures, and learning can occur in authentic contexts (fieldwork, workshops etc.). As perceived by Holzinger, Nischelwitzer, and Meisenberger (2005), situated learning is a combination of cognitivist and constructivist approaches, in which the learning situation plays a central role during the knowledge construction process. As observed by Colley and Stead (2003), educational research into situated learning points out the importance of giving learning a context. "Situation" encompasses aspects of the physical, social, and cultural environment, including communication with peers during the learning process (Cobcroft et al., 2006). As situated learning posits that learning can be enhanced by ensuring that it takes place in an authentic context and learners participate within a community of practice (Naismith et al., 2004), mobile devices are especially well suited to context-aware applications simply because they are available in different contexts, and so can draw on those contexts to enhance the learning activity. M-learning activities have actual, real-time and real-world relevance, "Real-world relevance" has been identified as a central theme of m-learning affordances (see section 2.3). As Beaty (2016) addresses, the use of mobile devices in a situated and real-world environment provide dynamic learning, and learning is meaningful when applied to a social or physical environment. Many of the early situated learning studies that addressed the use of m-learning focused on the use of devices to create situated learning contexts that were readily available to learners (Liaw et al., 2010). However, as research related to situated m-learning has continued to emerge, attention has been given not only to the advances of devices and technology but to the importance of designing authentic learning situations based on real-life learning situations (Berge & Muilenburg, 2013; Moses, 2008; Quinn, 2000).

2.4.1.5 Activity Theory

Since activity theory provides a philosophical framework for understanding collective human work activities as embedded within a social practice and mediated by artefacts, such as mobile technologies, it has been used to apply and analyse m-learning (Uden, 2007). Activity Theory is rooted in the work of Soviet scholars, Vygotsky (1962, 1978), Luria (1928, 1976) and Leont'ev (1977, 1981); which emphasised both the historical development of ideas as well as the active and constructive role of humans (Cobcroft et al., 2006; Ozhamar-Keskin & Ozturk, 2015). According to Vygotsky (1978), the key point of the activity theory is the concept of mediation: human activity is always mediated via the artefact and is never direct in its relationship with reality. Activity theory is a rich framework for studies of context due to its comprehensiveness and engagement with various issues of consciousness, intentionality, and history (Cao, Wang, & Luo, 2012). Activity theory is increasingly being used to study a variety of contexts which involve technology (Liaw et al., 2010). There is no question that activity theory has become a live force for education discourses and for projects seeking to develop practice in positive directions (Uden & Helo, 2008).

The concept of mediation under activity theory was particularly developed by Engestrom (1987) within the text, "Learning by Expanding: An Activity-theoretical Approach to Developmental Research", which is widely recognized as one of the key theoretical approaches for m-learning. A key point that offers insights for m-learning under activity theory is that of agency. In activity theory, human agency is linked to the relationship between the subject and the tools it uses to achieve its objectives (Cao et al., 2012). M-learning enables active forms of agency and allows the learner to be in a central position in the learning process (Batista, Behar, & Passerino, 2013; Liaw et al., 2010). As Liaw et al. (p. 454, 2010) assert, "the m-learning system offers a strategy that enables individuals to employ and sharpen their tacit knowledge into explicit formats. Therefore, the functions of m-learning systems provide opportunities for users to create their own knowledge based on their mental concepts and prior experience". Promoting m-learning allows the learner's agency to be in line with the needs of a society in constant transformation, where the ability to act and intervene creatively in reality becomes dominant. Indeed, the challenge of education for a global networked society is also in developing individual skills that can be autonomously acquired through technological means (Cao et al., 2012; Uden & Helo, 2008). To effectively use activity theory for designing context-aware m-learning, Uden and Helo (2008) suggest that it is important to understand the objects of the activity, the changes of those objects over time, and their relations to objects in other settings. Meanwhile,

the choice of apps will yet require care, because some are specific to certain operating systems and some do not work on others (Batista et al., 2013).

2.4.1.6 Socio-cultural Perspective

Socio-cultural approaches to learning and development were first systematised and applied by Vygotsky and his colleagues in the 1920s and 1930s (John-Steiner & Mahn, 1996), which emphasise the interdependence of social and individual processes in the construction of knowledge (John-Steiner & Mahn, 1996; McCarty et al., 2017; Phan, 2012). According to Vygotsky (1978, 1981), an individual's development is not an isolated entity but rather confined to an overarching sociocultural system. In other words, the extraneous social factors combine with internal cognitive-motivational processes to account for and explain individuals' learning and achievement outcomes in educational and non-educational settings (John-Steiner & Mahn, 1996; Matusov & Hayes, 2000). Mobile devices give users access to knowledge distributed across people, communities, locations, time, social contexts and sites of practice (Berge & Muilenburg, 2013). Through using mobile device, learners negotiate the world they live in, construct internal conceptualisations of knowledge, and make social use of knowledge. The engagement with m-learning under socio-cultural approaches does not focus on technological innovation as a stimulus for modernisation of the education system but on mobile devices and the digital artefacts produced with, and accessed through, them as "cultural resources" (Berge & Muilenburg, 2013; Pachler et al., 2010). In m-learning activities, learners connecting and interacting with a variety of people, sharing ideas, information, experience and building or maintaining social networks, the socio-cultural theory well reflects the characteristics of "Collaboration and Networking" afforded by mobile technologies.

Pachler et al. (2010) propose a sociocultural ecological approach to m-learning that is different from the traditional knowledge-transmitting style of learning. They define m-learning according to an interrelationship among three key components: structure, cultural practices, and agency (Pachler et al., 2010). Seipold and Pachler (2011) flesh out these three components as: digital media (technologies and systems), things people do, and human capacity to act in the world. Learning is conceived by Pachler et al. (2010) as a process of meaning-making or appropriation among these three components, claiming that the appropriation of the three components occurring in an educational context will trigger effective learning. These new sociocultural approaches have come out of both dissatisfaction with and dialogue with Piaget's, Vygotsky's and traditional cognitive paradigms. As Matusov and Hayes (2000) contend, the

sociocultural approach based on an assumption of multiplicity of developmental directionalities poses new questions such as: who defines and redefines the directionality and how; what promotes and hinders individual's access and participation in sociocultural activities and communities of practice, and why; and how do newcomers contribute to changes in practices, institutions, and communities by their learning and development.

2.4.1.7 Collaborative Learning

Collaborative learning, with its theoretical base in socio-cultural theories, places participants into groups of learning where they discuss ideas, explore solutions, complete tasks and reflect on their thinking and experiences and learn from each other (Caballe et al., 2010; Iglesias Rodríguez, García Riaza, & Sánchez Gómez, 2017). Powerful mobile devices such as smart phones or iPads coupled with mobile apps conducive to participation, sharing and communication can make collaboration at a distance easier (Hsu & Ching, 2013). Mobile devices can easily communicate with other similar types of devices, enabling learners to share data, information and pictures; meanwhile, they can also be connected to a shared network, further enhancing possibilities for communication. As Naismith et al. (2004) argue, both the capabilities of mobile devices and their wide context of use contribute to their propensity to foster collaboration. Roschelle et al. (2009) find that learners were more engaged and highly motivated through mobile devices, participating socially in questioning, explaining and discussing disagreements. Zurita and Nussbaum (2004) also report that there were increased learner mutual feedback, shared reflection, interaction and negotiation of possible suggestions in the m-learning context.

Research into collaborative learning with mobile devices is greatly informed by previous research on computer-supported collaborative learning (CSCL). In reality, much current research into mobile learning can be classed as mobile-CSCL, or MCSCL; and there is a specific focus on the use of mobile technologies to promote facilitate and enhance interactions and collaborations between learners. Contemporary literature on collaborative learning is, however, rather limited, though intensively increasing over recent years. As a result, mobile collaborative learning research is still in its infancy, and many challenges are to be addressed before the full benefits from incorporating mobility into day-to-day collaborative learning are realised (Caballe et al., 2010), for example: how to manage devices with very small screens and keyboards (Iglesias Rodríguez et al., 2017), which impede input or annotation; or how to coordinate small learning groups in the classroom (Troussas, Virvou, & Alepis, 2014). Graham

and Misanchuk (2004) identified three important challenges regarding the successful implementation of collaborative learning in CSCL environment: (1) group creation (including group size and heterogeneity), including the question of self-selection versus groups built by the instructor; (2) the structure of learning activities in order to create an appropriate level of member interdependence, while simultaneously supporting accountability; and (3) facilitating group interactions by helping students develop cooperative work skills and encouraging them to negotiate appropriate group norms (Roberts, 2004). Thus, there is a need for much additional research to increase our understanding of how collaborative learning might be used more effectively in m-learning environments.

2.4.1.8 Informal and Lifelong Learning

Learning happens all of the time and is influenced both by our environment and the particular situations we are faced with (Naismith et al., 2004). According to Knowles (1950, 1970) learning occurs best in informal settings. Although Knowles (1950) introduced the term of informal learning, explicit research about informal learning did not surface until the 1980s and 1990s (Clus, 2011; Marsick & Watkins, 2001). Points of view are provided from theorists regarding informal learning related to context, daily practices, benefits, being undetectable, learning without an instructor, and being preferred in the workplace. Marsick and Watkins (2001) suggested that context is a significant factor to be considered in an informal learning environment. Tough (1999) concluded that informal learning just seems to be a very typical, very ordinary activity: that the fact that it is so undetectable means that people seem unaware of their own learning. Shank (2012) reports that informal learning was preferred by people in the workplace and perceived to be the most effective training method. These points of view in the literature about informal learning may differ from each other, but they all appear to recognise informal learning as an acceptable and credible learning experience. However, researchers also argue that, because informal learning is not structured, learners might become encapsulated within their own world, related to the interpretation of learning experiences, and meanwhile, that learners rarely question their own views and others' views within a learning community (Clus, 2011; Marsick & Watkins, 2001).

Similar to informal learning, there is no exact definition of lifelong learning. Knapper and Cropley (2000) assert that the basic idea of lifelong learning is deliberate learning that can and should occur throughout each person's life. Rozhan and Hanafi (2007) note the relationship between the computer technology and lifelong learning, and define lifelong learning as life-

wide learning that hinges its successful endeavour on the potential of distance education via computer-mediated communication. Sharples (2000) pioneered the design of mobile technologies for lifelong learning, in which users could be equipped with mobile-carried content as tools for lifelong learning. According to Nordin (2010), with powerful mobile technologies, mobile devices can help to cultivate informal and lifelong learning, since knowledge acquisition is no longer restricted to the classroom and school time. Afforded by mobile devices, the characteristics of learning with "Autonomy" are eroding established notions of time and space in the traditional learning contexts. Literature indicates that m-learning and informal learning could be linked together using mobile devices, within a learning continuum that supports learning in different unplanned places and spaces for personalised learning over a lifetime period (Sampson, 2014). However, current m-learning researches offer few lessons and only broad guidelines for designing content for m-learning; especially for developers of informal and lifelong learning materials, about what learners need given their busy schedules and how the materials should be represented (Gu, Gu, & Laffey, 2011).

2.4.2 Emerging Theories and Perspectives for M-learning

A number of new learning theories and perspectives have emerged in recent years tailored to meet the needs of m-learning, such as Connectivism (Goldie, 2016; Siemens, 2005), Navigationism (Brown, 2006; Moran, 2008), Heutagogy (Bhoyrub, Hurley, Neilson, Ramsay, & Smith, 2010; Blaschke, 2012; Hase & Kenyon, 2000), Rhizomatic Learning (Bissola & Imperatori, 2016; Cormier, 2011; Ozhamar-Keskin & Ozturk, 2015), Context-awareness Learning (Cobcroft et al., 2006; Naismith et al., 2004), Conversational Learning (Sharples et al., 2002), Surface Learning (Aharony, 2006; Howie & Bagnall, 2013), and Fragmented Learning (Jiang, 2018; Peng, 2015; Xu & He, 2016). These emerging theories and perspectives are undoubtedly influenced by but also support the nature of m-learning affordances and the nature of today's society.

2.4.2.1 Connectivism

Connectivism, as a learning theory for the digital age, has the potential to improve different activities of m-learning (Al-Shehri, 2011). Connectivism learning theory focuses on actionable knowledge acquired by learners within organisations and databases that connects learners to information in a rapidly changing environment (Siemens, 2005). On explaining connectivism as a learning paradigm, Downes (2010) says it is "the thesis that knowledge is distributed across

a network of connections, and therefore that learning consists of the ability to construct and traverse those networks" (p. 9). Kop and Hill (2008) observe that learning begins when learners connect and share learning within a community of learning considered to be a network (Kop & Hill, 2008). Thus, learners who participate in a connectivist community share and find new information that alters their beliefs, which in turn connects with another network. Learning can be seen as connectivity, as learners obtain skills and competencies through forming connections with outside sources while focusing on connecting with certain pieces of information. Social interaction among learners in a community facilitates development of effective connections (Goldie, 2016). Connectivism emphasizes the importance of information and linking it to the right people, and efficient information navigating and filtering are particularly important (Rikala, 2015).

There are thoughts conveyed by theorists regarding connectivism and m-learning in literature. The principles of connectivism (life-long learning, networked learning, and professional learning networks) suggested by Siemens (2005) are applicable in m-learning settings. Mobile devices have facilitated collaborative processes necessary to effective mobile learning (Cruz-Flores & López, 2010), by expanding the use of social media as a learning tool for lifelong learning (Kukulska-Hulme, 2012). Networked learning through professional networks and social media are foundational tenants of m-learning. As Alshalabi et al. (p. 91, 2013) claim, "M-learning leads to simplify the formation of m-learning communities and globalises this process, students and trainers from all over the world can become engaged." Connectivism provides a learning theory that helps instructional designers to maximize the use of mobile devices in instructional designs. The principles and application of connectivism in m-learning environments provide guidelines for instructional designers who are tasked with providing educational content in a world with ever-changing technology (Siemens 2008).

2.4.2.2 Navigationism

Technological development introduced new and alternative views about our interaction with information and people and about the skills and competencies we require to survive in the knowledge era (Brown, 2006). The Navigationism perspective has arisen very recently, which makes fewer demands on the teacher as a font of all knowledge, or prescriber of content, but rather requires learners themselves to find, identify, manipulate and evaluate information and knowledge (Brown, 2006; Moran, 2008). Navigationism allows learners to navigate within the enormous information available online through their mobile devices. Kukulska-Hulme et al.

(2005) outline five aspects that mobile devices and mobile technologies can support Navigationism: 1) accessing information in anytime and information can be stored within a mobile context; 2) communication and collaboration activities can be conducted both synchronously and asynchronously; 3) supporting the acquisition and sharing of evidence in multiple environments for decision making; 4) supporting the teacher in a mentoring role; 5) supporting the teacher in the construction and deployment of social media tools to encourage developing information navigation skills (Kukulska-Hulme, Evans, & Traxler, 2005).

Brown (2006) emphasises that successful learning occurs when learners deal with contextual real-life problems through active engagement in problem-solving activities and extensive networking, communication and collaboration. Although knowledge is being gained or created in the process of these activities, the aim of these activities is not to gain or create knowledge but to solve problems (Brown & Mbati, 2015). Under navigationism, the role of the educator is to coach the learners in how to navigate. As Brown (2006) suggests, "teachers and trainers should become coaches and mentors within the knowledge era – the source of how to navigate in the ocean of available information and knowledge – and learners should acquire navigating skills for a navigationist learning paradigm" (p. 108).

Navigationism is a broader and more inclusive term than constructivism, but includes knowledge creation (McLoughlin & Lee, 2008). Users, using mobile devices for learning, need skills in navigating knowledge; and these skills are very different from passively complying with behaviourist conditioning, or being led into a constructivist approach which is typically strongly determined by the teacher and the syllabus (Moran, 2008). In the era of rapid expansion of information and communication technologies in learning and education, what is needed, and which will be much appreciated, is

> "a paradigm that is underpinned by different principles, based not on the acquisition of isolated facts and knowledge, but on the development of multidisciplinary connections with global networks and participation in communities of practice, together with reformed teacher roles, and greater autonomy and agency for students" (McLoughlin & Lee, 2008).

Educators should therefore adopt "pedagogies that move beyond instruction to creativity, innovation and generative thinking" (McLoughlin & Lee, 2008).

2.4.2.3 Heutagogy

The challenge is that a shift to the use of mobile devices for learning as described by Oblinger (2012) will require re-considering teaching and learning from teacher-directed pedagogy to enabling student-determined learning, which has been termed Heutagogy (Cochrane, Antonczak, Gordon, Sissons, & Withell, 2012; Narayan & Herrington, 2014). Heutagogy refers to self-determined learning (Bhoyrub et al., 2010; Blaschke, 2012; Hase & Kenyon, 2000; Narayan, 2017). According to Hase and Kenuyon (2000), heutagogy is learner-centred, holistic, and future-focused, and the core tenet is for the learner to learn how to learn or acquire to "lifelong learning" skills through active and proactive learning processes. Under Heutagogy, the learners are viewed as the major agent in their own learning process, and the aim of learning is to empower the learners over where, how and when learning occurs (Blaschke, 2012). As Narayan (2017) argues, heutagogy places emphasis on high autonomy, and on the facilitation of learning experiences that build competency and capability. By its nature, Heutagogy is firmly rooted in constructivist and humanistic approaches to learning, where the learner is viewed as the owner, the centre and the critical agent of the learning process (Narayan, 2017). As a learning and teaching approach, heutagogy has received renewed interest lately due to the rapid development of mobile technologies (Blaschke, 2012; Cochrane, 2011) which support learner engagement in authentic and real-world contexts and empower the learner in determining and directing their own learning path (Blaschke, 2012; Hase & Kenyon, 2000). For example, in m-learning, learners utilise the affordances of mobile devices, such as using the camera and GPS to display and interact with augmented reality layers created by learners to fulfil learners' learning goals (Cochrane & Rhodes, 2011). Narayan and Herrington (2014) argue that "learner ubiquity is the central tenet governing effective use of heutagogy as a framework for learning and teaching" (p. 151). Blaschke (2013) states that the learner's ability to be self-determined is inherent in m-learning, since the mobile technology allows them to decide in a flexible way what and how to learn. Furthermore, he adds that the ethos of social media tools: freedom, choice, communication, collaboration, ability to create and consume content and connect and establish relationship align with the principles of heutagogy.

While heutagogy implies fundamental changes in the way education is perceived, as it focuses on developing lifelong learning skills through active and proactive learning processes, it places itself in direct contrast to the ingrained, traditional practices (Narayan & Herrington, 2014). As McAuliffe et al. (2008) assert, "the removal of the educator makes the concept of heutagogy impractical in a credentialing institution" (p. 3). The "fear of losing power" to the students and

the resolute stand on assessment of students, rather than concern for the level of student engagement and learning, are other complicating factors in the adoption of heutagogy (Blaschke, 2012; Narayan, 2017). Meanwhile, heutagogy still lacks a framework for implementing and effectively using mobile technologies, for example, social media tools in learning and teaching, when placing the responsibility for learning on the learners (Narayan, 2017). As Blaschke (2012) states "research on the use of social media and its role in supporting heutagogy is limited, indicating that this is an area for further investigation" (p. 63).

2.4.2.4 Context-awareness Learning

The adoption of context-awareness in learning is not a new idea, but rather has been at the centre of one branch of m-learning. Because of the rapid development of sensor technologies, combining real-world contexts with learning systems is also becoming an important learning mode (Huang & Chiu, 2015). Today, mobile devices possess an ever-increasing set of inexpensive yet powerful embedded sensors that could help in m-learning, which include accelerometers, digital compasses, gyroscopes, and GPS, as well as microphones and ubiquitous digital cameras (Tortorella, Kinshuk, & Chen, 2017). These sensors are the key means by which a device is able to sample data from its context and surroundings; which distinguishes m-learning with some unique elements, such as context awareness and mobility from e-learning (Cochrane, 2011; Freifeld, 2013). Context-aware mobile learning (CAML) puts emphasis on mobile learners who are carrying portable devices augmented with sensors to detect location, activity, network connectivity, learner state, and so on (Wang, 2004). A CAML system examines the sensed learning contexts and reacts to changes to the learning environment (Tortorella et al., 2017). In CAML activities, course materials presented to learners properly reflect learning context, and provide more relevant information to meet their dynamically changing contextual requirements (Huang & Chiu, 2015). Context-aware mobile devices can support learners by allowing a learner to maintain their attention on the world and by offering appropriate assistance when required (Naismith et al., 2004). Some researchers consider context-awareness learning as a strand that is relevant to situated learning (Cobcroft et al., 2006; Naismith et al., 2004). Although the importance of context to the learning activity has been sufficiently articulated (Cobcroft et al., 2006; Liaw et al., 2010; Narayan, 2017), there are several challenges linked to context-aware functionality (Schmidt, 2005; Tortorella et al., 2017). Firstly, context is hard to identify: identifying concrete aspects or features of the situation is not operationalised. As Schmidt (2005) argues, there is no elicitation method for

context factors complementing the traditional requirements of elicitation methods. This problem is aggravated by the fact that research is split across different communities and organisations (Li, Ogata, Hou, Uosaki, & Mouri, 2012). Secondly, context is hard to acquire, in terms of how to acquire the actual information about the learner (direct asking can only be applied in very limited cases). Thirdly, context is hard to make use of, because empirical results on contextual influences on learning processes are scarce and mostly scattered among various disciplines (Li et al., 2012). Pedagogical theories and methodologies are also not well prepared to provide the foundation for context-aware learning support.

2.4.2.5 Conversational Learning

"Learning is a continual conversation: with the external world and its artefacts, with oneself, and also with other learners and teachers" (Sharples et al., 2002). Mobile technology can enable conversations between learners in real and virtual worlds, and also enables people to create learning communities that are both contextual and fulfil immediate needs (Sharples, 2005). Sharples (2002) considers Conversation Theory as a primary element for m-learning study, to be supplemented by a detailed analysis of the cognitive, social, and cultural aspects of learning (Jarvis, Holford & Griffin, 2003). Acknowledged to be an elaborate and difficult construct, conversation theory spans epistemology, educational technology, and cybernetics (Sharples, Corlett & Westmancott, 2002). Simply put, the theory describes learning in terms of conversations between different systems of knowledge. Pask (1976) purposefully draws no distinction between people and interactive systems, such as computer applications; which has the advantage that the theory may be applied equally to human teachers and learners as also to computer-based teaching and learning support systems.

Sharples, Corlett, and Westmancott (2002) present a much simplified version of Pask's (1976) original concept of learning as conversation, demonstrating how a learner comes to construct understanding of their activities. Central to this theory is continual interaction, reflection and adjustment between the person's thoughts and actions: "That is the minimum requirement for any person, or any system, to learn: it must be able to converse with itself about what it knows" (Sharples, Corlett, and Westmancott, 2002, p. 224). Moreover, a more effective form of learning is when people are able to converse with each other, interrogating and sharing their descriptions of the current context.

In summary, construction, conversation and control are the central pillars to this theory. Successful learning is seen as a constructive process (Brown & Campione, 1996), whereby a learner seeks solutions to problems through the ability to relate new experiences to existing knowledge. Conversation, between teachers and learners, and learners with themselves, as well as with technologies, is central to Pask's (1976) theory, as concepts are questioned and results reconciled. Finally, learning is most successful when the learner is in control of their own understanding, conducting a continuing cycle of experimentation and reflection (Kolb, 1994).

2.4.2.6 Rhizomatic Learning

Closely related to connectivism, rhizomatic learning has become one of the foundational theories behind the development of massive open online courses (Laurent Antonczak, 2015). Rhizomatic learning views ideas as multiple, interconnected, self-replicating and having no beginning and end (Bissola & Imperatori, 2016; Cormier, 2011; Mbati, 2015). According to Mbati (2015), the rhizomatic perspective is based on unstructured networks forming organically, where "Rhizomes need not be thought of as chaotic but rather as a self-regulating structure responsive to learner's needs, as determined by mechanisms in place for determining such needs" (p. 47). Deleuze and Guattari (1987) identify six principles of the rhizome: connection, heterogeneity, multiplicity, a-signifying rupture, cartography, and decalcomania. Cronje (2016) further study the connection between these six principles of rhizome with web 3.0 learning environments and find that the principles of the rhizome have very important connections to the general nature of teaching and learning in a m-learning setting (Cronje, 2016). Mbati (2015), in her recent research, also confirms that rhizomatic principles occur in m-learning practice and offer great potential to enrich learners' learning experience. As Antonczak (2015) argues, "the integration of m-learning and social media provides the potential for a social learning environment that is accessible from anywhere, anytime, and driven by student-generated content and contexts" (p. 253).

The rhizomatic approach calls for educational models that allow for the fluidity of knowledge conception, in a world where cutting edge knowledge becomes obsolete due to the ephemeral nature of the Web (Cormier, 2011). In the rhizomatic model of learning, the curriculum is not driven by predefined inputs from educators or trainers but constructed and negotiated in real time by the contributions of those engaged in the learning process (Cormier, 2008). In a sense, the rhizomatic viewpoint returns the concept of knowledge to its earliest roots, which dispenses with the need for external validation of knowledge, either by an expert or by a constructed

curriculum (Cormier, 2008). As Mackness et al. (2016) assert, the rhizomatic approach can successfully challenge traditional authoritarian, hierarchical approaches to teaching and learning, freeing learners to follow their own learning paths and determine their own learning objectives (Mackness, Bell, & Funes, 2016). However, as Deleuze and Guattari (2013) point out, a 'smooth space', the space of the rhizome, is a difficult space for learners' becoming; and as Gale (2010) notes, this space increases the vulnerability of learners. As such, an ethical approach would be one that ensures that this vulnerability is acknowledged, and that the consequences for learners' identity of increasing adoption of rhizomatic principles for course design are carefully thought through (Mackness et al., 2016).

2.4.2.7 Surface Learning

Biggs (1993) found that learners' approach towards the process of learning is a combination of the motivation and the strategy that they adopt during the learning process. The differences between the learners' approaches toward learning processes have been distinguished in the literature as deep and the surface strategies (Aharony, 2006; Chin & Brown, 2000; Dolmans, Loyens, Marcq, & Gijbels, 2016; Howie & Bagnall, 2013; Marton & Saljo, 1976a, 1976b). The terms "deep" and "surface" learning were originally coined by Marton and Saljo (1976a, 1976b), who described observing a surface approach to learning and a deep approach to learning being demonstrated in students they were researching; however, Biggs (1993, 2007) certainly popularised these concepts and contributed to the success of the model among learning and teaching institutions (Howie & Bagnall, 2013). The definition of a deep learning strategy is based on the learners' personal commitment to the learning process, which results from an inner need to reach complete understanding of the subject material and a search for self-fulfilment (Aharony, 2006; Chin & Brown, 2000). Alternatively, a surface learning strategy is based on the learners' need to avoid failure and the desire to minimise effort while completing assigned tasks (Aharony, 2006; Chin & Brown, 2000). The characteristics of a surface learning approach are as follows:

> "the tendency to choose the quickest way to accomplish the task; to acquire the learning material without asking in-depth questions, to study the material in a linear manner; to relate to minimal aspects of material or to a problem without showing interest; or the need to understand it in its entirety; to learn by rote by relying on memory and not on comprehension; and to be concerned with the time needed to fulfil the learning task" (Aharony, 2006).

In an open, Internet and m-learning environment, the learners have great freedom to choose their own path and strategy to learn. Many researchers consider that learners have the preference for adopting a surface learning strategy over a deep one in the Internet environment (Aharony, 2006; Dolmans et al., 2016; Sankaran & Bui, 2001; Spratt, 2009). For example, Aharony (2006) investigated learning behaviours of students learning English as a foreign language in an Internet environment, and found that all the participants preferred the use of the surface learning strategy towards their learning process online. However, some researchers argue that mobile technologies can be applied to help learners meet the goals of deep learning, and that learners would benefit from more training in how to use mobile tools to support their own learning (Cifuentes, Xochihua, & Edwards, 2011). Yilmaz and Orhan (2010) find that, athough surface learners use the Internet more when compared to deep learners, the ratios of the Internet use of deep learners for educational purposes are higher when compared to those of surface learners. They further reveal that learners given tasks/assignments that required the use of the Internet showed a significant difference in favour of deep learning (Yılmaz & Orhan, 2010). Other researchers contend that it is the learning motivation rather than learning environment that decides the strategy towards the learning process. Sankaran and Bui (2001) suggest that using either a deep or surface learning strategy leads to comparable positive performances in the Web-based environment, while motivation is significantly correlated to performance (Sankaran & Bui, 2001).

2.4.2.8 Fragmented Learning

The rapid development of Internet information technology and mobile intelligence devices provide good technical conditions for the popularity of Fragmented learning (Huang, 2016; Jiang, 2018; Liang, Wang, Zhang, & Zou, 2018). As Jiang (2018) claims, fragmented learning is an inevitable product of people' entry into the era of information and mobile technology, and an unavoidable new way of learning. Jiang (2018) further point out that any knowledge has always been a complete whole, but because of the changes of the times and ways of learning, the presentation of knowledge adopts a new way, the whole into a part, but after all, to return to the whole. Fragmented learning resources have features of independence and short time-frame, which may be that of an explanatory picture, a text message, the length of a short instructional video, or a piece of news (Li, 2014). Supported by the affordances of mobile devices and mobile technologies, such as mobility, blending, audio-visual feature and connectivity, fragmented learning has become an effective complement to the traditional

learning methods (Jiang, 2018; Liang et al., 2018). Although there is no single or universal contemporary definition of fragmented learning in the literature, its rich connotations can be represented by its four characteristics: fragmented learning content, fragmentation learning time, fragmented learning environment, and fragmented thinking (Jiang, 2018).

According to Peng (2015), learners in social life can learn knowledge in a fragmented way with various social media tools anytime and anywhere, so as to enhance knowledge and improve skills, and this learning style can be called "fragmented learning". Liang et al. (2018) emphasize that, in the process of fragmented learning, the learners use a fragmented way of thinking, use fragmented time to obtain meaningful fragments of knowledge, and learn the new knowledge system via knowledge debris extraction, storage and processing. Based on the research mentioned above, fragmented learning is an inevitable product of the era of information technology and an unavoidable new way of learning when mobile devices become ubiquitous. Fragmented learning shows different features from traditional collective learning, which can expand the original, fixed learning time and space, and increase learning opportunities for learners (Peng, 2015). As a new and ubiquitous way of learning in the mobile technology era, fragmented learning is considered worthwhile to try and promote in formal and informal education systems (Li, 2014).

However, researchers have addressed some drawbacks of this new learning style: firstly, fragmented learning will make learners less discriminating, and overwhelmed by the large amount of information through mobile devices; secondly, fragmentation of learning can result in a lack of deep analytic thinking; and thirdly, fragmented learning interferes with systematic knowledge collation (Jiang, 2018; Peng, 2015). Liang et al. (2018) argue that fragmented learning requires an improvement in the capabilities of the mobile devices or the mobile applications for "understanding" and "perceiving" individual learning needs in the process of organizing knowledge. Peng (2015) points out that fragmented learning is not conducive to the logic and integrity of an individual knowledge system, and is not suitable for learners to complete complex learning tasks.

2.5 Review of Current M-learning Frameworks and Models

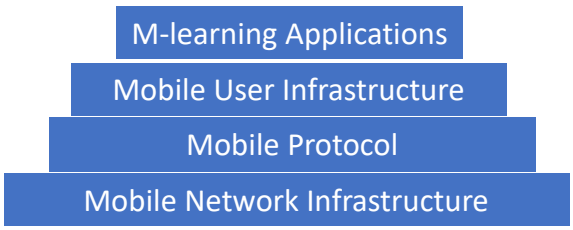
With the underlying theoretical approaches introduced in the above section, it is now possible to explore the many frameworks and models that have been addressed with regard to m-

learning over the past decade. As Petit and Santos (2014) assert, "Most of the time, analysing frameworks results more interesting and less philosophical than the definition's exploration" (p. 4). This section presents a brief review of m-learning frameworks and models in the relevant literatures. As it is not possible to discuss all available m-learning models and frameworks individually, only the most relevant and prominent frameworks/models have been discussed in detail. Each of these frameworks and models approach m-learning from a different angle and with different focus, based on the particular researcher's definition and perspective on m-learning, which may be influenced by theoretical stance from other disciplines including Education, Information Systems, Engineering and Human Computer Interaction.

2.5.1 Leung and Chan's (2003) Framework

With emphasis on designing and developing for m-learning environments, Leung and Chan (2003) introduced a framework focusing on the structure of the needs for technology. This framework of m-learning (Figure 2.1) consists of four functional levels: (1) mobile learning applications, (2) mobile user infrastructure, (3) mobile protocol and (4) mobile network infrastructure (Leung & Chan, 2003). The framework demonstrates the layers of functionalities for m-learning, which can simplify the design and development so that different parties (e.g. vendors, service providers, designers, developers) can address individual levels, and a single party can build on the top of the functionalities provided by others (Leung & Chan, 2003). This framework provides the groundwork for the actual application of the m-learning: without these necessary components, implementation of m-learning strategies will not be effective, and possibly non-existent (Hoey, 2011). This approach towards developing a framework is reflected in the definitions proposed by those who have focused on the tools for m-learning. As noted in the above section, the early theoretical approach was device-centred (Techno-Centric) (Kululska-Hulme & Traxler, 2005), which focused on the technological attributes of mobile devices for learning and teaching (Crompton, 2013).

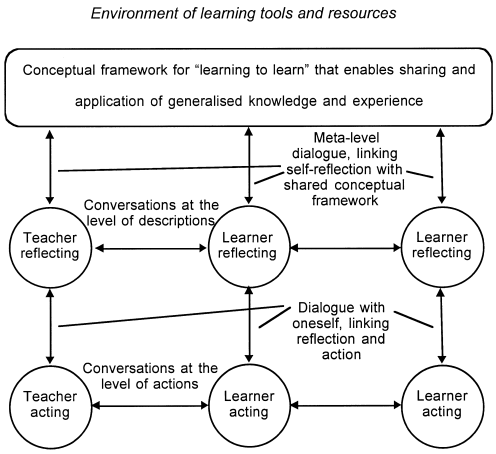
Figure 2.1 M-learning Framework, Leung and Chan (2003)



2.5.2 Sharples' (2009) conversational framework/model

Through the conversational aspect of m-learning, Sharples (2000; 2005) has provided a focus on technology-mediated personal lifelong learning. According to Sharples (2000), mobile technology provides opportunity for learners to communicate with teachers/facilitators and other learners via the Internet, to "interact with rich learning resources and simulated environments, to call on information and knowledge when needed to solve problems and satisfy curiosity, and to create personal learning narratives through an extended proves of capturing and organising situated activity" (Sharples, 2000). As illustrated in his model (Figure 2.2), the acts of reflection and action are integral to the development of the learners, and must include dialogue between the learners and the teacher for effective development to occur (Crompton, 2013). Three "Cs" serve as central pillars to this framework: construction, conversation and control (Sharples et al., 2002). Successful learning is seen as a constructive process, whereby a learner seeks solutions to problems through the ability to relate new experiences to existing knowledge. Sharples (2002) asserts that, in the conversational model of learning, technology has the potential to play more than one role: either it can be the facilitator for conversation, or a part of the conversation.

Figure 2.2 A conversational framework/model for m-learning, Sharples (2000)



2.5.3 Shih's (2007) mobile learning model

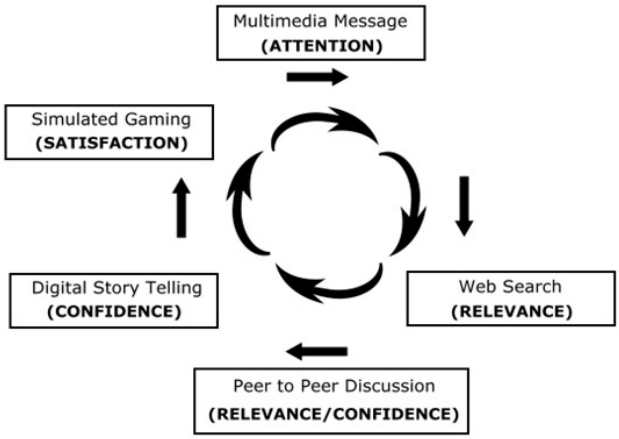
Drawing on the philosophy of social constructivism, Shih's (2007) m-learning model addresses the use of collaborative discussion and a learning styles theory based on digital story telling (Shih & Mills, 2007). Based on the ARCS (Attention, Relevance, Confidence, Satisfaction) model developed by Keller (2007) and incorporating in Vygotsky's activity theory, this

framework emphasises peer learner interactions via mobile communication. As Figure 2.3 shows, there are five steps contain in Shih's (2007) model: Attention, Relevance, Relevance/Confidence, Confidence, and Satisfaction. According to Shih's (2007) model, these five steps describe the learning cycle in the m-learning environments, which includes:

> "sending a multimedia message to mobile phones to trigger and motivate learners; searching the Web for relating information by using embedded hyperlinks in the message received in the phone; discussing with learning peers by text, voice, picture or video messaging; producing a digital story telling of what they learn by audio or video diary, and applying what they learn in the simulated environment, such as online educational gaming" (Moses, 2008).

Similar to those frameworks described above, Shih's (2007) model continues to mainly rely on the mobile infrastructure, but also analysing how different activities affect the learner through motivational means. This model of motivational design provides designers of instruction clearer guidelines on strategies they should implement in these lessons and curricula in blended and/or pure mobile learning environments (Hoey, 2011; Shih & Mills, 2007).

Figure 2.3 Shih's (2007)mobile learning model

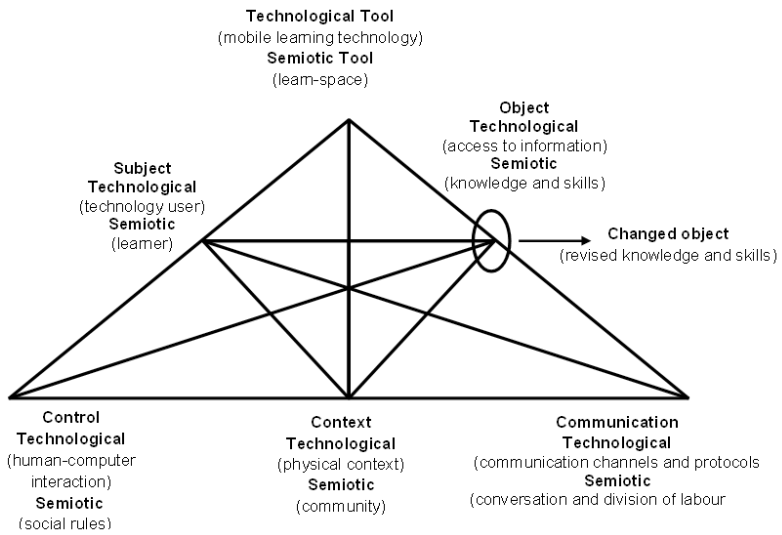


2.5.4 Sharples' (2005) framework for analysing m-learning

Based on Engestrom's (1987) activity theory and Laurillard's (2002) Conversational framework, Sharples et al. (2005) developed a theoretical framework of m-learning, named, "A framework for analysing mobile learning". As Figure 2.4 shows that m-learning is the interaction between the tool, subject, object, context, and control of learning, which differs

with respect to the location, time, subject and technologies used (Ozhamar-Keskin & Ozturk, 2015). In his framework, Sharples (2007, 2006, 2009) emphasises the importance of context in the process of m-learning, and defines m-learning as the "specific and general learning processes where people use interactive technologies to explore and interact in multiple contexts" (p. 1, 2009). According to Sharples et al. (2005), as Figure 2.4 illustrates: subject refers to mobile learners; tool refers mobile device; control means learners' autonomy; context focuses on the quality of system interactive functions, physical context or learning context; communication refers the level of collaborative work and interactive learning between the users; and objective is the learning outcome (Sharples, O'Malley, Vavoula, & Waycott, 2006; Sharples et al., 2005). The combination of these factors, as Ozdamar-Keskin and Ozturk (2015) highlight, makes active learners, provides meaningful learning, and helps learners to perform effective learning actions (intelligent, meaningful, independent and competent). Many researchers (Batista et al., 2013; Ozhamar-Keskin & Ozturk, 2015; Uden & Helo, 2008) consider that activity theory offers a powerful approach as it allows for an integrative analysis and assessment, through a theoretical and methodological perspective in designing m-learning environments; and therefore, this framework provides an analytical model and design rationale for m-learning by using the original components of the Engestrom activity system (Imtinan, 2014). As noted in the previous section, the later definition of m-learning in the literature puts emphasis on mobility in three interdependent yet distinctive aspects of learning, the learner, the process of learning, and technology, and thus tends to be more learner-centred.

Figure 2.4 A Framework for analysing m-learning, Sharples (2005)

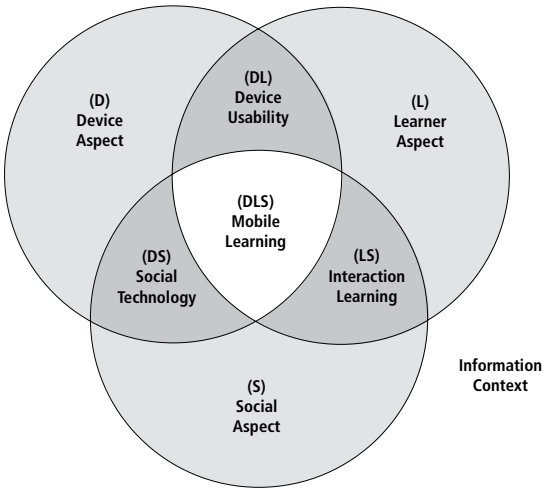


2.5.5 Koole's (2009) FRAME Model

Koole (2009) formulated a Framework for Rational Analysis of Mobile Education (FRAME) which describes m-learning as fully covering mobile technology, human learning capacities, and social interaction. As Figure 2.5.5 shows, the FRAME model is presented by a Venn diagram including three aspects: the Device aspect (D), Learner aspect (L) and Social aspect (S) (Koole, 2009). In the FRAME model, the Device aspect refers to the physical, technical and functional characteristics of mobile devices, which provides an interface between the learner and the learning task; the Learner aspect considers an individual's cognitive abilities, memory, prior knowledge, emotions, preference and possible motivations; while the Social aspect includes the processes of social interaction and cooperation, such as information exchange (Koole, 2009). Meanwhile, the overlapping areas contain more aspects attributed: (1) DL is the intersection of the Device aspect and Learner aspect, standing for Device Usability, which relates the featured mobile devices to cognitive tasks in relating to the manipulation and information storage; (2) DS is the intersection of the Device aspect and Social aspect, standing for Social Technology, which bridges the needs and activities of learners to the hardware and software characteristics of their mobile devices; (3) LS is the intersection of the Learner aspect and Social aspect, standing for Interaction Learning, which takes into account the needs of distance learners as individuals who are situated within unique cultures and environment; and (4) DLS is the intersection of the Device aspect, Learner aspect and Social aspect, standing for Mobile Learning, where the mobile technologies mediate the learning process for learners and facilitate social interaction within the community of learners for collaborative projects, and enhance learning outcomes (Koole, 2009). The FRAME model not only outlines the relationship between mobile learning, human learning capacities, and social interaction, but it also addresses contemporary pedagogical issues of information overload, knowledge navigation, and collaborative learning (Hoey, 2011; Saleh, 2015; Wong, 2015); and many important concepts such as wireless networking, authentic situations and collaborative learning come from this contextual framework explanation (Petit & Santos, 2014). However, the FRAME model has been criticised by some other researchers who suggest that it is more focused on the mobile technology and how it can enhance learning, while it doesn't effectively address the relationship between technology and the phenomena of learning and interaction (Hoey, 2011; Mahande, Susanto, & Surjono, 2017). Nonetheless, those criticisms themselves need criticism. Those who suggest that the FRAME model is focused on technology seem to lack an understanding of Venn diagrams or set theory. All the Venn diagram does is sort

phenomena into different categories without attributing value or importance. Further, only one circle focuses on technology while two focus on the learner and social interaction.

Figure 2.5 The FRAME model, Koole (2009)



2.5.6 Kearney et al.'s (2012) framework

In 2012, Kearney et al. extended Koole's model and developed a m-learning framework for educators and researchers working in and examining m-learning in different contexts. The framework was informed by a comprehensive review of the relevant literature as well as inputs from interviews with experts in the field of m-learning (Phelan, 2017). The framework highlights socio-cultural features of mobile pedagogy but also absorbs the views of social constructivism, situated learning, context awareness learning, collaborative learning, conversational learning and connectivism. This model presents three key features of mobile learning with sub-scales: *Authenticity, Collaboration and Personalisation*; embedded in the unique time-space context of mobile learning.

Personalisation is the component of the framework that represents learner control and autonomy. M-learning allows learners to manage what they are learning, where they are learning it, and how they want to learn it. Drawing on motivational theory (Pintrich and Schunk 1996) and socio-cultural theory (Vygotsky 1978), personalisation has become a corner stone of e-learning. Personalisation allows for a flexible, convenient, on-demand learning experience that is suited to each learner. Key features associated with personalisation include learner choice, agency and self-regulation as well as customisation (McLoughlin and Lee 2008). Mobile users can use tools to record, organise and reflect on their customised m-learning

experiences over time (Kearney et al., 2012). Two sub-scales are used in analysis of personalisation: agency and customisation.

The Authenticity component of the framework means that the m-learning task has actual, real-world relevance and the learner perceives it to be valuable. CTGV[2] (1990) delineate task, factual and process levels of authenticity. Task authenticity refers to the extent to which tasks are realistic and offer problems encountered by real-world practitioners. Factual authenticity refers to how particular details of a task (such as characters and instruments) are similar to the real world; while a process level of authenticity refers to how learner practices are similar to those practices carried out in the community or ''real-world'' of practice (Kearney et al., 2012). Two sub-scales are used in analysis of authenticity: contextualisation and situatedness (Kearney et al., 2012).

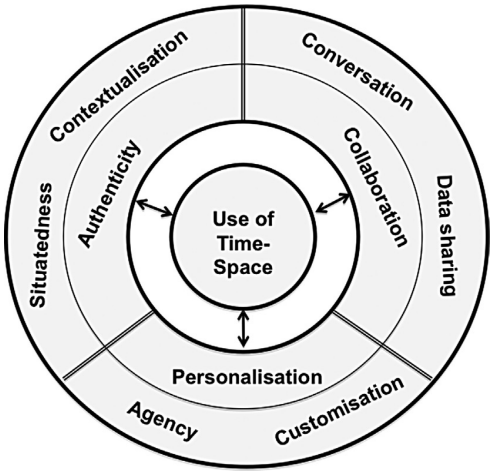
Collaboration in socio-cultural theory is often emphasised in terms of learning interactions with more capable peers or adults, and there is a pedagogical emphasis on scaffolding (Trudge 1990). M-learners can enjoy a high degree of collaboration by making rich connections to other people and resources mediated by a mobile device. This often-reported high level of networking creates shared, socially interactive environments so that m-learners can readily communicate multi-modally with peers, teachers and other experts, and exchange information (Kearney et al., 2012). Two sub-scales are used in analysis of collaboration: Conversation and Data sharing (Kearney et al., 2012).

In general, the authenticity feature highlights opportunities for contextualized, participatory and situated learning. The collaboration feature captures the often-reported conversational, connected aspects of m-learning, while the personalization feature has strong implications for ownership and autonomous learning (Kearney et al., 2012) (see Figure 1). Similar to Koole's (2009) framework, Kearney et al.'s (2012) framework also suggests that m-learning has certain elementary characteristics that separate it from other types of learning; and especially, social and personal learning processes have been taken into account. By combining many characteristics that are common to other frameworks, and viewing m-learning holistically, Kearney et al.'s (2012) theoretical framework well presents the trends in learning and education that are shifting to more socio-cultural, social constructivist and connectivist perspectives as

[2] The Cognition and Technology Group at Vanderbil

mobile learning provides an opportunistic convergence of communities of practice and mobility affordances (Brown, 2006; Siemens, 2005).

Figure 2.6 Kearney et al.'s (2012) model of m-learning



2.6 Practices of M-learning in Teaching and Education Environments

As the use of mobile technology increases around the world, m-learning is emerging as an important and imperative area for the development in education at all levels, where mobile technologies offer a spectrum of tools for educators, learning opportunities as well as new options for student-technology partnerships in learning (Benjamin, 2016; Freifeld, 2013; Lim & Churchill, 2016; Mehdipour & Zerehkafi, 2013). As Lim and Churchill (2016) state, "the powerful technical features of mobile technologies, and available mobile applications powered with social media cloud computing enable new forms of learning platform which can serve contemporary pedagogies across a variety of educational contexts" (p. 273). Mehdipour and Zerehkafi (2013) emphasise that, with access to so much content, anytime and anywhere, there are plenty of opportunities for formal and informal learning through m-learning, both inside and outside the classroom. Educational researchers, therefore, have begun to focus on and investigate topics related to m-learning more frequently (Phelan, 2017). The literature review conducted by Petrova and Li (2009) on m-learning found 333 articles and papers between 2005 to 2007, most of which were conducted in or focusing on teaching and educational contexts.

Arriving at similar results, Baran (2014) conducted a review of research on m-learning and found there was an increasing number of studies regarding m-learning in educational settings noted during 2000 to 2004. As Fraga (2012) addresses, although all of the prior studies in other industries have a direct impact on education, the field of education continues to be the forerunner in research on m-learning.

The response to this increased interest in m-learning from researchers and educators has been favourable. A number of studies report positive outcomes after adopting m-learning into learning activities (Ally, 2009; Batista et al., 2013; Benjamin, 2016; Berge & Muilenburg, 2013; Brown & Mbati, 2015; Caballe et al., 2010; Chee et al., 2017; Chen, Kao, & Sheu, 2003; Chen et al., 2005; Wu et al., 2012). Wu et al. (2012), in their meta-analysis of 164 studies related to m-learning, conclude that eighty-six percent of the studies indicated positive results. Song (2016) conducted a study investigating how elementary students developed their inquiry skills in science learning through mobile devices, and found that m-learning had positive impact on developing students' inquiry skills. The DEECD[3] (2011) reports that eighty-three percent of teachers in primary schools and sixty-seven percent of teachers in special schools demonstrated improved literacy skills and outcomes for their students to a significant extent after adopting an m-learning trial. Heinrich's (2012) study at Longfield Academy finds that seventy-three percent of students reported a highly positive impact on the quality of their work. Prieto et al. (2016) investigated an afterschool technology club in an elementary school from a sociocultural perspective, and the results reveal that the students made significant progress in their personal, academic, and creative development within a mobile technology-enhanced learning environment. Based on the review of literature for the present study, it can be concluded that most of the studies on m-learning in the teaching and education environments feature positive outcomes and researchers generally agree that mobile devices increase engagement and have other benefits such as improved motivation, collaboration and attitude. A few studies, however, have reported findings on the absence of improved academic achievement through adopting m-learning. For example, Kinash et al. (2011) studied the perception of m-learning from higher education students, and the results show that the majority of students were not convinced that the trial made a difference to their learning. Nguyen et al. (2015) reviewed current research using iPads in higher education and report that iPads

[3] Department of Education and Early Childhood Development, Australia.

improved the learning experience but without significantly better learning outcomes. These studies indicate that the presence or absence of m-learning on their own may not guarantee or preclude better learning achievements.

Meanwhile, although mobile devices in general can be used in a wide variety of ways in both formal and informal education settings, most m-learning studies were conducted in higher education environments, followed by in primary school settings (Chee et al., 2017; Pimmer & Grohbiel, 2008). As Hwang and Tsai (2011) found, higher education students form the main sampling pool regarding m-learning research, which may be due to the convenience factor, because most researchers originated in higher educational institutions (Chee et al., 2017). The high penetration rate and heavy usage of mobile devices in learning-related activities in the higher education environment can be another reason. El-Hussein and Cronje (2010) consider that mobile devices are strategic tools with the capacity to deliver higher education instruction in a way that was never anticipated when the first prototypes of these devices were designed and marketed. Lac et al. (2014) assert that there has been too much focus regarding m-learning given to the higher educational settings, and as a result, that there is tremendous room for research to be carried out on other samples, such as in corporate business settings.

Various theories, models, and paradigms of teaching and learning have been employed to structure and support m-learning practice in teaching and learning environments (Berge & Muilenburg, 2013; Cobcroft et al., 2006; Lim & Churchill, 2016). Each, of course, may provide difference perspectives and practices for m-learning. For examples, Lan et al. (2011) conducted a web-based drill and feedback study (classroom response system) that used mobile devices instead of traditional handheld transmitters called clickers, based on a behaviourist perspective, which indicates that m-learning promotes the application of knowledge to problem solving. Herrington and Herrington (2007) assert that situated learning and authentic learning approaches are useful for guiding the design of technology-supported learning. Hwang et al.'s (2010) study adopted a cognitivist view, and suggests that students' cognitive load can be decreased if the m-learning systems are well designed. Al-Shehri (2011) employed the connectivist approach to describe how learners can communicate and learn language through m-learning and social networking. Laru (2012) explored how to facilitate mobile computer-supported collaborative learning, which employed constructivist theories. However, many researchers in this field also suggest a blended approach to implementing m-learning in the teaching and educational environment. Naismith et al. (2005) recommend a mixed approach to m-learning, since successful and engaging m-learning activities draw on a number of theories

and practices. Similarly, Tangney (2006) also address that educationally appropriate m-learning practices should be built on a combination of different learning theories and approaches.

2.7 M-learning in Business Settings

The nature of organisations and business has changed significantly in the past decades. There is a stronger need to cope with greater market competition, job insecurity, greater job mobility and rapid technological development in the workplace (Pimmer et al., 2010). Mobile device and mobile technologies have dramatically increased the convenience and effectiveness of accessing information for business and employee development, which alters the nature of work as well as the balance between training and performance support (Traxler, 2007). The relevant literatures suggest that m-learning can support learners' development of the skills they will need in future life and work (Pimmer et al., 2010; Tawadrous, Antiado, & Castillo, 2016). As Binkley (2012) states, mobile technology can provide skills development in areas such as communication, problem solving, and critical thinking, which are considered important skills for future life and work. For example, job skill and competency requirements have risen significantly in the last decades, while the number of jobs has declined; and more and more employees indicate that their job requires them to constantly learn new things (Pimmer et al., 2010). Many corporate and industry practitioners are able to realise the adoption of m-learning as a platform for their business and employee development needs (Tawadrous et al., 2016). The revenue of the worldwide m-learning market (including m-learning products, content authoring, assessment and services) is expected to reach $37.60 billion by 2020 (www.marketsandmarkets.com). According to a Towards Maturity (2014) report[4], 71% of businesses are adopting m-learning, which has increased from 47% in 2012 and 36% in 2010. These trends and updates on the practical side of human resources and business in general will continue over the years (Tawadrous et al., 2016), which establishes a need for better understanding how people learn through mobile devices in the increasingly complex and dynamic business environment. As many researchers in the m-learning field emphasise, m-learning research is needed to investigate how emerging perspectives could contribute to the teaching and learning environments for different educational levels and settings (Traxler, 2007;

[4] www.towardsmaturity.org/mobile2014.

Traxler & Koole, 2014).

It is obvious that the growth in mobile devices and mobile technologies has brought many opportunities and benefits of promoting m-learning in business settings (Brown & Mbati, 2015; Lac et al., 2014; Pimmer & Pachler, 2013). Ally and Tsinakos (2014) find that m-learning helps just-in-time learning in the workplace, which means that information can be acquired at any time desired. Pasanen (2003) claims that m-learning encourages innovation and offers new business opportunities. Pachler et al. (2010) suggest that m-learning could be extended to the ever-changing business environments in and through work with mobile devices. Elias (2011) addresses a few benefits of implementing m-learning in a corporate business setting, which include: relatively inexpensive learning devices, multimedia download availability, and easy continuous learning. Pimmer and Pachler (2013) find that mobile devices can connect and span different situations and forms of learning, and support learners across various contexts and phases of their career development. Lankford (2014) states that m-learning has become a rapidly growing initiative of learning and development in the workplace. Lac et al. (2014) contend that there are many benefits of using mobile devices and applications to support employee development in corporate business environments.

However, based on the literature reviewed for the present study, despite the benefits and growth of m-learning in business settings, research on m-learning in business settings is a relatively new phenomenon, and to date, limited rigorous research has been done even through there is similar m-learning research in other fields, for example in school and higher education contexts (Chee et al., 2017; Lac et al., 2014; Pimmer & Grohbiel, 2008). According to the review for the present study, no systematic research on m-learning in business settings has been conducted as yet (Pimmer & Grohbiel, 2008; Pimmer & Pachler, 2013). As Pimmer and Grohbiel (2008) report, "There are some papers on the use of m-learning in companies, most of them are non-scientific, without serious evaluation, conducted by internal evaluators. Consequently, they are of little scientific significance" (p. 2). Lac et al. (2014) state that the relatively low number of journal publications on m-learning in business contexts also exposes the lag for the journals in publishing research on how to leverage current mobile technological advancements in the business context. Evidently, there is little systematic knowledge available in the literature about how mobile devices can be used effectively for learning and training purposes in the workplace and how the m-learning concept or theories can continue to advance and grow in corporate settings around the world.

It is recognised that the benefits of and potential for adopting m-learning in business settings are not possible without deep understanding of the practices and discourses of m-learning. In the context of the business or workplace, it has to be considered that the main objective of many organisations is not learning but business results and profits. M-learning can make a crucial contribution to business and organisational development, but its importance might be underestimated because it is (in some contexts) difficult to separate from daily work practices. According to Cordock (2010), one of the biggest challenges and barriers in adopting m-learning in business settings, conveyed in the literature, is that companies are not aware of the potentials of m-learning for organisational training and development; and he also emphasises that m-learning should be geared toward the business goals to be achieved. Evans et al. (2010) claim that, for a recontextualisation of implementation of m-learning in the workplace, an inclusive understanding of workplace learning includes the need to explore how creative, digital technologies can enhance learning. Rainbird et al. (2004) and Ashtom (2004) contend that learning in the workplace has to be explored particularly within the context of power relations, and that the organisational structure and context has significant influence on learning in the business settings. Based on these studies, it has become evident that m-learning in the workplace is not only a matter of practice that floats free of context, but is, on the contrary, a phenomenon that is strongly impacted by contextual factors.

2.8 M-learning in China

There were 1.41 billion people in China (about one fifth of the world's population) and about 1.4 billion mobile subscriptions by 2017 (https://statista.com). Reports from the China Internet Network Information Centre (CNNIC) show that 95.1% of Internet users in China used a mobile device to access the Internet in 2016, and the total number of Internet users reached 695.3 million last year – a figure that is more than double the US population (https://cnnic.com.cn/). With the sheer size of China's population and the high mobile penetration rate, the potential of m-learning market in China is large. In 2015, China was predicted to be the largest mobile education market worldwide, with $2.3 billion revenue in 2019, up from the $1.1 billion reached in 2014 (Adkins, 2015). Apparently, m-learning is a booming sector in China, and infrastructure- and environment-related opportunities for m-learning have been developing tremendously over the last decade.

The formal introduction of mobile device-based learning in China occurred in 2000, after which rapid progress was made (Hao et al., 2017). For example, many government-led or government-supported initiatives and programs that target digital education and m-learning were rolled out (Adkins, 2015; Churchill et al., 2018) in the 2000s. The Chinese government embarked on a major digitisation effort called Connecting Every Class, which aimed to provide connectivity and learning technology to all the schools in the country by the end of 2015. One of the most noticeable Connecting Every Class initiative has been the so-called electronic book bag, or e-Schoolbag, which are conceptual terms for implementation of learning through tablets with preloaded digital textbooks for K12 schools (Churchill et al., 2018). The government's goal is to have the entire K12 student population online in the next ten years (Adkins, 2015). In parallel with these government-led initiatives that use mobile devices to support formal education systems, the last few years have seen the emergence of a new digital ecosystem incorporating apps from the private sector, as a platform of knowledge distribution with "fragmented" learning content. According to the 2014-2019 China Mobile Learning Market Report, the number of learning apps exceeded 70,000 in November 2014, equivalent to 10% of total apps in China (Adkins, 2015). Among these apps, the most popular category is English language learning, which also reflects the large English language learning demand in China (Adkins, 2015). For example, New Oriental is the largest English language education provider in China and had 9.6 million registered online students by October 2014 (Adkins, 2015). In April 2014, New Oriental spun off a new m-learning ap,p LeCi, which attracted 310,000 users in just the first two months of its operation (Adkins, 2015).

Social media have also been playing a significant role in developing and spreading m-learning in China in the last decade (Churchill et al., 2018; Gumeta & Khan, 2017). With more than 760 million monthly active users in 2016, WeChat (Weixin), by Tencent Holdings, is the most popular social media app in China (Churchill et al., 2018; Gumeta & Khan, 2017). As Gumeta (2017) reports, many of the social media apps and tools available to Chinese users are more advanced than those in the West (Gumeta & Khan, 2017). WeChat includes text messaging, voice messaging, video conferencing, video gaming, and sharing of photographs and videos; and additionally, users can pay bills, shop online, transfer money and check-in for flights etc. An important feature of WeChat is the WeChat Public (Official) Account (公共账号), which includes a WeChat subscription account (微信订阅号), service account (微信服务号) and enterprise account (微信企业号). The WeChat Public Account (WPC) is a broadcasting and

promotion service launched by famous persons, authorities, organisations and media. Although WeChat was never designed to act as a learning management system initially, through the WPA channel, learning content providers can push or broadcast information to their followers on a real-time basis. For example: the British Council posts IELTS[5] learning content; TED posts speech videos; Sydney Today posts news of the Chinese community in Australia; and Mint Reading distributes a list of popular books. Even though WeChat lacks tools that traditional learning/education systems provide, such as grade books, course calendars, unified syllabus, and a designated class teacher, WeChat creates an organic way for learners to communicate with their facilitators/trainers and to collaborate with peers in webinars or online chatting rooms. Learners do not learn in a vacuum; rather, they learn while competing and collaborating, and they learn by doing and by correcting misconceptions from previous learnings (Yang & Wang, 2011). As Churchill et al. (2018) state, WPA, as a learning platform, has "succeeded where many traditional learning management systems have failed: in promoting social interaction and taking education to where students already are" (p. 8). Recent researches indicate students in China mainly used social media for informal and non-formal learning (Gumeta & Khan, 2017). According to Gumeta and Khan's (2017) research, students in China have learning objectives (e.g., learn how to cook a specific dish) and intentionality (achieve a certain test score) of m-learning, although their learning may lack structure and organisation, their willingness of using mobile devices for learning is increasingly high (Adkins, 2015; Gumeta & Khan, 2017).

The conditions appear favourable for m-learning to flourish in China, and significant opportunities for formal and informal learning via mobile devices have been developing over the last few years, with many Chinese companies currently looking at adopting m-learning into their learning management systems (Adkins, 2015). In this rapidly growing market of m-learning, there is clearly a need for research to develop a theoretical foundation for studying the Chinese context, linked to rigorous empirical studies (Churchill et al., 2018). However, based on the literature review for the present study, the research on m-learning in China is still scant, and many of the existing m-learning studies have adopted Western pedagogical perspectives only. As Gumeta and Khan (2017) assert, m-learning appears to be ubiquitous in

[5] IELTS: International English Language Test System.

China, thus requiring attention to theorise and formalise the use of mobile devices and social media for learning in the Chinese cultural context. To date, there has been no research conducted exploring or conceptualising the characteristics of m-learning in a business setting in China.

2.9 Cultural Influences in Chinese Business Context

Imperial China's long written history and the Confucian heritage culture determined the essence of what the Chinese chose to view as "learning" for centuries (Gao, 2015). To explore the Chinese view of "learning", it is important to develop an understanding of its unique learning goals, motivations and learning focuses (Carless, 2012; Gao, 2015; Li, 2003).

2.9.1 Goals and motivations of learning in traditional Chinese culture

Guo (2015) explores four goals and motivations of learning in Chinese contexts where a typical Confucian approach and input-driven teaching and learning style is evident.

First objective of learning is for "personal moral cultivation". As Yuan et al. (2001) describes, "the goal of Great Learning is to teach and transfer lofty virtue from people to people, to renovate people and to make people attain the highest excellence". Confucius and his followers believed that the primary goal of learning was to achieve behavioural reform and make the learner become a moral person. The idea of moral learning has had great influence on contemporary learners in China (Guo, 2015). Li (2002) investigated Chinese college students' motivations of learning and found that Chinese college students were more likely to consider learning as fulfilling a need to perfect themselves instead of understanding the world.

Second objective of learning is to "contributing to society". In Chinese traditional believes, educated people have social and moral responsibilities to contribute to society after they had achieved behavioural reform (Li, 2003). In Chinese history, learning and serving the government has been seen closely associated, and an important criterion for selecting government servant candidates is good education. Since the *Sui* dynasty (AD 581-618), the imperial examination system, known as *Keju (科举)*, had been used to select government servant candidates throughout the almost 1,500 years (Carless, 2012).

The third motivation of learning is "personal utilitarian orientation". In the *Keju* system, studying the required subjects and passing the examinations became the major track for upward

social mobility (Guo, 2015). The extraordinarily high economic and social rewards attached to success in this exam made the pursuit of learning a hallmark of Chinese society. Such a link between learning and upward social mobility with exceptionally high financial rewards reinforced the demand for learning, which also laid the ground for the high utilitarian orientation on learning among the people (Gao, 2015). There is a Chinese idiom saying "There are gold houses and beautiful women in books", which reflects the seeking of external rewards, such as fame, wealth, and social status in learning (Watkins & Biggs, 1996).

The fourth motivation of learning is "valuing of education". Education is high valued in the Chinese tradition (Li, 2003). Through education, a person can transform him or herself and become a moral and able person, as so called Junzi (君子). Education is also important for social harmony and development because the government needs educated people to govern the nation efficiently (Watkins & Biggs, 1996). Given the significance of education in the Chinese tradition, learners in Chinese context are highly motivated to learning. Success in schools can earn respect and fame for their family, which is highly valued in Chinese society.

2.9.2 Emphasis and strategies of learning in traditional Chinese culture

Besides the goals and motivations of learning, the learning focuses and learning strategies also reflects the characteristics of "learning" under traditional Chinese culture, which helps understanding the advantages and shortcomings of Chinese traditional way of learning and recognize how it influence the cotemporary Chinese business context. In the book of *Great Learning*, Yuan et al. (2001) illustrated two important emphasis of learning in Chinese context: developing and transferring. According to Yuan et al. (2001), people can continuously develop themselves by obeying the following six stages: "The point where to rest being known, the object of pursuit, is then determined, and, that being determined, a calm unperturbedness may be attained to. To that calmness there will succeed a tranquil repose. In that repose there may be careful deliberation, and that deliberation will be followed by the attainment of the desired end". Also, according to *Great Learning*, people can transfer their learning or knowledge to other people by following the eight stages: "The ancients, who wished to illustrate illustrious virtue throughout the kingdom, first ordered well their States. Wishing to order well their States, they first regulated their families. Wishing to regulate their families, they first cultivated their persons. Wishing to cultivate their persons, they first rectified their hears. Wishing to rectify their hears, they first sought to be sincere in their thoughts. Wishing to be sincere in their

thoughts, they first extended to the utmost their knowledge. Such extension of knowledge lay in the investigation of things". In summary, learning in traditional Chinese culture emphasizes the unity of developing and transferring; that is to say, it emphasizes not only inheriting excellent traditional ideas and virtues from other people, but also developing new ideas or virtues in the new time.

In order to achieve the goals of learning and carry out the focuses of learning, learners under Chinese traditional culture developed three strategies of learning (Guo, 2015). Firstly, Chinese learners generally believe in persistence and effort (Li, 2003; Watkins & Biggs, 1996). According to Hau and Salili (1991), Chinese learners tend to attribute academic success to hard work rather than to some internal attribute or quality. In Chinese traditional culture, teachers and parents expect persistence and effort from learners when they encounter difficulties and failures in learning. Heine and colleagues (2001) found that learners in Chinese contexts persisted longer after failure than did Western learners. Secondly, learners in Chinese contexts are engaging in active learning. As Grimshaw (2007) points out, although Chinese learners might remain quiet in the classroom and are reluctant to question teachers and express their own ideas, they could be engaging in active learning in the classroom. Chinese traditional culture did not put much value on talking, as can be seen in Confucius sayings "be careful with speech" and "the man of perfect virtue is cautious and slow in speech" (The Analects, Book 12). Collectivist cultural values do not encourage the individual to initiate questions (Hofstede, Hofstede, & Minkov, 2005). Chinese learners may be busy trying to gain the knowledge and full understanding before questioning others or expressing their own thoughts. Thirdly, memorization of foundational knowledge is an important strategy for learners in Chinese traditional contexts to deepen their understanding. In Chinese traditional teaching, memorizing the classics is essential in developing virtues for the learners, and learner in Chinese contexts see memorizing knowledge as the first stage of learning (Tweed & Lehman, 2002b), and they widely use memorization in learning.

2.9.3 Confucian heritage cultural influences

It has been observed that researchers also highlight an important constraint on defining affordances; that is, culture and context (Oshlyansky, Thimbleby, & Cairns, 2004; Turner, 2005). As Oshlyansky et al. (2004) state, when we ignore the context of use, or the culture of our users, and think about the technological affordances only, the design is flawed as well. According to the existing literature, the perceived affordances of mobile device and m-learning

in China are slightly different from those in the Western context (as summarised in the Section 2.3). Cheng et al. (2014) surveyed 760 university students, and find that technological convenience, information exchange and social interaction can significantly predict Chinese users' engagement in using mobile devices. Song et al. (2015) identified and developed concepts that are important to Chinese consumers' mobile device adoption. There are eight concepts generated and confirmed as influential factors affecting the likelihood of adopting mobile devices in China: 1) utilitarian expectation, 2) hedonic expectation, 3) status gains, 4) status loss avoidance, 5) normative influence, 6) external influence, 7) cost, and 8) quality concern (Song, Sawang, Drennan, & Andrews, 2015). Liu et al. (2018) conducted an empirical analysis on the influence factors of satisfaction with m-learning in China, and find that perceived responsiveness and perceived content are the important factors that affect user adoption of m-learning in China. In other words, Chinese users have high satisfaction with the content conforming to the m-learning context, and expect to receive immediate feedback in the process of m-learning (Liu, Zhang, Ye, & Liu, 2018). Apparently, the Chinese culture is an important factor in how people in China perceive the affordances of mobile devices and m-learning; which consideration has provided important inputs to the field research of the present study.

Given that China has its unique circumstances in terms of a strong culture based on deep-seated Confucian values, a number of Confucian concepts have been identified that may both enable and constrain how people engage in business activities and personnel development activities in the Chinese business context (Cheung & Chan, 2005; Ma & Tsui, 2015). With the growing stature of China's economy and businesses and the internationalisation of trade and commerce, it is likely that this influence will extend to a larger scale of the world business environment (Chan, 2007). Key among these concepts is *Guanxi* (social relationship), which is rooted in Confucianism and comprises a number of cultural elements: the face issue, respect for authority, affection, harmony, trust, and team spirit (Bedford, 2011; Cha, 2003; Child & Möllering, 2003; Davison, Ou, & Martinsons, 2018; Ding & Xu, 2015; Hao et al., 2017; Zhang & Nesbit, 2018). It is important to note that *Guanxi* provides moral guidelines for the Chinese as to their behaviour within their family, in society and in business activities (Lin, Ho, & Lin, 2013; Ma & Tsui, 2015). Traditionally, *Guanxi* required face-to-face communication; however, in many workplaces nowadays, face-to-face interaction would be a luxury. Thus, *Guanxi* may be developed and maintained through mobile technology and social media. Davison et al. (2018) conducted intensive investigation into interpersonal knowledge exchange and the impact of

social media in China. They find that informal knowledge exchange arrangements predicated on *Guanxi* that embodies elements of the face issue, trust and mutually reciprocal obligation to help were ubiquitous; and that the intertwined elements of knowledge, *Guanxi* and technology collectively comprise an informal learning system that supports work effectively (Davison et al., 2018).

In addition, "respect for education and scholars" is also considered an important value from Confucianism that influences career development and personnel management in the Chinese business context (Lin et al., 2013; Zhang & Nesbit, 2018). As Confucius lectured, "万般皆下品，唯有读书高" ('*To be a scholar is to be the top of society, and learning is the noblest of human pursuits'*). People with higher educational background are highly respected and are considered to have greater chances to achieve career success in the workplace in China. Thus, Chinese people spend heavily on their learning and education (Kai-Ming, Xinhuo, & Xiaobo, 2010), and lifelong learning is nothing unusual in the Chinese tradition (Kai-Ming et al., 2010). In 2001, a survey conducted by China's National Statistics Bureau showed that more than 60% of Chinese families invested one-third of their income in their children's education, and a family's spending on education and learning was second only to their food expenses (Yang, 2007b). While the motives for such heavy spending on learning could be related to jobs and incomes initially, many people in China would rather consider participating in educational activities as a matter of leisure and as a way of realising a meaningful life (Kai-Ming et al., 2010). Based on the extensive history of Confucian values in Chinese society generally, it would be expected that m-learning in a Chinese business setting would also be impacted by these traditional philosophies (Zhang & Nesbit, 2018).

In 1991, Hofstede published *Cultures and Organizations*, a revised and popularized version of *Culture's Consequences (1980),* where identified four work-related cultural dimensions, including power distance, uncertainty avoidance, individualism, and masculinity, to analyse work-related cultural values in different countries A vital feature of this book is the inclusion of "Confucian dynamism" (also known as long-term orientation - LTO) as a fifth dimension of national culture variance. According to Hofstede (1991), the fifth-dimension deals with "time orientation" and consists of two contrasting poles: long-term orientation versus short-term orientation (Fang, 2003). Long-term orientation refers to a positive, dynamic, and future oriented culture linked with four "positive" Confucian values: persistence, ordering relationships by status and observing this order, thrift, and having a sense of shame. Short-term

orientation, however, represents a negative, static and traditional and past-oriented culture associated with four "negative" Confucian values: personal steadiness and stability, protecting your face, respect for tradition, and reciprocation of greetings, favours and gifts. According to Hofstede (1991, 2001), Chinese societies (China, Hong Kong, Taiwan, Singapore), Japan, Korea, Thailand, etc., are ranked as more future and long-term oriented cultures, whereas Pakistan, Nigeria, the Philippines, Canada, Zimbabwe, the UK, the USA, New Zealand, Australia and Germany are more past and short-term oriented cultures (see Table 2). Furthermore, Hofstede uses the index of Confucian dynamism (long-term orientation) to explain the business behaviours and the economic growth of nations (Fang, 2003). However, many researchers argue that there is a philosophical flaw inherent in Hofstede's fifth dimension due to the fatal flaw and other methodological weaknesses, therefore, the usefulness of Hofstede's fifth dimension is doubted. Wu (2006) also points out that the political, societal, and economic environments change, people's cultural values also change, thus, Hofstede's theory should be updated and re-evaluated periodically (Wu, 2006).

Aside from broader social and national cultural values, learning habits that are cultivated by the social values and traditional Chinese educational system may also influence the characteristics of m-learning. The Confucian philosophy of learning, for example, which can be summarised as "effortful learning, behavioural reform, pragmatic learning, acquisition of essential knowledge, and respectful learning" (Tweed & Lehman, 2002a), has shaped the learning habits in China for millennia. Marton and Saljo (1976) conducted research on Chinese students' learning approaches through comparing Chinese students with Western learners, and identified the former as surface learners and the latter as deep learners. Ryan (2010) outlined differences in academic values and learning habits between Western cultured learners and Confucian cultured learners, finding that Western learners tend to be "deep" learners while Confucian learners tend to be "surface" or rote learners (Ryan, 2010; Saravanamuthu, 2008). The literature on deep and surface learning, as the two main learning approaches or learning strategies towards learning activities (Aharony, 2006; Dolmans et al., 2016; Howie & Bagnall, 2013), shows that: deep learning approach results from an inner need to reach a complete understanding of the subject material, and that behind the deep strategy hides a search for self-fulfilment (Aharony, 2006; Saravanamuthu, 2008); whilst a surface learning approach results from choosing the quickest way to accomplish a task, and that behind the surface strategy hides a need to avoid failure and the desire to minimize effort when completing tasks (Aharony, 2006; Biggs & Moore, 1993). In the m-learning environment, users can choose their own path, and

their own strategies in the learning process, according to their personal tendencies, their abilities and their own pace (Aharony, 2006). It is unrealistic to expect that Eastern learners, who have been influenced by Confucian for many years as passive learners and have used basically surface learning strategies, will immediately exploit all the advantages that are provided to them in an open, m-learning environment, and will turn into active learners who use deep learning strategies. However, many researchers argue that the learners in Chinese cultural contexts are not necessarily always passive and surface learning (Guo, 2015). In contrast, as Guo (2015) asserts, Chinese learners who prefer to keep silent in the classroom, are reluctant to question others and express their own ideas can also be active and deep learners. Pratt et al. (1999) found that the emphasis on memorisation in Chinese cultural contexts may actually reflect a deep approach to learning, which is aimed at a better understanding of the subject. Nonetheless, it is difficult to judge if deep learning or surface learning is actually taking place by Chinese learners because no single sign or a simple answer can clearly tell us which kind of learning is adopted by most of the Chinese learners. One rule in answering this question is that surface learning is more likely to take place in the working environment in China where requires immediate solutions and quick learning outcomes, while, when learners invest a lot of time and effort in learning, deep learning is more likely to take place.

However, it is noted that the dramatic historical and social changes in recent decades, especially the recent rapid economic development as an emerging market in a globalising era, have altered many people's values in China (Sun & Wang, 2010; Tan & Louie, 2008; Zeng & Greenfield, 2015). Many researchers argue that the Western cultural values under globalisation have offset the traditional cultural behaviours in China, shifting the cultural climate from Confucianism to a modern, neo-Confucianism (Cha, 2003; Hartmann, Feisel, & Schober, 2010; Tan & Louie, 2008; Zhang & Nesbit, 2018). Sun and Wang (2010) state that the younger generations in China have already shifted from traditional values to modern values in a recent social transformation process. Under these modern values, "people tend to be more secular and are more likely to regard self-development as the most important thing in life rather than making contribution to the country and society" (Sun & Wang, 2010). Zeng and Greenfield (2015) also address similar findings in their recent research, that the individualistic values carried by Chinese people increased between 1970 to 2008, in contrast to collectivistic values in general decreasing over the same period. Meanwhile, there are also some researchers who consider that the influences of culturally shared beliefs, attitudes and practices on individual learning preferences are moderated or even negated by individual differences (Gieve & Clark, 2005; Huang & Cowden,

2009; Littlewood, 1999). Thus, the determining role of Chinese culture and social values, as represented in the tendency towards m-learning in terms of interdependent rather than dependent learning, passive rather than active learning, and surface rather than deep learning, may be contradicted in individual cases. Therefore, to sum up from the relevant literature on cultural influence, the learning preferences or learning styles of Chinese learners are more complicated than some Western observers have described (Sit, 2013); and the characteristics of m-learning in contemporary Chinese business environments may face competing pressures from cultural and social values as well as individual differences and personal preferences.

2.11 Chapter Summary

Mobile technology is permeating everyone's life and the way people learn. While the penetration of mobile technologies and mobile devices is rapidly increasing, the research on m-learning is still in its infancy. This chapter has provided a summarised discussion on the definitions, affordances, theoretical perspectives, frameworks, models and practices of m-learning from the relevant literatures. The literature has indicated that the conceptualisation of m-learning is still challenging in terms of a commonly acknowledged definition, and that a cohesive theory is still missing (Rikala, 2015). However, the literature also suggests that mobile devices and mobile technologies can enhance and extend teaching and learning in various educational contexts. A number of studies have been conducted in a variety of venues providing information about the affordances and challenges of mobile technology and mobile device use in educational environments, especially in primary school and higher education settings. M-learning researchers have borrowed established theories from other disciplines to inform their m-learning theories and conceptualisations, and many of them have created their own m-learning theoretical perspectives, frameworks and models; which indicates that the process of theorisation is progressing. However, these studies have done little to explore organisational issues and challenges in m-learning adoption in business settings. Thus, there is little evidence or guidelines to support understanding of the fundamental steps leading to successful deployment of m-learning at the organisational level, especially in Eastern cultural contexts.

M-learning is an emerging and rapidly expanding field of research and practice across disciplines, organisations and countries. The advances in mobile strategies and pedagogy are important aspects for future organisational learning and development. The deployment of m-

learning in an organisation should take into account the learners' needs and preferences, technology, context, usability, and pedagogy, along with the objectives of learning. However, the literature review in this chapter identified a lack of empirical research on these topics. The intent of the present research study is therefore to address the key characteristics of m-learning in a Chinese business setting, and to represent and interpret the relationship between these key characteristics with that identified in the West. This chapter also provided a glance into the social and cultural factors in Chinese business settings which may influence the acceptance, usage and practice of m-learning. The results of this study are intended to inform a conceptual foundation for future research on m-learning in the Eastern business context. In addition, this research will provide practical guidelines for implementing m-learning at the organisational level in China.

Chapter Three: Methodology

3.1 Introduction

This chapter presents details on the rationale of the research design and explains the procedures of the research. Firstly, the purpose of the study and the research questions are stated. Next, the method and design of the research instruments are described; followed by explanation of the procedures of the pilot study, sampling, data collection, and data analysis. Then, the chapter addresses the reliability, validity, credibility and limitations of this study. Finally, the ethical considerations are also discussed.

3.2 Research Purpose and Research Questions

The purpose of this study includes gaining a greater understanding of the characteristics of m-learning associated with m-learning usage, perceptions, benefits and key issues in the Chinese business context, and their relationship with characteristics suggested by Western researchers. To characterize m-learning in a Chinese business environment, a mixed methods research approach of quantitative and qualitative methods is employed. Important stakeholders (key users), including employees and their managers, from selected Chinese organisations were invited to participate in the data collection, and m-learning characteristics investigated by using the experience, intentions, perceptions, concerns, and expectations of the users in these organisations. The identified characteristics are further analysed, categorised and matched with previous research findings in the Western literature. The findings from the present study provide guidance and recommendations to organisations and HDR practitioners to make successful adoption and implementation of m-learning in Chinese business environments. Meanwhile, the present study also contributes to the current m-learning literature and provides a conceptual foundation for future research on m-learning in similar Chinese businesses settings as well as other Eastern cultural contexts.

According to the research purpose, this study will focus on theorising m-learning in a Chinese business context by identifying its key characteristics. Therefore, the following five research questions have been framed in order to achieve the research objectives:

RQ 1 What is the current status of using mobile devices for learning purposes in a Chinese

business setting? (Description of mobile usage and m-learning facts of the Chinese organisations.)

RQ 2 What are the employees' perceptions of m-learning in the Chinese business context? (Employees' acceptance of and attitude toward using mobile devices for learning.)

RQ 3 From the employees' perspectives, what are the benefits that m-learning could bring to individuals and organisations?

RQ 4 What issues need to be addressed or highlighted to enhance the successful adoption of m-learning in the Chinese business context?

RQ 5 What are the similarities and differences between the characteristics of Chinese m-learning and Western m-learning?

3.3 Research Design

This research employs a mixed methods approach in order to answer its research questions. A mixed methods research design is a procedure for collecting, analysing, and "mixing" both quantitative and qualitative research in a single study to understand the research problem (Creswell, 2014). According to Punch (2009), mixed methods research "combines the methods in a way that achieves complementary strengths and non-overlapping weaknesses" (p. 290). According to Creswell (2014), the mixed methods design combines quantitative and qualitative methods in a study where quantitative data tend to be closed-ended questions while qualitative data tend to be open-ended questions. Since little is known about m-learning in Chinese business contexts, using quantitative methods allows inferences about the usage, behaviours and demographics of the population being studied, whereas using qualitative methods provide more robust findings on perceptions and concerns about m-learning (Anderson, 2009; Creswell, 2014).

In particular, quantitative methods provide numeric descriptions of trends and allow the researcher to generalise or make claims about the sample population, which establishes the overall tendency in the study (Creswell, 2014; Croucher, 2013). This allows inferences about the behaviours of the sample population being studied. In addition, quantitative methods are cost-effective and efficient for conducting a study of large-scale data and standardized analysis (Creswell, 2014; Strang, 2015). To identify the characteristics of m-learning in a Chinese business setting, the present study uses a quantitative method to survey key users of m-learning

in the Chinese business setting regarding their usage, preferences, and perceptions about mobile devices and m-learning (RQ 1 and RQ 2). On the other hand, a qualitative research design provides rigorous and systematic descriptive analysis required to obtain rich, in-depth details for understanding the phenomena of the study participants. Qualitative research should provide descriptions in greater detail from a few selected individuals (Creswell, 2014). Merrian (2009) explains qualitative research as understanding the interpretations of the participants' experiences, the meanings constructed in their worlds, and making sense of their experiences. Merrian also explains that qualitative research can develop a conceptual framework for a study which is thorough, concise and elegant. Given the purpose of the present study is to explore key characteristics of m-learning in a Chinese business setting, this study used qualitative method to interview selected users of m-learning in the Chinese business setting to capture a deeper understanding of their perceptions, expectations and suggestions from quantitative studies to represent and interpret these characteristics (RQ 2, RQ3, RQ4 and RQ5).

Therefore, the intention in using the mixed methods research design was to bring together different strengths and non-overlapping weaknesses of quantitative methods (large sample size, trends and generalization) and of qualitative methods (small sample, details and in depth), and improved the confidence of the study results (Anderson, 2009; Creswell, 2014; Patton, 2002; Strang, 2015). Moreover, the present study in particular adopted an explanatory sequential mixed method, where the quantitative method was initially employed then the qualitative method was applied to further explain the findings of the quantitative method in more detail. In this study, a survey questionnaire collected quantitative data through closed-ended questions, while interviews collected qualitative data through open-end questions. The key strength of the sequential explanatory strategy is ease of implementation, description and reporting; while the key weakness of this strategy is the extended length of time needed for two phases of data collection: the survey and the interview.

3.5 Target Population

The target population of this study is the employees who are the current and potential users of m-learning employed by selected Chinese organisations. The following reasons were considered in developing the criteria for selecting target organisations. Firstly, middle to large

size organisations[6] (with more than 250 employees) were focused on because they have the resources, manpower and existing T&D systems/platforms to implement m-learning in the organisation. Small organisations usually lack resources (investment and manpower) to implement and maintain organisational m-learning systematically. The second criterion was to focus on MNC (Multi-national company), JV (Joint venture) and Private organisations, as this helped to focus the research on for-profit firms, which are more likely to have embraced Western HRD or human capital approaches. In Chinese state-owned companies, HRD and T&D practices may still be operating in a relatively unreconstructed, old-style of "personnel management" within a Maoist model (Iles, Preece, & Chuai, 2010); thus it is most likely that the organisational learning practices are fragmented, secretive and complicated, with a strong political orientation. The third criterion was to focus on organisations located in first- and second-tier cities in China. The first- and second-tier cities such as Beijing, Shanghai and Suzhou, whilst having less than 20% of the national population (Iles et al., 2010), possess more than 80% of the headquarters of the middle- to large-size companies, and account for 57% of the country's GDP (CDRF, 2018; Yang, 2007a). As such, it more likely that representative organisational m-learning activities would be on the agenda of organisations in these cities.

3.6 Sample

The research employed purposive sampling through a snowball process in the selection of the sample organisations. A purposive sample is a non-probability sample that is selected based on the characteristics of a population and the objective of the study. Purposive sampling allows the researcher to seek participants who are suitable and qualified (experience, knowledge, or/and background) to be studied for a certain phenomenon (Creswell, 2014; Patton, 2002). According to Creswell (2014), snowball sampling (also called network sampling) is a type of purposeful sampling that can be employed to find participants from a hard-to-reach population. The snowball sampling process occurs where existing study subjects recruit future subjects from among their acquaintances.

[6] The definition of company size is based on the OECD classification of an enterprise by employee numbers: a small size enterprise has 1 to 49 employees, a medium size enterprise has more than 49 but less than 250 employees, and a large size enterprise has more than 250 employees. https://data.oecd.org/entrepreneur/enterprises-by-business-size.htm.

Snowball sampling is arguably one of the most widely used method of sampling in qualitative research in various disciplines across the social sciences (Baltar & Brunet, 2012; Noy, 2008). According to Noy (2008), sometimes snowball sampling is used as the main vehicle through which informants are accessed, or as an auxiliary means, which assists researchers in enriching sampling clusters and accessing new participants and social groups. More recently, when social media tools are widely used in our daily lives and research work, researchers have found that response rate through social media tools is higher than the traditional snowball technique (Baltar & Brunet, 2012; Choudhury et al., 2010; Dusek, Yurova, & Ruppel, 2015). As Baltar and Brunet (2012) explain, people increase their level of confidence because the researcher shows his/her personal information (social media profile) and also participates in their groups of interest (groups on the social media). Thus, snowball sampling via social media has been employed widely as a convenience and effective sampling mechanism, especially when collecting a sample from a population in which a standard sampling approach is either impossible or significantly expensive (Dusek et al., 2015). Given the huge population of organisations in 1st and 2nd tier cities in China and the difficulty of data access in a relatively conservative social culture, an initial probability sample could be impossible or impractical; therefore, snowball sampling through HR networking groups on WeChat, China's biggest social media platform, has been employed to identify and access the sample organisations for the present study.

Based on the sample selection criteria, an initial invitation to be involved in the study was posted in two HR networking groups on WeChat (the biggest social media app), with more than 160 members around of the country. Then the members of the HR networking groups were asked to recommend relevant contact persons of the potential sample organisations who match the selection criteria (including his/her own employer), and also extend the information by posting the invitation on their sub-group forum on WeChat. Five members (organisations) responded, and the preliminary contact with the organisations and their HR teams was made in order to identify and verify the suitable sample organisations for this study. As Table 3.1 shows, four organisations were chosen from various industries and locations.

Table 3.1 Sample Organisations

	Type	Industry	Location	Size
Organisation 1	MNC	FMCG	Beijing (tier 1 city)	Large
Organisation 2	MNC	Retail	Shanghai (tier 1 city)	Large
Organisation 3	MNC	Automobile	Suzhou (tier 2 city)	Large
Organisation 4	Local Private	Pharmaceutical	Dongguan (tier 2 city)	Large

MNC: Multi-national company; FMCG: Fast-moving consumer goods

Organisation 1 is one of the world's largest food and beverage MNC, which has more than 2000 brands ranging from global icons to local favourites, and presents in 189 countries around the world. Organisation 1's China head office is based in Beijing, with around 450 employees working in the corporation. Organisation 2 is an American privately owned MNC, which sells cosmetics through a multi-level marketing model. With around 780 employees and 13 branches, China has become Organisation 2's second largest market worldwide. Organisation 2's China HQ is based in Shanghai with around 270 employees working in the HQ office. Organisation 3 is a German-owned private company which manufactures automotive parts and accessories. Together with its four business units and two plants, Organisation 3 has most of its facilities and employees based in Suzhou, Jiangsu Province. Organisation 4 is a local private pharmaceutical company founded in 1992. With four branches and over 500 employees in China, Organisation 4's HQ is located in Dongguan, Guangdong Province.

3.7 Instruments

By virtue of the research questions, the researcher developed two instruments for collecting data. The first instrument is the survey. The quantitative data will be drawn from the results from survey data collected from the four Chinese organisations to identify the key characteristics of m-learning in a Chinese business setting. The second instrument is interview. The overall objective of the interview instrument is to collect in-depth responses to the items on the survey instrument, and to explain in detail the nature of the key characteristics and develop a theoretical framework/model for the Chinese business context.

3.7.1 Quantitative Instrument: Questionnaire

A quantitative instrument, questionnaire, was employed to provide general numerical trends or measure cumulative effects such as patterns of use, including making observations on the types of devices used, users' average access time, frequent activities via mobile devices, and learning preferences, as well as rough demographic predictions, which the researcher can use to generalize or make claims about the sample population (Creswell, 2014). An online questionnaire, as the data collection technique, was used for this study. The online questionnaire was designed to be short, unambiguous, and easy for participants to complete through personal computers or mobile devices within approximate 5-8 minutes.

3.7.1.1 Constructing the Questionnaire

The process of developing the survey questionnaire started by a review of the relevant literature regarding the affordances of mobile devices and m-learning. Previous studies in the relevant literature have indicated that the affordances of mobile devices and m-learning reflect the unique characteristics of adopting mobile devices for learning (Benjamin, 2016; Chee et al., 2017; Chen et al., 2003; Saleh, 2015). As Chen et al. (2002) suggest, the unique characteristics of m-learning benefits and mobile device affordances are the essential features to differentiate m-learning from other learning methods. Meanwhile, according to the existing literature, the affordances of mobile devices and m-learning in China may be slightly different from those in the Western context due to cultural influences (as summarised in Section 2.9). As Oshlyansky et al. (2004) state, when we ignore the context of use, or the culture of our users, and think about the technological affordances only, the design is flawed as well.

This survey was aiming to explore the key characteristics of m-learning in a Chinese business setting. Therefore, the survey questionnaire included 3 parts and 13 questions covering the usage of mobile devices, frequent activities through mobile devices, organisational learning preferences, important aspects/affordances of m-learning, and the perceptions of m-learning (Appendix A). Part I has 5 questions, which were about respondents' personal information related to gender, age, education background, job function and job type (questions 1-5). Part II contains 5 questions, which were related to mobile device usage (questions 6-9) and mobile activities (question 10). Likert scales (1-5) with anchors ranging from "never" to "very often" were used for Question 10 to measure behavioural intention of activities carried out through using mobile devices. As Table 3.2 shows, question 10 contains 21 items on mobile activities,

which are based on the review of relevant literature related to the affordances of mobile devices (see Section 2.3). Part III includes 3 questions (questions 11-13), focussed on the preferences of learning method and the perceptions of m-learning. Question 11 asks about preferred learning method against different organisational learning topics/contents. Variables measured by the organisational learning method preferences include: classroom learning (face-to-face), computer-based learning, m-learning, and on-the-job learning. Question 12 is related to the perceived important aspects (affordances) of m-learning, which contains 16 items. These items were based on reviewing the relevant literature related to the affordances of m-learning (see Section 2.3). Table 3.3 presents the linkages between the 16 items of question 12 and the summary of relevant literature. Likert scales (1-5) with anchors ranging from "Very unimportant" to "very important" were used for Question 12 to measure behavioural intentions of the key aspects/affordances of m-learning. Question 13 aims to explore the perceptions of m-learning with a specific focus on learning efficiency, learning interest, learning result, support for career development, ease of use, future expectations, and overall satisfaction. Likert scales (1-5) were used with anchors ranging from "strongly disagree" to "strongly agree".

Table 3.2 Mobile device affordance, activities and the corresponding items of Q10

Mobile Device Affordance and Activities/Possibilities		Corresponding Items of Question 10
Portability	▪ Data transfer (iDeop, Bluetooth, etc) ▪ Entertainment (Game/Movie/Radio/Music) ▪ Online shopping	▪ Data Transfer (iDrop, Bluetooth transfer, etc) ▪ Entertainment (Game/Movie/Music/Radio) ▪ Online shopping
Connectivity	▪ Access to Internet-supported apps (M-banking) ▪ Access to information	▪ Mobile finance/banking ▪ Accessing professional websites/portals
Communication	▪ Making phone calls ▪ Checking emails ▪ Instant Messaging ▪ Meeting/conference	▪ Making phone calls ▪ Checking and replying to emails ▪ Engaging in instant messaging ▪ Video conference (meeting)
Collaboration	▪ Social networking ▪ Feedback/Discussion	▪ Looking at or posting to social media: WeChat, QQ, Facebook, WhatsApp, etc.
Learning Modules	▪ Just-in-time learning/Micro Learning ▪ Using search engine ▪ Lifetime learning	▪ Accessing organisational learning program ▪ Use of a search engine (Baidu, Google etc.) ▪ Accessing personal learning program
User-Generated Content	▪ Translation ▪ Taking Photos/Videos/Audio	▪ Language translation ▪ Taking pictures or video or recording audio
Contextual and Outdoor environment	▪ GPS ▪ Location-specific content: sports/healthy tracking ▪ Time ▪ Weather	▪ Map, location and GPS ▪ Health and sports tracking ▪ Checking time ▪ Checking weather
e-Reading	▪ E-News ▪ E-books/magazine/articles	▪ Reading news ▪ Reading books/magazine/articles

Table 3.3 M-learning affordances and corresponding items of Question 12

Affordances of M-learning	Corresponding items of Question 12
1. Portability/Mobility/Usability ***Refers to the ease of using mobile devices (in respect to screen size, battery life, size and user interface) for learning anytime, anywhere***	M-learning allows autonomy in choosing learning environments (learn anytime and anywhere)
2. Connectivity ***Refers to mobile devices effectively connecting to the information or learning material wirelessly***	Learning can be timely (can look up information when needed) through m-learning
3. Communication ***Relates to the effective interpersonal communication with others through mobile technology***	M-learning allows ongoing sharing and communication M-learning helps overcome shyness in face-to-face training
4. Collaboration and Interactivity ***Refers to how m-learning supports interaction and teamwork with others through the m-learning activities***	M-learning allows interaction with trainers and other learners
5. Personal Publish and Sharing ***Relates to m-learning supporting content creation and the personal publishing of content***	M-learning allows publishing and sharing of progress and insights among a group of people
6. Context and Situated ***Relates to m-learning allowing the learner to interact with the surroundings and contextual activities***	Information can be updated easily to reflect environmental changes through m-learning
7. Authenticity ***Refers to m-learning being interwoven with real-world and practical activities that take place in the everyday environment***	Learning can be more realistic/relevant and practical through m-learning
8. Personalisation ***Refers to m-learning allowing learners to personalize their learning based on their characteristics and preferences, as well as the tools and applications available to them***	Can use targeted and customized Learning Apps. through m-learning
9. Individuality ***Relates to m-learning providing opportunities for individual exploration and allowing persons to learn in their own way***	M-learning allows a person to learn in their own way
10. Control /Administrative Support ***Refers to the amount of power and autonomy a teacher or a learner has on the learning process for smooth continuity and best outcomes***	M-learning helps to monitor and keeping track of learning progress
11. Content ***Refers to the learning resources for m-learning in a format compatible with mobile devices or fragmented learning. Allows autonomy in choosing leaning content.***	M-learning allows autonomy in choosing learning content
12. Cost ***Refers to m-learning reducing the learning investment for institutions and learners compared with traditional learning methods***	M-learning reduces training/learning cost
13. Social network ***Relates to m-learning helping users in building and maintaining their social network with other users through the m-learning activities supported by social media tools***	M-learning allows to build and maintain organisational /social networking which is linked to your learning
14. Blending ***Refers to a learning solution combining the benefits of various learning approaches and supporting multi-task learning***	M-learning allows multi-task learning (or learning while doing something else)
15. Audio-visual ***Relates to the rich and user-friendly audio-visual functionalities through m-learning***	M-learning allows access to audio-visual support of learning
16. Location Awareness and GPS ***Refers to mobile technology providing a personalised, location-based and interactive learning environment***	M-learning support location awareness and GPS

3.7.1.2 Techniques for Maximizing Survey Return

Babbie (2007) recommends Dillman's (1978) strategies to maximise return rates, which are through minimising time costs for responding by keeping the survey simple, maximising the reward for participation, establishing trust that the rewards promised will be delivered, providing a statement that supports their value, and providing some statement of gratitude

(Donaldson, 2011). To keeping the survey easy to respond to, the platform of survey questionnaire was supported by *Survey Star 问卷星* (www.wjx.com), a leading provider in China of online and mobile survey management, data processing and tabulation services to researchers. Participants may access the online survey through either computer, tablet, or mobile phone. To establish trust, a brief message was delivered through the contact person (usually the HR manager) of the organisations and posted on their internal portal or intranet before the survey. All employees from the four organisations were invited via an email or WeChat message requesting their voluntary participation in completing an anonymous online survey. This message contained a brief description of the research objectives, the guarantee of confidentiality and anonymity, an expression of appreciation for participation, and a link to the constructed web-page on *Survey Star*. However, due to monetary constraints under Macquarie University's Human Research Ethics Code, no rewards were provided to the participants of the survey. The personalisation of email invitation for Internet surveys has been reported to increase response rates in a number of groups (Heerwegh, Vanhove, Matthijs, & Loosveldt, 2005).

3.7.1.3 The Pilot Study

Functionality is of the utmost importance for an online survey. A good questionnaire should be designed as simply as possible, and the participants should be able to understand well every sentence in the questionnaire. The purpose of the pilot study was to evaluate whether the questionnaire design was appropriate and ensured that data collection was straightforward, uncomplicated, and trouble-free for the participants. As Altman et al. (2006) argue, a pilot study should be on a small scale and reveal deficiencies before doing a large-scale research study. On the 1st of August 2017, 25 participants (10 male and 15 female) from the researcher's social media networks (WeChat) were contacted and invited to engage in the pilot survey. All these 25 participants are of Chinese nationality and had working experience in Chinese business environments; and 20 of them were located in China, while 5 of them were located in Australia. By 8th of August 2017, 24 participants (10 male and 14 female) had responded to the survey.

According to the pilot survey results, it was confirmed that there was heavy usage of mobile devices for learning purposes. The pilot survey also proved that participants mostly owned 3 mobile devices and 92% of them used smartphones as the main/most used device. These results confirmed the positive research direction for studying m-learning in a Chinese business setting.

Feedback on the quality of the questionnaire in terms of design, expression, Chinese translation, and cultural suitability was collected through telephone or social media communication. According to the feedback, there were two issues. Firstly, some Chinese translations of the survey questions were reported as ambiguous, for example, some items in Question 10. Secondly, there was one affordance (important aspect) of m-learning missing in Question 12, which was addressed by three participants as an important affordance for Chinese mobile learners to "help overcome shyness in face-to-face training or in a public class". Therefore, through the pilot study, two modifications were made to make the questionnaire clearer and more reliable: firstly, the expression (the wording of Chinese translation) of the items in Question 10 was changed; secondly, one additional item (help overcome shyness in face-to-face training or in a public class) was added into Question 12. Because of the differential size of the pilot groups and because changes were subsequently made to the questionnaire, the data obtained from the pilot were not included in further analysis.

3.7.2 Qualitative Instrument: Interview

The qualitative method was applied to explore deeper understanding of the research questions and further explain the findings of the quantitative method in more detail. In this study, formal, semi-structured, face-to-face interviews were used to collect data, because these can lead to insightful information about the complex behaviour of a social group without limiting the field of enquiry (Fontana & Frey, 2000). In semi-structured interviews, the researcher may ask additional follow up questions that were not planned before the interview. This is to ensure that the interviewees were able to understand the interview questions or components of a question, so that the researcher (interviewer) can collect in-depth responses to the interview questions. The researcher was responsible for creating the semi-structured interview questions and interview guide (see Appendix B). It is the researcher's responsibility to obtain credibility as the creator of how data will be collected (Patton, 2002). The researcher anticipated that the formal semi-structured interview questions would lead to other questions. Interviews were conducted in Chinese by the researcher in person during the period from November 28th 2017 to December 10th 2017. Each forty interviews lasted from 15 to 30 minutes and were recorded by a digital voice recorder.

3.7.2.1 Constructing the Interview Guide

A semi-structured interview guide (protocol) was developed by the researcher to ensure consistency throughout the interview process, which contains four steps: step one is to explain the research background information; step two is to explain and get the consent letter signed; step three is to acquire interviewees' personal information (age range, function and job type); and step four is to ask questions and take notes. Seven interview questions were formulated with the intention to deepen the exploration of the key characteristics of m-learning in a Chinese business setting:

1. *In the past few months, have you ever used mobile devices for learning, either company based or for personal learning? (Please share these experiences). (If not used, go to 3.)*
2. *What are the personal benefits for you from using a mobile device for learning?*
3. *What are the potential and future benefits that m-learning could bring to you/your team/your organisation?*
4. *Do you see mobile devices as being useful for any specific learning activities you might have in the future?*
5. *Do you see mobile devices as being more useful for any specific group of people in the organisation?*
6. *What are your concerns when using a mobile device for learning?*
7. *What can be done to increase the effectiveness of mobile learning?*

Question 1 focuses on gaining insight and information on employees' use of mobile devices for learning. Questions 2, 3, 4, 5 focus on gaining insights into the use and perceptions of using mobile devices for organisational learning purposes and self-develop purposes. Questions 6, 7 focus on concerns and barriers to using mobile devices for learning.

3.7.2.2 Techniques for Improving the Interview Quality

Introduction and explanation of the purpose, scope, process, benefit and importance of the research project was given before each interview to ensure that question responses would not be uncomfortable to answer, reflect negatively on participants, or make the interview feel confrontational. In addition, the introduction and explanation ensured participants were not influenced to believe that the research was intended to reflect positively or negatively on m-learning. A consent letter was presented to each interviewee to obtain their approval. For the

convenience of the participants, interviews were designed to be 30 to 45 minutes long. The interviews were recorded with the consent from the participants to enable subsequent analysis of the data. As Merriam (1998) suggested, recording devices allow a researcher to preserve data for analysis and capture data regardless of how fast they write. Recording devices also provide an opportunity for the researcher to make observational notes when reviewing the interview at a later time (Harvey, 2011). To preserve the anonymity of the research participants and organisations, the original names were not used, and a special coding scheme was developed and used throughout the conduct of the research.

3.7.2.3 The Pilot Study

The researcher conducted a field test to obtain feedback regarding the working of the questions and to ensure a suitable flow of the interview guide. By the field-testing questions, the researcher could map the primary aspects of the topic and test how the pilot participant understands the question. During the period from 20th of November to 23rd of November 2017, the interview questions were field tested by four Chinese professionals to ensure that the questions made sense, were worded correctly, and could achieve the goals of the study. These four participants were from the researcher's personal contacts in the local Chinese community in Sydney, who were all of Chinese nationality and had more than 5 years working experience in China but were currently working in Chinese or Australian organisations in Sydney. In addition, all three had experience of using mobile devices for learning purposes in Chinese business contexts. Based on the conversations, all the participants agreed that a mobile device (smartphone) is the most important tool for daily life and their work. They said that they preferred using a mobile phone in acquiring information in the workplace, and that the efficiency of using mobile devices to search for information was higher than using desktop computers. They further confirmed that m-learning was the most helpful method for formal and informal learning in their organisations. Following the interview guide, the pilot interviews were conducted smoothly and effectively, and relevant information was collected through the interview questions as planned. Feedback from the pilot test aided in the adjustment of the interview questions to make them easily understood by Chinese interviewees and to ensure that interviews could be finished within thirty to forty minutes. Because of the differential size of the pilot groups and because changes were subsequently made to the interview questions, the data obtained from the pilot were not included in further analysis.

3.8 Data Collection

The researcher received a signed "Information and Consent Form" from the HR heads of the four organisations before the data were collected. In the Consent Form, the introduction of the research, the purpose of the study, the methodology and the estimated timeframe of the research were presented and explained (see Appendix C). The researcher was granted approval from the Human Research Ethics Committee of Macquarie University (MGSM sub-committee) to conduct the research, and to take two research trips to China to collect the data in person during the second half of 2017.

3.8.1 Quantitative Data Collection

Due to time constrains, costs, and the number of possible participants, an online survey was the method of delivery selected for this study. The researcher constructed a web-based questionnaire in the *Survey Star 问卷星* (www.wjx.com), a leading provider in China of online and mobile survey management, data processing and tabulation services to researchers. All employees from the four organisations were invited via an email or WeChat message requesting their voluntary participation in completing an anonymous online survey. This message contained a brief description of the research objectives, the guarantee of confidentiality and anonymity, an expression of appreciation for participation, and a link to the constructed web-page on *Survey Star*. Each organisation was given a different link (each containing a different account code) for grouping purpose. Participants could access the online survey through either computer, tablet, or mobile phone. Because employees' participation in the survey in this is research was limited to the completion of the web-based questionnaire, a signed informed consent form was not necessary for every participant. The participants were given two weeks to complete the survey. One week after the initial message was sent, a reminder message was sent to remind all participants to take the survey if they had not already. After the two-week deadline, the survey platform was turned off on September 4, 2017; and by that day, the survey had received 665 valid responses from these four organisations. The raw data collected via *Survey Star* were organised and downloaded to SPSS software for analysis.

3.8.2 Qualitative Data Collection

The semi-structured face-to-face interviews were conducted from 28th of November through 10th of December 2017 in the four organisations located in four different cities in China:

Shanghai, Beijing, Suzhou and Dongguan. The researcher spent two days in each organisation, and the interview participants were randomly picked by their HR manager based on their availability on those days. There were 40 participants, 12 males and 28 females, from the selected four organisations who volunteered to participate in the interview. The high ratio of female participates was due to the fact that a larger proportion of the office-based employees in these organisations are female.

Once an interviewee arrived at the designated meeting room, the researcher started with an initial welcoming greeting and introduced himself to develop rapport. An information and consent form was presented and explained to the participant, then the researcher asked them to sign the document. Permission to audio record the interview was also asked to proceed with the interview. All 40 of the participants agreed to be recorded. During the interviews, the researcher took an appreciative stance and listened attentively in order to understand the interviewee's meanings rather than think about the next interview question (Beaty, 2016). The research asked for clarification when needed and asked for confirmation of accuracy when the researcher paraphrased the participant's response. The digital files of the records of the interviews were extracted from the recording devices and stored in a secure and password-protected electronic folder, which is accessible only by the researcher.

3.9 Data Analysis

3.9.1 Quantitative Data Analysis

All data from the survey questionnaires were analysed through Excel and the Statistical Package for the Social Sciences (SPSS) version 15.5. The data analysis used descriptive statistics, independent samples t-tests, linear regression, ANOVA, Post-hoc test and Bonferroni correction to determine relationships between variables. Descriptive statistics were calculated on all variables. The descriptive statistics were analysed to evaluate mean, range, frequencies, percentages and standard deviations of the various usage and demographics (Betts, 1998; Duffy & Jacobsen, 2001; Kellar et al., 2003; Scollin, 2000). Means and standard deviations were calculated for variables on a ratio or interval scale, while frequencies and percentages were provided for nominal or ordinal scaled variables. An independent samples t-test was conducted to address the significant differences between two groups, in this case, male and female groups or managerial and non-managerial groups (Croucher, 2013). One-way analysis of variance (ANOVA) and chi-square were utilized to determine patterns and significant differences in the

data, which lead to a better understanding of different groups' usage or perceptions related to m-learning. As Aczel and Sounderpandian (2002) argue, the ANOVA is an appropriate test to use in determining differences between several population means for normally distributed populations. Furthermore, Post-hoc (Tukey HSD) pairwise multiple comparisons were conducted to determine significant differences among the means within the groups' dimensions (Creswell, 2014). For example, to investigate the differences regarding the m-learning usage in the 5 educational level groups, firstly the ANOVA test was conducted to determine whether there was statistical difference, and if yes, the Post-hoc (Tukey HSD) would be run to compare every two groups of them and identify the differences. By collaborating with the statistical analyst, the researcher has been able to answer Research Questions 1 and 2 and partially RQ 3; which adds significant data to the body of knowledge related to m-learning in the Chinese business context. Detailed quantitative results and analyses are presented in Chapter 4.

3.9.2 Qualitative Data Analysis

The interviews were transcribed manually because there was no available voice recognition software for the Chinese language that reaches a satisfying level of transcription accuracy. The interview transcriptions were checked and translated by the researcher, who is a native Chinese speaker and trained interviewer[7]. Comparison of a back-translation of selected transcripts to the original text were employed by a NAATI[8]-certified professional as a quality check on the original translation. When each transcription was completed, the researcher reviewed and compared each against the digital transcript to check and ensure the accuracy against the audio recording. When necessary, the researcher made appropriate corrections. Later, the transcripts were coded using inductive analysis and Nvivo 11.4.3 software to identify patterns, and thematic categories for the data (Patton, 2002). The reasons for using Nvivo, which resonated with the research design, include the following:

- It provides an overall management process for documents and analysis in studies involving large amounts of data;
- It provides faster and more rigorous analysis methods compared to manual processes;

[7] The researcher received proper training in conducting research interviews in his Master's of Research studies; meanwhile, the researcher also possesses more than 10 years' working experience as a human resource executive at MNCs where he was trained as a professional interviewer.
[8] NAATI: Australian National Accreditation Authority for Translators and Interpreters.

- It facilitates iterations within data coding and analysis;
- It is mostly used for doing constant comparative analysis. (Brightman, 2003; Miles & Huberman, 1994; Patton, 2002).

The data analysis of the transcripts was driven by the act of categorising and coding. Coding is attaching tags or labels to data, allowing the researcher to discover the true meaning of the information (Basit, 2003).

Firstly, focused coding was conducted, through which each relevant interview text was searched for aggregate repeating comments/ideas regarding the certain topic/segment, for example, personal benefits, organisational benefits, and concerns of m-learning. The possibility that a comment/idea represents an important idea increases with the number of times the comment/idea repeats. This process of coding aims to use the most significant and/or frequent earlier codes to sift through large amounts of data. During this process, the researcher was primarily looking for expressions of a comment/idea relevant to the research questions. The researcher sought to develop both descriptive and explanatory themes. An instance of a theme may be text or concepts of any size, and a unit of text could be assigned to more than one theme simultaneously. These codes derived are more directed, selective, and conceptual than word-by-word, line-by-line, and incident-by-incident coding (Charmaz & Belgrave, 2007), which are used to synthesise and explain larger segments of data.

Secondly, in developing themes, the process used in developing the themes in this research includes using abstraction, generalisation and "scaling up", and is consistent with the approach suggested by Urquhart et al. (2010). The research objectives and research questions were considered in the development of themes. To ensure consistency of coding, a coding sample was done at the onset on each interview transcript. Coding consistency of the sample was constantly checked by the researcher through a re-examination of assigned coding throughout the coding process. Adjustments to the nodes were made. Once all themes were identified, the researcher looked for commonalities, differences, patterns, and structures to help generate results and answers to the research questions.

Thirdly, theoretical categories were developed with the support of developing central themes. Through comparing and grouping similar themes into broad categories, themes were subsequently integrated and abstracted into central themes. The focus of this qualitative analysis is to further investigate and conceptualise the characteristics of m-learning based on assumptions through literature review and findings from quantitative results. Therefore, the

three central themes of m-learning based on literature review and quantitative analysis results were adopted as the initial categories. To reduce the potential bias and increase the validity and trustworthiness of the qualitative results, the categorising and matching process was duplicated by two academics through a peer-checking process. As Inger (1994) suggests, a peer-checking process helps researchers to increase the trustworthiness of the research through confirming their qualitative findings with other researchers (INGER, 1994). Both of the academics are from the management research field and have at least three years' working experience in the corporate business environment. The themes, and central themes, including a description of each theme, are included in Chapter 5.

3.10 Techniques for Ensuring Reliable and Valid Data

Salkind (2006) states that the reliability and validity of a measurement instrument are crucial and are the first line of defence against inaccurate conclusions. Assuring accuracy of the data in a study is an important step in establishing credibility for such study (Jackson-Butler, 2016). The research design in the present study included steps to assure the accuracy of the data obtained, analysed and reported.

Firstly, the adoption of the mixed methods research design can increase the reliability and validity of the study. As suggested by Greene et al. (1989) and Donaldson (2011), the results from the different methods have offsetting biases and can corroborate each other, thus strengthening the validity and reliability of the research findings. Interviews in this research help to compensate for some of the weakness in the results derived from survey data, provide in-depth information, enhance the findings of the quantitative data, and identify commonalities and discrepancies.

Secondly, prior to implementing the survey and interview, pilot studies were conducted to determine the reliability and validity of the research instrument with a small group of participants. The purpose of the pilot study was to evaluate whether the questionnaire and interview question design were appropriate and ensured that data collection was straightforward, uncomplicated, and trouble-free for the participants; and meanwhile, also to obtain feedback regarding the working of the questions and to ensure a suitable flow of the data collection. Based on the pilot studies, survey questionnaire and interview questions were polished and adjusted to ensure the effectiveness and efficiency of the data collection.

Thirdly, recording the interviews and having a professional translator check the quality of translation helped to assure the accuracy of the interview data. In line with the data analysis strategy detailed in Sections 3.8.2 and 3.9.2, all the recorded interviews were manually transcribed because there was no available voice recognition software for the Chinese language that reaches a satisfying level of transcription accuracy. The interview transcriptions were checked and translated by the researcher, who is a native Chinese speaker and experienced interviewer. Comparison of a back-translation of selected transcripts to the original text has been conducted by a professional translator as a quality check on the original translation.

Fourthly, ensuring honesty was encouraged by providing an Information and Consent Form for all the HR heads of the sample organisations and every participant of the interviews. The purpose of the consent form was to inform the participants of the goals, harms and risks involved with the particular study, providing them with the freedom to accept or decline participation (Beaty, 2016; Singleton & Straits, 1999). Moreover, the issue of confidentiality was confirmed in the Consent Form, and the researcher provided each interviewee with a copy of the consent form. Participants were informed that they could ask questions about the study at any time before, during and after the interview. Furthermore, the researcher maintained an open communication and relationship with the participants.

Fifthly, to reduce the potential bias and increase the validity and trustworthiness of the qualitative results, a peer-checking process was conducted in checking the results of categorising and matching central themes. As Inger (1994) suggests, a peer-checking process helps researchers to increase the trustworthiness of the research through confirming their qualitative findings with other researchers. This peer-checking process was conducted by two academics, both of whom are from management research field and have at least three years' working experience in the corporate business environment. The results of peer-checking were highly consistent with the researcher's initial result with 95% to 100% consistency.

3.11 Limitations

There were four limitations identified for this research study in the process of data collection and analysis, which may impact the conclusions drawn. Firstly, the quantitative data were collected through an online survey which was distributed using email and a social media outlet (WeChat). Social media outlets tend to lend themselves to those people who would consider themselves as more technologically savvy (Fraga, 2012). Therefore, the respondents may not

be a representative sampling of the organisations. This limitation was countered by the fact that the survey information was also delivered through employees' company email accounts. In these four organisations, employees' accessibility to their company email account reaches 100%. Thus, the respondents were a representative sampling of the organisations, and this study is generalisable through replication in similar theoretical domains.

Secondly, the study may be limited by the collegial relationship between the researcher and the HR manager of one of the sampling organisations. As previously mentioned, this researcher and one of the organisations' HR manager had previously worked for the same company eleven years ago. The collegial relationship may have contributed to some of the positive outcomes of the survey and interview. This limitation was countered by the effort of building the researcher's role as an "outsider", which was carefully considered and explained to the participants before collecting the data. Thus, the researcher was seen as not having a direct personal stake in the research interpretations and outcomes, and therefore participants were relatively frank in expressing their views (Walsham, 1995).

Thirdly, there might be some bias and subjectivity in interpreting the interview data since the researcher has more than ten years of industrial experience as an HRD professional in the Greater China region, and such a rich experience may influence the data interpretation and analysis. Harvey (2011) asserts that using a flexible interview guide, with already formatted and field-tested questions, allows the researcher to minimise their impositions and perspectives on participants' responses. In this study, the interview guide with formatted and pilot-tested questions was used during the interviews. The researcher made a conscious effort to apply objectivity and adhere to the semi-structured interview procedures throughout the data collection and analysis process. Moreover, the mixed methods approach adopted by this study also strengthens the validity of the study and its findings.

Fourth, self-report bias may also threaten the validity of the research conducted in business settings. In general, research participants want to respond in a way that makes them look as good as possible (Donaldson & Grant-Vallone, 2002). Thus, they tend to under-report behaviours deemed inappropriate by researchers, and they tend to over-report behaviours viewed as appropriate (Donaldson & Grant-Vallone, 2002). Self-report bias is particularly likely in organizational behaviour research because employees often believe there is at least a remote possibility that their employer could gain access to their responses (Moorman & Podsakoff, 1992; Zerbe & Paulhus, 1987). In this study, the researcher made a clear declaration in the IC form and at the beginning of interview that the survey or the interview was for purely

research purpose and the participants' employers could never gain access to their responses, in which way to minimise the bias of self-reporting.

3.12 Ethical Considerations

The ethics approval policy at Macquarie University was followed during the entire process of this research. An approval from the MGSM sub-committee of Human Research Ethics Committee of Macquarie University was granted (see Appendix D) to conduct the research and to take two research trips to China to collect the data in person during the second half-year of 2017. As a part of the ethics application, survey questionnaire, interview questions and data collection processes were prepared and subsequently approved. An Information and Consent Form was circulated before the actual data collection proceeded. The consent form provides the participants information on the goals, process, harms and risks involved with the particular study, providing them with the freedom to accept or decline participation (Beaty, 2016; Singleton & Straits, 1999). Participants gave their written consent to voluntarily participate in the research and were informed of the right to withdraw their participation from the research at any time. The contact information of the researcher and the supervisor was provided in the consent form in case of further queries or concerns. The digital files of all collected information were stored in a secure and password protected folder, which was accessible only by the researcher. As a compulsory part of researches to be conducted outside Australia, an additional application (Appendix B of ethics application) was concluded in the ethics application to make sure necessary considerations (culture, safety, language and compliance etc.) had been made.

3.13 Chapter Summary

This chapter outline the methodology that was used in this study. The purpose of this study was to explore the characteristics of m-learning in a Chinese business setting. According to the research purpose and research questions of this study, a mixed methods research approach was employed as the research design to collect quantitative and qualitative data. In relation to the quantitative data, an online survey was conducted and 665 valid sets of questionnaires from the four Chinese organisations were collected. As related to the qualitative data, 40 semi-structured interviews were conducted in these four organisations located in four cities in China. Detailed information regarding the research population, research instruments, data collection procedures, and data analysis tools and steps were described. In addition, the techniques for

ensuring reliability and validity, the limitations of the research design, and the ethical considerations, were also discussed in this chapter. The following chapter, Chapter Four, presents the details of the results and analysis of quantitative data.

Chapter Four: Quantitative Results and Analysis

4.1 Introduction

The purpose of this chapter is to present the results and analyses of the quantitative data. A quantitative survey study provides general numerical trends, which the researcher can use to generalise or make claims about the sample population (Creswell, 2014). Based on 665 surveys of employees across four organisations in China, the quantitative results and analysis in the present study explore the mobile usage, m-learning practices, and mobile learners' attitude/perceptions, in the Chinese business context. All data from the survey questionnaires are analysed through Excel and the Statistical Package for the Social Sciences (SPSS). The data analysis uses descriptive statistics, independent samples t-tests, ANOVA (one-way), Post Hoc test, Bonferroni adjustment, and linear regression to analyse the data and determine relationships between variables.

The following research questions are addressed by the quantitative data results and analysis:

> *RQ 1 What is the current status of using mobile devices for learning purposes in a Chinese business setting? (Description of mobile usage and m-learning facts of the Chinese organisations.)*
>
> *RQ 2 What are employees' perceptions of m-learning in the Chinese business context? (Employees' acceptance of and attitudes toward using mobile devices for learning.)*

4.2 Demographic Characteristics

Part I of the questionnaire contains five questions, which ask about respondents' personal information. The demographic variables measured are: gender, age, education background, job function and job type.

Population and Gender. Six hundred and sixty-five employees from four Chinese organisations participated in the survey. The demographic data accurately reflect the composition of the organisations. Participants' source distribution and gender demographics are described in Table 4.1. There were slightly more male participants (53.7%) than female (46.2%).

Table 4.1: Demographic (Population and Gender)

Gender	Org 1	Org 2	Org 3	Org 4	Total	%
Male	84	124	69	80	357	53.7%
Female	75	161	36	35	307	46.2%
Unidentified	1	0	0	0	1	0.1%
Total	160	285	105	115	665	100%

Age. The participants' age group distribution is presented in Table 4.2. The majority of participants were between 26 to 45 years old (85%). The average age of participants was 36 years.

Table 4.2: Demographic (Age)

	Age group	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19-25 years	38	5.7	5.7	5.7
	26-35 years	278	41.8	41.8	47.5
	36-45 years	291	43.8	43.8	91.3
	46+ years	58	8.7	8.7	100.0
	Total	665	100.0	100.0	

Educational Background. Participants' educational background is presented in Table 4.3, showing that the participants were highly educated, with only a small percentage (2.6%) not having tertiary qualifications[9].

Table 4.3: Demographic (Educational background)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High School	17	2.6	2.6	2.6
	Associate Degree	134	20.2	20.2	22.7
	Bachelor	401	60.3	60.3	83.0
	Master	109	16.4	16.4	99.4
	PhD	4	.6	.6	100.0
	Total	665	100.0	100.0	

Job Function. The participants' job functions are presented in Table 4.4. Around one-third of

[9] The average educational level in China's labour market has been increasingly upgraded in the past decades as a part of the country's open business climate and significant shift towards a services- and skills-based economy. The number of annual graduates has increased by six times from 2001 to 2010, according to a KPMG (2010) report. Most of the degree holders seek to work in the tier 1 and tier 2 cities in China.

the participants (33.4%) are from the Sales and Marketing function. The remaining two-thirds of participants were distributed among eight other functional areas. This high proportion of Sales and Marketing is mainly contributed by Organisation 4, a local private pharmaceutical company, where the Sales and Marketing workers are the major exempt employees[10].

Table 4.4: Demographic (Job Function)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sale and Market	222	33.4	33.4	33.4
	Manufacture	39	5.9	5.9	39.2
	HR/Fin/Admin/Training	84	12.6	12.6	51.9
	Operation	110	16.5	16.5	68.4
	Engineering	37	5.6	5.6	74.0
	IT/Communication	52	7.8	7.8	81.8
	R&D	28	4.2	4.2	86.0
	Logisitcs/Purchasing	32	4.8	4.8	90.8
	Others	61	9.2	9.2	100.0
	Total	665	100.0	100.0	

Job Type. Participants' job type is presented in Table 4.5, revealing a nearly even number of non-managerial position holders and managerial position[11] holders.

Table 4.5: Demographic (Job Type)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Managerial	343	51.6	51.6	51.6
	Non-managerial	321	48.3	48.3	48.3
	No response	1	.2	.2	100.0
	Total	665	100.0	100.0	

4.3 Mobile Device Usage

The quantitative results from Part II of the questionnaire provided answers to *Research Question 1* "*What is the current status of using mobile devices for learning purposes in a Chinese business setting? (Description of mobile usage and m-learning facts of the Chinese*

[10] Exempt employee classifies employees who are exempt from overtime pay and the minimum wage. Exempt employees are paid not for the hours worked but rather for the work that they performed. In order for an employee to be considered exempt they must use discretion and independent judgment at least 50 percent of the time (www.businessdictionary.com).

[11] In this study, employees who provide leadership and management to other employee(s) are considered managerial position holders.

organisations)". Specifically, three aspects of the current use of mobile learning were explored: mobile device penetration, mobile daily usage, and frequent activities carried out through mobile devices.

4.3.1 Mobile Device Penetration

Most respondents (69%) have 2-3 mobile devices (Table 4.6), with the vast majority (90.2%) indicating that a smart phone is their most used mobile device (Table 4.7). With regard to the years of experience in using mobile devices (Table 4.8), 81.3% of respondents have more than 6 years' experience of using mobile devices, with more than half of respondents (51.7%) indicating greater than 10 years' experience. These results show that mobile devices have a high penetration and ubiquity in the selected Chinese organisations, and that a mobile (smart) phone is the major device used to carry out online activities. This finding mirrors the reported increasing mobile phone penetration and internet access in China. For example, a recent report from Statistics Portal (https://statista.com/) shows that there were 1.4 billion mobile phone subscriptions registered in China by the end of 2017. In addition, according to a report by CNNIC (2017), 95.1% of internet users in China used a mobile device to access the internet in 2016, with the total number of internet users reaching 695.3 million in 2017.

The growth in mobile penetration and mobile usage has brought many opportunities for corporate learning and development via m-learning (Chee et al., 2017; Lac et al., 2014). With increasingly favourable market conditions, China has been predicted to be the largest m-learning market worldwide, with estimated revenue of $2.3 billion in 2019, up from the $1.1 billion reached in 2014 (Adkins, 2015; Delgado, 2017).

Table 4.6: Number of mobile devices

	Number of devices	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	9	1.4	1.4	1.4
	1	106	15.9	15.9	17.3
	2	255	38.3	38.3	55.6
	3	201	30.2	30.2	85.9
	4	62	9.3	9.3	95.2
	More than 4	28	4.2	4.2	99.4
	No response	4	.6	.6	100.0
	Total	665	100.0	100.0	

Table 4.7: Most used mobile device

	Device Type	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Smart phone	600	90.2	90.2	90.2
	Tablet	14	2.1	2.1	92.3
	Laptop	49	7.4	7.4	99.7
	Other	0	0	0	99.7
	No response	2	.3	.3	100.0
	Total	665	100.0	100.0	

Table 4.8: Experience of using mobile devices

	Years of experience	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 year	9	1.4	1.4	1.4
	1-3 years	48	7.2	7.2	8.6
	4-5 years	65	9.8	9.8	18.4
	6-10 years	197	29.6	29.6	48.0
	More than 10 years	344	51.7	51.7	99.7
	No response	2	.3	.3	100.0
	Total	665	100.0	100.0	

4.3.2 Mobile Daily Usage

As indicated in Table 4.9, the respondents spent a considerable amount of time each day on their mobile devices. On average, respondents reported spending 4.95 hours on mobile devices per day, and more than one-quarter (26.6%) of the respondents claimed to spend more than 7 hours daily. Compared with the mobile usage in the United States, which is 4.2 hours per day in 2017 according to eMarketer (2018), the respondents in the sample organisations are spending more time on mobile devices, with the difference possibly being almost one hour per day.

Table 4.9: Usage of mobile devices

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 hour	5	.8	.8	.8
	1-2 hours	41	6.2	6.2	6.8
	2(+) – 3 hours	133	19.8	19.8	26.6
	3(+) – 5 hours	181	27.2	27.2	53.8
	5(+) – 7 hours	127	19.1	19.1	72.9
	More than 7 hs	177	26.6	26.6	99.7
	No response	2	.3	.3	100.0
	Total	665	100.0	100.0	

To examine whether differences in daily mobile device use are related to gender, age, educational background, job function or job type of the participants, independent samples t-test and ANOVA analyses were conducted. The T-test reveals a significant difference between the females and males in daily mobile device usage (See Table 4.10 and Appendix E for details): t (663) =-4.463, p<.05, with female respondents spending more time (M=5.3 hours, SD=2.30) on mobile devices than male respondents (M=4.5 hours, SD=2.19). Why gender influences mobile device use in these organisations is not clear; and the literature reports mixed findings. Some studies have indicated that women spend more time on mobile devices (Andone et al., 2016) because women spend more time in communication and social apps; while other studies have found that men are the higher users of mobile devices (Baron & Campbell, 2012; Rowntree, 2018), because women have lower perceived ease of using information technology compared to their male counterparts (Goswami & Dutta, 2016).

No statistical differences in mobile usage were found between the different age groups of respondents, although the younger group (19-25 years) was the highest users of mobile devices (see Table 4.11 and Appendix F for details). In terms of daily mobile usage and educational background, analysis shows that respondents with higher education level spent more time on mobile devices, and the difference between the groups is significant (F *(4, 660)=2.8, p*=.025) (see Table 4.12 and Appendix G for details). Simple linear regression test indicates a significant relationship between participants' educational level and the time they spend on mobile devices (B=.299, ß=.092, t=2.368, p=.018). The slope coefficient for participants' educational level is .299 so the hours spent on mobile devices increases by .299 for each education level progressively. However, the regression model can only explain very small portion of variation in hours by education level (R^2=.08). Multiple (group) comparisons through a Post Hoc Test (Tukey HSD) reveals that there are significant differences between the "High School" group and "Associate Degree"[12] group, the "High School" group and "Bachelor" group, and the "High School" group and "Master's" group. To reduce the chances of obtaining false-positive results (type I errors) in the multiple pair comparisons, the Bonferroni correction was used through Post Hoc (Bonferroni) test, which further shows that the significant differences only

[12] An associate degree is an undergraduate academic degree awarded by colleges and universities upon completion of a course of study intended usually to last two years or more. It is considered to be a lower level of education than a Bachelor's degree.

occur between the "High School" group and "Bachelor" group, and the "High School" group and "Master's" group. However, given the small size of the "High School" group, one should be cautious about drawing a conclusion about the relationship between education and mobile use[13]. In the present study, the difference may reflect the discouragement of high school educated employees from using mobile devices during working hours.

Table 4.10: Mobile Daily Usage by Gender Group

Gender group	N	Mean (hours)	Std. Deviation
Male	357	4.55	2.20
Female	308	5.33	2.30
Total	665	4.91	2.28

Table 4.11: Mobile Daily Usage by Age Group

Age group	N	Mean (hours)	Std. Deviation
19-25 years	38	5.20	2.29
26-35 years	278	4.80	2.35
36-45 years	291	4.98	2.19
46 years and above	58	4.97	2.35
Total	665	4.91	2.28

Table 4.12: Mobile Daily Usage by Education Level

Education level groups	N	Mean (hours)	Std. Deviation
High School	17	3.24	2.30
Associate Degree	134	4.86	2.28
Bachelor's Degree	401	4.93	2.23
Master's Degree	109	5.14	2.35
PhD	4	5.88	3.07
Total	665	4.91	2.28

Table 4.13 reports the mobile device usage by different job functions. All job functions had high mobile daily usage, with the lowest number of hours per day being 3.91 hours for the Engineering group. The One-way ANOVA test reports that the difference between the job function groups were statistically significant (see Appendix H): $F\ (8,\ 664) = 2.401,\ p = .015$. The Post Hoc Test (Tukey HSD) of multiple group comparisons reveals that there were

[13] The researcher was told during the interviews that operators in two of the organisations mainly have high school education and are not encouraged to use mobile devices in their work.

significant differences between the Logistics/Purchasing group and the Engineering group, as well as between the IT/Communication group and the Engineering group (see Appendix H). To reduce the chances of obtaining false-positive results in the multiple pair comparisons, the Bonferroni correction was also used through Post Hoc (Bonferroni) test, which further shows that the significant differences only occur between the Logistics/Purchasing group and the Engineering group. The heavier usage in the Logistics/Purchasing function may reflect the nature of these jobs, which typically require more intensive communication with their key stakeholders. For example, employees who work in Logistics/Purchasing are likely to be in constant contact with vendors in seeking quotations, comparing prices, seeking information about products, etc. (Lambert & Stock, 1993; Monczka, Handfield, Giunipero, & Patterson, 2015). By contrast, jobs in "Engineering" and "Manufacture" may require less and have less opportunity for mobile phone communication[14].

Table 4.13: Mobile Daily Usage by Job Function

Job Function group	N	Mean (hours)	Std. Deviation
Sale and Marketing	222	4.91	2.28
Manufacture	39	4.40	2.32
HR/Fin/Admin/Training	84	5.05	2.50
Operation	110	5.05	2.19
Engineering	37	3.91	2.13
IT/Communication	52	5.42	2.12
R&D	28	4.30	2.29
Logistics/Purchasing	32	5.75	2.24
Others	61	4.87	2.10
Total	665	4.91	2.28

Although people with higher educational background have more chances to reach the managerial level in China (Cai, Morris, & Chen, 2011; Li & Nesbit, 2013; Zhang & Nesbit, 2018) and people with higher educational background tend to spend more time on mobile devices, the survey data indicate that non-managerial position holders spend slightly more time on mobile devices each day than managerial position holders (see Table 4.14). However, this difference between the non-managerial group and managerial group is not statistically significant (t=0.176, $p=.81$) (see Appendix I).

[14] The researcher was told when conducting interviews in organisations 2 and 3 that employees who work in Manufacturing are not allowed to use mobile phones during working hours.

Table 4.14: Mobile Daily Usage by Job Type

Job Type group	N	Mean (hours)	Std. Deviation
Non-managerial position holders	343	4.933	2.25
Managerial position holders	322	4.894	2.31
Total	665	4.91	2.28

4.3.3 Frequent Activities

To explore what are the most frequent activities that respondents engage in through mobile devices, a list of 21 possible activities, derived from the literature (see Sections 2.3 and 3.7, Chapters 2 and 3, respectively, for discussion of these activities), was presented in the survey. Using a 5-point Likert scale (1=never, 2=seldom, 3=sometimes, 4=often, 5=very often), respondents indicated the frequency of those activities they engaged in on their mobile devices. Although respondents could also indicate other activities they engaged in frequently on their mobile devices, none chose to do so, suggesting that the list of activities presented in the survey captured the full gamut (or close to it) of mobile device activities carried out by respondents.

Table 4.15 displays the percentages of respondents who indicated use of an activity for each level of frequency. The results show that there are 11 activities where more than 50% of responses were rated as "Often" and "Very Often". Using social media apps and making phone calls were ranked the top two frequent activities among the respondents. These activities relate to the broad theme of communication. Another very frequent activity related to communication is checking and replying to emails.

Other frequent activities include checking the time and weather conditions, as well as GPS location, all sharing a common function relating to finding out information about the local environment. Frequent activities that seek a broad range of information about the non-local environment include use of search engine and reading news. The activities of online shopping and conducting mobile banking/financing relate to e-commerce activities. The final activity, with more than 50% rating as being conducted "often" or "very often", is taking pictures, which relates to the broader theme of entertainment or leisure. Therefore, all the 11 activities rated by more than 50% of respondents as being carried out "often" or "very often" relate to four broad themes, which are: communication, acquiring information on local and non-local environments, e-commerce, and entertainment/leisure.

These frequent mobile activities identified in this study have some similarities with those in previous research conducted in the Western context. In the West, the most frequent activities carried out by mobile device users have focused on communication, entertainment, acquiring information, and e-commerce (Fawkes, 2018; Goldstein, 2017; Statista, 2018).

Table 4.15: Frequent activities through mobile devices

Activities \ Frequency	Never	Seldom	Sometimes	Often	Very often	(No resp)	Frequency (Often + Very Often)
Looking at or posting to social media: WeChat, QQ, Facebook, WhatsApp, etc.	1.4%	3.7%	8.7%	31.4%	53.8%	1.1%	**85.2%**
Making phone calls	1.8%	5.0%	13.7%	30.3%	47.0%	2.3%	**77.3%**
Mobile finance/banking	4.3%	8.1%	15.5%	37.3%	35.5%	0.9%	**72.9%**
Checking time	2.3%	11.4%	18.1%	32.6%	34.3%	1.2%	**66.9%**
Map, location and GPS	2.3%	6.3%	23.2%	38.4%	28.2%	1.5%	**66.6%**
Use of a search engine (Baidu, Google etc.)	2.3%	9.5%	20.7%	38.0%	28.0%	1.5%	**66.0%**
Taking pictures or video or recording audio	3.0%	11.1%	19.7%	31.1%	33.4%	1.7%	**64.5%**
Reading news	2.0%	15.4%	18.8%	36.1%	26.7%	1.1%	**62.8%**
Checking weather	1.5%	11.9%	24.2%	37.0%	23.5%	1.8%	**60.5%**
Checking and replying to emails	4.1%	14.5%	25.5%	27.6%	27.1%	1.2%	**54.7%**
Online shopping	5.3%	14.3%	24.7%	31.6%	22.6%	1.4%	**54.1%**
Entertainment (Game/Movie/Music/Radio)	5.8%	19.4%	27.1%	26.1%	20.3%	1.4%	46.3%
Reading books/magazine/articles	4.0%	22.7%	25.8%	28.7%	17.2%	1.7%	45.9%
Health and sports tracking	4.6%	22.1%	29.0%	27.7%	15.2%	1.4%	43.0%
Accessing professional websites/portals	4.4%	22.3%	31.9%	25.3%	14.5%	1.7%	39.8%
Accessing organisational learning program (incl. video, app)	5.2%	22.4%	36.9%	23.3%	10.7%	1.5%	34.0%
Video conference (meeting)	10.1%	24.2%	30.8%	21.5%	11.7%	1.7%	33.2%
Engaging in instant messaging	6.3%	35.1%	25.6%	16.8%	14.2%	2.1%	30.9%
Data Transfer (iDrop, Bluetooth transfer, etc)	7.8%	29.7%	31.4%	18.1%	11.7%	1.2%	29.9%
Accessing personal learning program (incl. video, app)	7.8%	25.5%	38.3%	18.8%	8.5%	1.2%	27.3%
Language translation	4.4%	28.7%	37.7%	18.1%	8.8%	2.3%	27.0%

Some differences regarding the top 11 frequent activities are found between the demographic groups. Examining these frequent activities in terms of gender (see Table 4.16) shows that gender plays a significant role in the amount and type of mobile usage in these organisations. Women were more frequent users of mobile devices for most of the top eleven activities except for reading news (male=65%, female=61%). This finding is contrary to the previous results in the literature that claim that women have lower mobile usage than men because they have higher levels of anxiety in using mobile technology (Goswami & Dutta, 2016). However, in the Chinese business context, at least in the present study, female respondents demonstrated a higher frequency of the top 11 mobile activities than males. Of particular note, women were engaged significantly more in time online shopping than men (male=40%, female=71%).

Previous studies in the West suggest that males and females were found to be equally using online shopping (Goswami & Dutta, 2016; Li, Glass, & Records, 2008), or that males engage more than females in online shopping and making online purchases (Aziz & Wahid, 2017; Hasan, 2010; Hernández, Jiménez, & José Martín, 2011; Lissitsa & Kol, 2016). Lim and Yazdanifard (2014) explain the reason for why males have more willingness to purchase online than females as being that "females are not secure and familiar with online purchasing. Males tend to have utilitarian motivation because they focus more on time saving and convenience which is a rational approach to purchase online" (p.8). However, similar research conducted in China tells a different story. Clemes et al. (2014) conducted an empirical analysis of online shopping adoption in China and found that Chinese female consumers are more likely to shop online, and indication that "female consumers are more influenced by their friends and family" (p. 372). The findings of the present study support Clemes et al.'s (2014) argument. It is evident, at least in the Chinese organisations in the present study, that females are more likely to shop online than males.

Table 4.16: Top 11 Frequent M-activities by Groups (Gender, Age, Job type)

	Gender		Age				Job Type	
Top Activities \ Frequency (Often+Very often) by	Male N=351	Female N=304	18-25 N=36	26-35 N=273	36-45 N=287	46+ N=58	Mgr N=316	Non-Mgr N=338
Looking at or posting to social media	81%	90%	89%	86%	86%	78%	85%	86%
Making phone calls	77%	77%	61%	79%	78%	79%	80%	75%
Mobile finance/banking	69%	78%	69%	74%	76%	55%	72%	74%
Checking time	61%	74%	81%	70%	64%	59%	64%	70%
Map, location and GPS	64%	70%	75%	69%	67%	52%	66%	67%
Use of a search engine	62%	71%	67%	70%	63%	64%	65%	67%
Taking pictures/video or recording audio	56%	74%	56%	61%	68%	69%	67%	63%
Reading news	65%	61%	53%	64%	64%	59%	65%	61%
Checking weather	54%	69%	64%	59%	62%	59%	61%	61%
Checking and replying to emails	54%	56%	36%	51%	61%	59%	67%	43%
Online shopping	40%	71%	50%	54%	56%	48%	50%	58%

An examination of these frequent activities in terms of age shows that younger respondents (18-25 years) are much lower users of mobile devices for making phone calls and checking/replying to emails (Table 4.16). This finding is similar to research on mobile device use in the West which has shown that younger users tend to focus on activities such as texting and social media applications for their communication needs (Andone et al., 2016) rather than making phone calls or replying to emails. Meanwhile, younger respondents demonstrate a higher frequency of using mobile devices for checking time and for map/location/GPS. The

prevalence of checking time and GPS/location through smartphones has changed young people's habits, as noted by Montgomery (2012), in that most adults in their early 30s or younger don't wear a watch on a regular basis, and in turn, such a habit makes smartphone use more pervasive (Oulasvirta, Rattenbury, Ma, & Raita, 2012).

Examining these frequent activities in terms of job role (managerial role and non-managerial role) (see Table 4.16), there was no significant difference discerned in most of the 11 activities; however, managerial respondents tended to check and reply to emails more than non-managerial respondents (mgr=67%, non-mgr=43%). This finding is likely to reflect the more formal communication responsibilities associated with the managerial role (Broome, Ko, & Rosander, 2016; Tenhiälä & Salvador, 2018).

Examining these frequent activities in terms of education background (see Table 4.17), it is noted that respondents with high school education (lower education level) were less frequent users of mobile devices for each of the top eleven activities except for checking time. This finding reflects the job nature of the employees with high school education: as operators in manufacturing plants, employees with high school education are discouraged from using mobile devices during work hours. Most likely, the limited access to mobile devices caused the lower frequency of conducting the top eleven mobile activities among the group with high school education. It is also noted that respondents with high school education and associate degree education didn't shop online as much as the groups with higher education. Besides the limited access to the mobile devices due to the nature of job (most employees with high school education and some of the employees with associate degrees are operators in manufacturing plants), this finding may also reflect the influence of income level on the intention of online shopping. It is understandable that, in China, people with higher education are more likely to be earning more income than people with lower education (Luo & Zhu, 2008), and thus the higher income gives more confidence in online shopping (Hernández et al., 2011).

Table 4.17: Top 11 Frequent M-activities by Groups (Education Level)

Top Activities \ Frequency (Often+Very often) by	High School N=17	Associate N=131	Bachelor N=395	Master N=110	Doctoral N=4[15]
Looking at or posting to social media	59%	82%	87%	90%	--
Making phone calls	65%	80%	78%	75%	--
Mobile finance/banking	47%	76%	72%	77%	--
Checking time	71%	66%	65%	76%	--
Map, location and GPS	47%	65%	68%	69%	--
Use of a search engine	35%	64%	66%	74%	--
Taking pictures/video or recording audio	59%	62%	64%	71%	--
Reading news	53%	64%	61%	69%	--
Checking weather	59%	63%	60%	61%	--
Checking and replying to emails	35%	54%	55%	59%	--
Online shopping	24%	44%	58%	58%	--

Examining these frequent activities in terms of job function (see Table 4.18), it is found that respondents who are working in the logistics function were more frequently engaged in most of the mobile activities than respondents from other functions; while, by contrast, respondents from the manufacturing function demonstrated less frequency in engaging in most of the mobile activities than those in other functions. Meanwhile, respondents from the sales/marketing function were found to have the highest frequency of checking and replying to emails, respondents working in engineering function had the most frequency of online shopping, HR/admin employees were more frequent using search engines, and IT/communication people were more frequently checking the time through mobile devices. These differences among the job functions may reflect the nature of these jobs. For example, employees who work in the manufacturing function usually have less access to mobile devices according to the regulation of "no mobile phone in working hours"; while, by contrast, people working in the logistics function are encouraged to frequently check the information on weather, location and relevant business news, and to communicate with vendors, through their mobile devices. Meanwhile, the jobs of the sales/marketing function often involve intensive business travel, which increases the frequency of using mobile devices for checking and replying to emails. However, it is not clear why HR/admin employees are engaging more in using mobile search engines and why IT/communication people were more frequently checking the time through mobile devices. Therefore, although the nature of the job may influence the frequency of engaging in some mobile activities, it is too early to conclude that

[15] The norm of respondents with Doctoral degree is too small (n=4) to generate a valid report.

job function is a moderator of mobile usage, at least not to all the activities or not by every job function. By reviewing the relevant literature, it is found that there has been no clear conclusion made as to why job function would influence mobile device usage and the behaviour of mobile device usage.

Table 4.18: Top 11 Frequent M-activities by Groups (Job Function)

Top Activities \ Frequency (Often+Very often) by	Sales/Mkt N=220	Eng N=36	IT/Com N=50	HR/Adm N=83	Manufa N=38	Log N=32	R&D N=28	Opt N=108
Looking at or posting to social media	82%	69%	90%	94%	76%	94%	82%	88%
Making phone calls	81%	83%	64%	63%	71%	78%	75%	85%
Mobile finance/banking	73%	78%	69%	69%	68%	81%	68%	68%
Checking time	62%	64%	81%	70%	71%	72%	68%	68%
Map, location and GPS	67%	53%	75%	64%	50%	81%	64%	64%
Use of a search engine	63%	53%	67%	73%	53%	63%	64%	64%
Taking pictures/video or recording audio	55%	67%	56%	66%	63%	66%	54%	54%
Reading news	63%	58%	53%	58%	71%	81%	54%	54%
Checking weather	57%	56%	64%	58%	50%	72%	57%	57%
Checking and replying to emails	62%	50%	36%	46%	47%	53%	43%	43%
Online shopping	47%	71%	44%	65%	32%	66%	36%	36%

4.4 Perception about M-learning

Part III of the questionnaire focuses on the respondents' perceptions of m-learning, and aims to answer *Research Question 2 "What are the employees' perceptions of m-learning in the Chinese business context? (Employees' acceptance of and attitudes toward using mobile devices for learning)"*. Four aspects of respondents' perceptions related to m-learning are discussed in the following, Sections 4.4.1-4.4.4: "the use of m-learning", "learning preference", "attitudes towards m-learning" and "perceived important aspects of m-learning".

4.4.1 The use of m-learning

Respondents were asked about their use of mobile devices for learning activities, referred to as 'm-learning'. As shown in Table 4.15, 34% of the respondents reported accessing organisational m-learning programs via mobile devices "often" or "very often", while 5.2% of the respondents never used mobile devices to access organisational m-learning programs. In addition, 27.3% of the respondents reported accessing self-arranged m-learning courses/activities "often" or "very often", while only 7.8% respondents never did.

Although the respondents' figures relating to "often" and "very often" in using organisational and personal m-learning sites are comparably low in the list of activities used on mobile devices, the actual use of mobile devices in learning activities is likely to be much higher. This is because learning and educational use of mobile devices is likely to be reflected in a range of activities associated with less formally defined learning programs. As noted by previous studies in the literature, many informal learning activities through mobile devices have been overlooked and underestimated (He & Zhu, 2017; Jiang, Sumintono, Perera, Harris, & Jones, 2017; Sampson, 2014). For example, using a search engine to look up information or to clarify the meaning of a word could be considered a form of informal learning. According to Noe et al. (2013), informal learning accounts for up to seventy-five percent of learning that occurs within organizations. At workplaces, information seeking and information sharing through mobile devices are presented as important, complementary components in the shift along the formal to informal learning continuum (Mills, Knezek, & Khaddage, 2014). However, with the rapid development of mobile technology and social media, it is difficult to distinguish whether the provision of digital learning resources is formal or informal (He & Zhu, 2017). While recognising that the survey data are likely to underrepresent the respondents' engagement with m-learning, in the survey data analysis below, only organisational and personal learning programs are discussed.

Analyses of the use of personal and organisational m-learning programs in terms of gender, age, education background, job function and job type were conducted. Gender was found to impact m-learning use, in that female respondents reported significantly more often using organisational m-learning programs *(p=.01; F=6.763, t=-2.287) (Table 4.19, Appendix J)*, while there is no significant difference between the gender groups relating to accessing personal m-learning programs *(p=.55; F=.358; t=-2.881)(Appendix K)*. In Chinese society, a traditional belief is that men occupy the "breadwinner" role and that women have the housekeeper role (Cooke & Xiao, 2014; Foley, Ngo, Loi, & Zheng, 2015; Zuo & Bian, 2001), and this traditional belief has resurfaced since the transitioning from a state-planned to the market-oriented economy. As Cooke and Xiao (2014) argue, the rapid development of the Chinese economy has brought new opportunities for women, on the one hand, but also created space for "the resurgence of traditional Chinese cultural values that were suppressed through strong state intervention during the state-planned period as part of the construction of an egalitarian socialist China" (Cooke & Xiao, 2014). Therefore, for many female employees, m-

learning, especially formal m-learning programs may support their effort to rise above the biases against their involvement in the workplace (Wallis, 2015).

In addition, significant difference was found between the education level groups in accessing organisational m-learning programs: *F(4, 660)=2.853, p=.023 (Table 4.20, Appendix J)*. Respondents with associate degrees reported more often visiting organisational m-learning programs than other educational background groups; however, there was no significant difference between the education level groups related to accessing personal m-learning programs: *F(4, 664)=1.336, p=.24 (Appendix K).* This finding may reflect a concern to remain competitive in the emerging and highly dynamic Chinese labour market (Knight & Yueh, 2008; Takeuchi, Chen, & Lam, 2009). Although the need to maintain skill and knowledge relevance is characteristic of all societies, the Confucian value of "respect for education and scholars" places additional pressure on Chinese employees to enhance their educational qualifications and knowledge. However, employees with lower educational background in China are mostly engaged in operational and non-managerial jobs, where they have less opportunities to attend formal educational courses which are usually costly for them. Consequently, employees with lower educational background may be more motivated to take advantage of the educational opportunities provided by m-learning.

Independent sample T-test was carried out to investigate the difference between the job type groups: managerial group and non-managerial group. According to the T-test results, there is no statistically significant difference between the job type groups in accessing neither organisational m-learning activities *(p=.181)* nor personal m-learning activities *(p=.152)* (Table 4.21).

Using ANOVA to analyse the use of m-learning programs by job function shows that there are significant differences between the groups: *F(8,656)=4.598, p<.001.* People who work in Operations, and in Sales/Marketing, reported more often accessing organisational m-learning programs than did those in other job functions. *(Table 4.22, Appendix L)*. Post Hoc analysis with Tukey HSD and Bonferroni Correction shows that significant differences occurred between the HR/Fin/Admin/Training and Sales/Marketing respondents and between HR/Fin/Admin/Training and Operation respondents *(p=.043 in Bonferroni adjustment)*. Previous studies have found that the informal knowledge exchange through mobile technology and social media in China lubricates the *guanxi* (social networks and personal relations) in social networks (Davison et al., 2018; Hao et al., 2017). These differences between the job function groups may reflect the fact that, compared with HQ-based employees (typically, employees

who work in HR/Fin/Admin/Training functions), mobile workers and remote workers (typically, employees work in Sale/Marketing and Operation functions) tend to spend more time on company-organised m-learning activities to maintain and enhance their relationship with HQ colleagues. This is because the distance impacts the effectiveness of networking between the remote/mobile workers and the HQ, and those distance-based workers are more likely to emphasise building and maintaining ties with their colleagues at HQ to enhance their network with HQ (Clegg, Wang, & Berrell, 2007; Taggart, 1999). Given that the m-learning activities through social media provide intensive opportunities to build and maintain networks with other learners in different locations, remote/mobile workers are more likely to take advantage of m-learning activities for the benefit of guanxi. As Davison et al. (2018) assert, "when employees can leverage social media for informal knowledge exchange in their guanxi network in order to get work done, the *guanxi* itself will also benefit from the act of using it, as this is also the act of maintaining and enhancing it" (p.231). ANOVA testing shows that respondents in these two functions (Sales/Marketing and Operation) were also accessing personal m-learning resources more than those in other job functions: $F(8, 664), p=.016$ *(Table 4.22, Appendix M)*. However, the multiple comparisons through Post Hoc Tests didn't show any statistical difference between these groups.

Table 4.19: Frequency[16] of accessing m-learning programs by Gender

Gender group	N	Organisational Programs		Personal arranged programs	
		Mean (Level)	SD	Mean (Level)	SD
Male	357	3.02	1.00	2.83	1.03
Female	308	3.20	1.08	3.06	1.04

Table 4.20: Frequency of accessing m-learning activities by Education Level

Educational level groups	N	Organisational Programs		Personal arranged programs	
		Mean	SD	Mean	SD
High School	17	2.53	1.07	2.41	.939
Associate Degree	134	3.28	1.01	3.03	1.07
Bachelor's Degree	401	3.10	1.05	2.91	1.05
Master's Degree	109	3.00	.991	2.84	1.01
PhD	4	2.50	1.29	3.00	.816
Total	665	3.10	1.04	2.91	1.04

[16] Frequency level: 1-Never, 2-Seldom, 3-Sometimes, 4-Often, 5-Very Often.

Table 4.21: Frequency of accessing m-learning activities by Job Type

Job Type group	N	Organisational Programs		Personal arranged programs	
		Mean	SD	Mean	SD
Non-managerial	343	3.03	1.05	2.92	1.04
Managerial	322	3.16	1.09	2.90	1.20

Table 4.22: Frequency of accessing m-learning activities by Job Function

Job Function	N	Organisational Programs		Personal Arranged Programs	
		Mean	SD	Mean	SD
Sale and Marketing	222	3.27	1.07	3.07	1.09
Manufacture	39	2.74	1.09	2.56	1.05
HR/Fin/Admin/Training	84	2.83	.955	2.74	.995
Operation	110	3.38	1.08	3.03	1.04
Engineering	37	2.73	.962	2.57	.929
IT/Communication	52	2.87	1.01	3.12	1.02
R&D	28	2.75	.799	2.93	.858
Logistics/Purchasing	32	3.25	.916	2.88	1.07
Others	61	3.10	.926	2.92	.988
Total	665	3.10	1.04	2.94	1.04

4.4.2 Attitudes towards m-learning.

Table 4.23 presents respondents' perceptions on seven statements in the survey concerning their attitude to m-learning. As Table 4.23 demonstrates, all seven statements received more than 50% ratings of "Agree" or "Strongly Agree", indicating that the survey respondents have very positive perceptions about m-learning. The majority of respondents (78.2%) agree that they would like to use mobile devices for learning, 74.5% of respondents agree that m-learning can enhance learning efficiency, 64.2% of respondents agree that m-learning enhances their learning interest, 67% of respondents are satisfied with the learning effectiveness/results of m-learning, and 65.3% of respondents agree that m-learning can support their career development. It is noteworthy that 82% of the respondents believe that m-learning is most likely to be the mainstream learning method in the future. According to previous studies in the literature, learning expectancy, effort expectancy, ease of use and satisfaction are predictors of users' intentions to use m-learning (Davis, 1989; Venkatesh & Davis, 2000). Therefore, this finding

of positive attitude towards m-learning is likely to indicate significantly high intention to use m-learning in the Chinese business environment. Together with the high penetration and heavy usage of mobile devices in China identified in Section 4.3, the very positive attitudes towards m-learning among the participants illustrates the great potential of the use of mobile devices for organisational learning in Chinese business settings.

Table 4.23: Attitudes towards m-learning

Statement \ Attitude	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	(No resp.)	Positive attitude (Agree + Strongly Agree)
Mobile device can enhance my learning efficiency	1.4%	3.2%	21.6%	47.4%	27.1%	0.6%	74.5%
Mobile device can enhance my learning interest	2.3%	4.7%	29.4%	43.0%	21.2%	0.8%	64.2%
I am satisfied with the results and effectiveness of mobile learning	1.2%	4.3%	28.2%	46.3%	20.7%	0.6%	67.1%
Mobile learning can help my career development	0.9%	4.3%	29.9%	45.0%	20.3%	0.6%	65.2%
I can use mobile device with great ease	0.8%	1.4%	12.0%	50.5%	35.5%	1.2%	86.0%
M-learning is most likely to be a mainstream learning method in the future	0.6%	2.7%	15.4%	45.9%	36.1%	0.6%	82.0%
In general, I like using mobile devices to learn	1.2%	4.0%	17.2%	49.1%	29.1%	0.8%	78.2%

4.4.3 Important aspects (affordance) of m-learning.

Table 4.24 displays the level of importance perceived by the respondents for 17 important aspects (affordances) of m-learning developed from examination of the extant literature (see Section 2.3 and Section 3.7, Chapters 2 and 3, respectively). Respondents were also given the opportunity to add additional items to the list in responding to the survey, but there were no further important aspects of m-learning suggested. Thus, these 17 aspects appear to capture the full range of m-learning affordances as perceived by respondents.

In the first column of Table 4.24, the total percentage of respondents who rated each important aspect (affordance) as “important” or “very important” is presented in order. As can be seen, the percentage of respondents rating items as “important” or “very important” was very high for each of the important aspects (affordances), ranging from 40.5% to 86.9%. For 7 items, more than 80% of respondents rated them as “important” or “very important”, and only for one item did the rating fall below 50% (“Location awareness and GPS”). Given that the extant literature is primarily based on Western research, these ratings highlight the similarity of perceptions about the affordances of m-learning by these Chinese employees with Western views. However, in the previous research conducted in the West, there is no research based on

empirical studies to demonstrate preference or the order of importance of the m-learning affordances. Therefore, in the discussion below, the ranking of the importance of m-learning affordances derived from the survey data is discussed in detail to identify the factors of influencing the intention on the affordances of m-learning. Firstly, the seven top ranking important aspects (rated by more than 80% of the respondents) and their corresponding affordances are discussed in detail to explore the potential influencing factors. Secondly, the 17 important aspects (affordances) are reviewed and compared at a broader level of abstraction as the central themes of affordances. Thirdly, the ranking of these central themes is further reviewed and compared across demographic sub-groups.

Table 4.24: The importance of the aspects (affordances) of m-learning

Important + Very Important	Important Aspects	Corresponding Affordances	Central Theme of the Affordance
86.9%	Allows autonomy in choosing learning environments (learn anytime and anywhere)	**Portability/Mobility/Usability**	**Autonomy**
85.8%	Information can be updated easily to reflect environment changes	**Context and Situated**	**Real-world Relevance**
85.4%	Learning can be timely (can look up information when needed)	**Connectivity**	**Real-world Relevance**
82.6%	Allows a person to learn in their own way	**Individuality**	**Autonomy**
82.3%	Learning can be more realistic/relevant and practical	**Authenticity**	**Real-world Relevance**
80.3%	Reduce training/learning cost	**Cost**	**Autonomy**
80.0%	Allows autonomy in choosing learning content	**Content**	**Autonomy**
78.0%	Can use targeted and customized Learning Apps.	**Personalisation**	**Autonomy**
77.0%	Allows access to audio-visual support of learning	**Audio-visual**	**Autonomy**
75.2%	M-learning allows ongoing sharing and communication	**Communication**	**Collaboration and Social Networking**
70.4%	Monitoring and keeping track of learning progress	**Control /Administrative Support**	**Autonomy**
68.4%	Allows interaction with trainers and other learners	**Collaboration and Interactivity**	**Collaboration and Social Networking**
68.4%	Allows multi-task learning (or learning while doing something else)	**Blending**	**Autonomy**
66.8%	Allows you to build and maintain organisational /social networking which is linked to your learning	**Social network**	**Collaboration and Social Networking**
62.3%	Allows publishing and sharing of progress and insights among a group of people	**Personal Publish and Sharing**	**Collaboration and Social Networking**
51.9%	Helps overcome shyness in face-to-face training	**Communication**	**Collaboration and Social Networking**
40.5%	Location awareness and GPS	**Location Awareness and GPS**	**Real-world Relevance**

As shown in Table 4.24 the most highly rated important aspect of m-learning is related to "autonomy in choosing learning environments" (86.9%), which reflects a mobile learner's freedom to select where, when and how to learn (Berge & Muilenburg, 2013; Brown & Mbati, 2015; Kululska-Hulme & Traxler, 2005). As discussed previously in Chapter 2, Section 2.3

and Chapter 3, Section 3.7, this important aspect of m-learning stands for the affordance of "Portability/Mobility/Usability" of m-learning under the central theme of "Autonomy" (see details in Section 3.7). As Ozdamli and Cavus (2011) argue, m-learning is more mobile and spontaneous than other learning types (Ozdamli & Cavus, 2011). Given the context of the Chinese working environment, where employees are more mobilised while requiring more spontaneous responses to the rapidly changing world (Elkin, Cone, & Liao, 2009), it is not surprising that "Mobility/portability/usability" is perceived as the most important affordance of m-learning, and it is probably the most defining characteristic of m-learning in the Chinese business context.

Another feature of m-learning highly rated by respondents (85.8%) is that "information can be updated easily to reflect environment changes". In other words, information accessed through mobile devices for learning can be renewed effectively according to different situations and contexts (Berge & Muilenburg, 2013; Cochrane, 2011; Mahande et al., 2017). This important aspect of m-learning stands for the affordance of "Context and Situated" of m-learning under the central theme of "Real-world Relevance" (see Section 3.7). As the biggest emerging economy in the world, the Chinese business environment requires its organisations to more efficiently connect with the rapidly changing and competitive market; and therefore, to quickly adapt to such challenges and changes (Elkin et al., 2009), it is understandable that high connectivity is considered as the second most important characteristic of m-learning by employees in these Chinese organisations.

The third most important aspect of m-learning perceived by respondents is that "learning can be timely (can look up information when needed)". With well-developed mobile and wireless technology, learners are able to easily access learning material regardless of time and location, so that learning can occur "anytime anywhere" (Kululska-Hulme & Traxler, 2005). This important aspect of m-learning stands within the affordance of "Connectivity" under the central theme of "Real-world Relevance" (see Section 3.7). Using a mobile device is often about immediacy (Eteokleous & Ktoridou, 2009; Cavus & Ibrahim, 2009). This preference is perhaps even more evident when it comes to a high-pace emerging market such as China, the need for quick answers to specific questions through fast learning is prominent in the workplace (Cohen, 2010). The highly perceived importance of "Connectivity" reflects the requirement of fast access to online information to deal with the emerging issues in these Chinese organisations.

Another aspect of m-learning rated highly according to the respondents is that it "allows a person to learn in their own way", which emphasises the freedom to learn. This aspect stresses

the capacity of m-learning to adapt to individual learning styles. Through the ongoing use of mobile devices, the learner builds and develops his/her own approach to educational activities (Naismith et al., 2004). This important aspect of m-learning stands within the affordance of "Individuality" of m-learning under the central theme of "Autonomy" (see section 3.7). This finding confirms the finding in the previous studies in the literature related to the approach of personalisation and learner-centeredness in the trend of organisational learning and m-learning (Garavan, Carbery, & Rock, 2012; Mehdiabadi & Li, 2016; Sharples et al., 2005). Just as organisational learning is shifting from being company-centred to learner-centred, a learning activity in an organisation, including m-learning, "is being re-conceived as a personalised and learner-centred activity" (Sharples et al., 2005).

Ranked as the fifth most important aspect of m-learning is that "learning can be more realistic/relevant and practical", which means that the m-learning task has actual, real-world relevance and can help tackle real-world problems. This important aspect of m-learning stands within the affordance of "Authenticity" of m-learning under the central theme of "Real-world Relevance" (see section 3.7). While all the organisations focus on business goals, and all the organisational learnings are aiming to solve real-world problems (Anlesinya, 2018), the Chinese organisations are required to have more efficient adaptation to the rapidly changing and competitive market conditions. The perceived importance of "Authenticity" reflects the utilitarian and pragmatic orientation in Chinese organisations, reflected in looking for what works, what benefits, or how to absorb complexity and develop continuous innovation to meet rapidly changing market conditions (Elkin et al., 2009; Redding, 1990; Shen & Williams, 2016).

The aspect, to "save training/learning cost", was also considered by respondents as an important feature of m-learning. The implementation of m-learning can comparably reduce the heavy training costs for organisations and learners (Adkins, 2015; ADL, 2017; Ally, 2009). The lower cost of m-learning broadens access to and choice of learning activities, which enhances personal control. As is typical of emerging economies, Chinese consumers are highly sensitive to price (Zhu, 2013) and are attracted to the capacity of m-learning to provide education at a fraction of the cost of formal education programs (Imtinan, Chang, & Issa, 2013). This important aspect of m-learning stands within the affordance of "Cost" of m-learning under the central theme of "Autonomy" (see Section 3.7).

Another essential aspect of m-learning, rated by more than 80% of respondents, is that it "allows autonomy in choosing learning content". This affordance highlights that the content of m-learning is linked to the individual's needs/choices and suitability for m-learning (e.g. screen

size and fragmented learning). This important aspect of m-learning stands within the affordance of "Content" of m-learning under the central theme of "Autonomy" (see Section 3.7). Unlike traditional learning programs where learners learn material determined by the lecturer or content developer, m-learning allows individuals to pick and choose content based on their specific needs and preferences. Given that the educational system in China was highly centralized and didn't provide autonomy or allow students in choosing learning context, time, space, and location (Halstead & Zhu, 2009; Hua, Harris, & Ollin, 2011; Littlewood, 1999; Xia, Gao, & Shen, 2017), this preference for autonomy in the learning content may be a re-balancing after a long history of centralised education in the Chinese formal education system.

In these discussions above, the seven most important aspects of m-learning and their corresponding affordances of m-learning, based on an exploration of the literature, have been discussed in terms of their nature and contribution to understanding employees' perceptions, within these four Chinese organisations, about m-learning. An important insight about m-learning is that the ranking of the importance of these affordances explores the intent of these affordances that influence learners' intention of using mobile devices for learning in a Chinese business setting. Based on the ranking of the top seven important affordances, it is noted that the Chinese business environment as an emerging market, in terms of the high-pace working environment, rapidly changing and competitive business conditions, and the pressure of fast learning and development, has a strong influence on the intention of adopting mobile devices for learning.

To further review and compare the importance of the 17 aspects of m-learning at a broader level of abstraction, these aspects and affordances were grouped into the three central themes: "Autonomy", "Real-world Relevance" and "Collaboration and Social Networking" (see Section 2.3 and Section 3.7, Chapters 2 and 3, respectively, for the details on categorisation regarding the central themes of affordance). According to the percentage of responses of "important" or "very important" of the statements under each central theme of affordances, the average weight of the importance of each central theme is calculated and presented in Table 4.25.

Table 4.25: The importance of the affordance of M-learning by central themes

Important Aspects of M-learning	Corresponding affordance	Average importance*	Central Themes
Allows autonomy in choosing learning environments	Portability/Mobility/Usability	78%	**Autonomy** The freedom and the capacity of the learner to exert power and ownership over their learning preference and experience.
Allows a person to learn in their own way	Individuality		
Allows autonomy in choosing learning content	Content		
Can use targeted and customized Learning Apps	Personalisation		
Allows access to audio-visual support of learning	Audio-visual		
Monitoring and keeping track of learning progress	Control /Administrative Support		
Reduce training/learning cost	Cost		
Allows multi-task learning (or learning while doing something else)	Blending		
Information can be updated easily to reflect environment changes	Context and Situated	74%	**Real-world Relevance** The learning activities have actual, real-time and real-world relevance, which can help learners achieve their goals in the real situation.
Learning can be timely (can look up information when needed)	Connectivity		
Location awareness and GPS	Location Awareness and GPS		
Learning can be more realistic/relevant and practical	Authenticity		
M-learning allows ongoing sharing and communication	Communication	65%	**Collaboration and Networking** Connecting and interacting with a variety of people, sharing ideas, information and experience.
Allows interaction with trainers and other learners	Collaboration and Interactivity		
Allows you to build and maintain organisational / social networking	Social network		
Allows publishing and sharing of progress and insights among a group of people	Personal Publish and Sharing		
Helps overcome shyness in face-to-face training	Communication		

*The average percentage of respondents who rated the respective aspects as important or very important

In general, respondents perceive the central theme of "Autonomy" as the most important theme of m-learning, followed by "Real-world Relevance" and then "Collaboration & Networking". This finding confirms findings in previous studies in the literature related to the approach of personalisation and learner-centredness in the trend of organisational learning and m-learning (Garavan et al., 2012; Mehdiabadi & Li, 2016; Sharples et al., 2005). Just as organisational learning is shifting from being company-centred to learner-centred, a learning activity in an organisation, including m-learning, "is being re-conceived as a personalised and learner-centred activity" (Sharples et al., 2005). The perception of importance related to each of these themes also reflects Mujtaba et. al.'s (2013) finding that Chinese employees are highly focused on their relationships, while also being highly oriented toward completing their tasks. Similarly, the present research stresses the task nature of real-world relevance and the emphasis on social relations. However, Mujtaba et al. (2013) found that Chinese employees gave greater importance to relationships than tasks; whilst in the present study, tasks (real-world relevance) are perceived as more important than social relationships in terms of collaboration and networking. This may imply that, although it is undeniable that social relationships are still

important for achieving business success in China due to the high-context culture and deep-rooted Confucian values, with the increasing influence from Western management practice under globalisation (Ahlstrom, Bruton, & Chan, 2001; Li & Nesbit, 2013), Chinese employees tend to be more task- and result-oriented. However, given the collectivist value of the Chinese culture (Wang & Chen, 2010), it may have been expected that the Collaboration & Networking aspect of m-learning would be the most important of the three themes. One reason for the finding in the present study may be that the respondents in this study are employees, and this finding probably reflects the organisational learning focus of these employees. In other words, these learners are likely to be concerned with the application of their learning to their careers and work demands.

The ranking of these themes of affordances is consistent across demographic sub-groups. As Table 4.26 shows, respondents across all demographic perceive the central theme of "Autonomy" as the most important theme of m-learning, followed by "Real-world Relevance" and "Collaboration & Networking". This order of importance reveals the orientations of personalization focus, result/task focus, and relationship focus, in conducting m-learning activities in a Chinese business setting. Although relationship and social networking is still considered vitally important towards career and business success in the Chinese business environment, it is not perceived as more important than personalization and the relevance of result/task in m-learning.

Table 4.26: Average Importance of central themes by demographic groups

Distribution Percentage of total Importance	Overall	Male	Female	Age 18-25	Age 26-35	Age 36-45	Age 46+
Autonomy	78%	74%	81%	72%	77%	78%	77%
Real-world Relevance	74%	70%	76%	69%	74%	72%	72%
Collaboration and Networking	65%	65%	64%	66%	67%	63%	59%

Distribution Percentage of total Importance	High School	Associate Degree	Bachelor	Master's	Doctoral	Managerial	Non-managerial
Autonomy	61%	83%	76%	77%	--	77%	77%
Real-world Relevance	67%	81%	72%	70%	--	73%	72%
Collaboration and Networking	58%	71%	63%	62%	--	64%	64%

To sum up the above discussion, the present study finds that the 17 affordances of m-learning drawn from analysis of the literature on the West also apply to the mobile learners in these Chinese organisations. Based on the ranking of the top seven important affordances, it is noted

that the Chinese business environment as an emerging market, in terms of the high-pace working environment, rapidly changing and competitive business conditions, and the pressure of fast learning and development, has a strong influence on the intention of adopting mobile devices for learning. The ranking of these central themes shows that "Autonomy" is perceived as the most important attribute comparably, "Real-world Relevance" as the second, and "Collaboration and Networking" as the third; which reveals the orientations of personalization focus, result/task focus, and relationship focus, in conducting m-learning activities in a Chinese business setting. Although relationship and social networking is still considered vitally important towards career and business success in the Chinese business environment, it is not perceived as more important than personalization and the relevance of result/task in m-learning as previous Western researchers have expected.

4.4.4 Preferred Methods for Organisational Learning

In addition to exploring perceptions on the importance of m-learning affordances, this research explored respondents' perceptions about the relevance of m-learning to different types of learning content. According to a report by UI China[17], one of the biggest consulting firms in China specialising in training and education (UI, 2017), there are six types of learning programs typically associated with organisational learning: "Leadership & Managerial", "Job related knowledge and skills", "Soft Skills (inter-personal skills, language etc.)", "IT Skills", "Product/Industry information", and "Compliance (Regulations) related" learning programs/courses. In addition to the use of m-learning, UI China has identified four other training methods: "Classroom face-to-face based", "Computer based", "Mobile device based", and "On-the-job based" learning. To explore the value of m-learning in comparison with these other learning methods, respondents in the present study were asked about their preferred learning methods for each of these six learning topics (see question 11 of the survey). Respondents could nominate more than one learning method for each of the topics.

Table 4.27 displays the respondents' preferences of organisational learning methods for different learning topics. M-learning is well regarded by respondents as a training method for

[17] UI (Universal Ideas) is one of the biggest consulting firms in China specialising in the training and education industry. Since 1998, UI has been the creator and publisher of the "Training Services in China Directory" with more than 80,000 copies in circulation among China's procurement decision makers for training (www.uichina.com).

each of these training activities. Preference for m-learning is rated the highest or equal highest learning method for four of the six training topics. These results highlight the acceptance of m-learning, as well as the perception that it can be used for a variety of types of organisational training.

For leadership and management training, m-learning was the second highest training method preferred by respondents (46.4%), but was much lower than classroom delivery (62.3%). While there may be pedagogical reasons for the preference for face-to-face learning for managerial and leadership training, previous research has highlighted the inherent social networking advantages of face-to-face learning. In China, social networking has been identified as a very important factor in the pursuit of managerial and leadership training, such as in MBA programs (Huang & Jao, 2015; Zhang & Nesbit, 2018). The activities and the processes of developing leadership and management skills, within or between Chinese organisations, are considered an integral part of developing a broader relationship network for both the organisations and individual's business success (Gibb & Zhang, 2016; Warner, 2016; Xiao, 1996).

For learning of job-related knowledge and skills, m-learning was perceived as the equal highest training method with on-the-job training (52.1%). However, it is interesting to note that all training methods were highly regarded, reflecting the variety of skills and knowledge inherent in most jobs and therefore the applicability of a variety of learning methods.

For Soft Skills training (interpersonal skills, language, etc.), m-learning had the highest-level preference among the learning methods (55.8%), followed by classroom training (51.2%). The wide application and adoptability of combining m-learning with classroom training method in soft skills learning, especially with the audio-visual feature for language or interpersonal training, has increased the acceptance of implementing m-learning in soft skill training activities.

M-learning had the highest-level preference among the learning methods (51.1%) for IT Skills, followed by computer training (50.9%). With the increased need for IT skill among the corporate employees, a large range of IT-know-how training (for example, email setting, software download guide) can be easily delivered through mobile devices and is well accepted by the respondents.

M-learning had the absolute highest-level preference among the learning methods (62.8%) for Product/Industry information training. In a high-pace emerging market such as China,

Product/Industry information needs to be updated regularly, and it is understandable that these updates can be done efficiently through m-learning with its great accessibility and timeliness.

Given the cost advantage of m-learning, for most of these organisational learning programs/courses – Product/Industry information learning (preferred by 62.8% participants), Compliance/regulations related learning (60.4% participants), Soft Skills learning (55.8% participants) and Job-related knowledges/skills learning (52.1% participants) – the general learning cost would be reduced significantly if they were conducted through m-learning. This finding indicates that there is a huge potential for a more widespread adoption of m-learning for organisational learning activities in China. However, classroom training is perceived by 62.3% participants as the best training delivery method for leadership and managerial learnings, which supports previous research in the relevant literature regarding the inherent social networking advantages of adopting a face-to-face learning approach in China. Indeed, social networking has been identified as a very important factor in pursuit of managerial and leadership training in Chinese business context (Huang & Jao, 2015; Zhang & Nesbit, 2018).

Table 4.27: Preference for organisational learning method by training topic

Training Topics	Learning Methods					(No resp.)
	Classroom	Computer based	M-learning	On the Job	NA	
Leadership & Managerial	62.3%	37.4%	46.4%	43.9%	3.3%	1.2%
Job related knowledge and skills	46.0%	44.7%	52.1%	52.1%	4.4%	1.5%
Soft Skills (interpersonal skills, language, etc.)	51.2%	39.0%	55.8%	38.7%	4.3%	1.2%
IT Skills	36.0%	50.9%	51.1%	31.3%	3.4%	2.6%
Product/Industry information	40.1%	48.3%	62.8%	35.4%	4.3%	1.7%
Compliance (Regulations) related	32.9%	49.7%	60.4%	26.8%	2.7%	1.7%

4.5 Chapter Summary

This chapter presented the quantitative findings generated by the analysis of the survey data examining the characteristics associated with m-learning, and the important aspects of m-learning as perceived by respondents working in Chinese organisations. Firstly, the quantitative results illustrate the high penetration and heavy usage of mobile devices among the respondents. On average, respondents have 2-3 mobile devices and spend 4.95 hours on mobile devices per day, which includes informal learning and formal m-learning activities; which indicates that using mobile devices for learning has become ubiquitous among the participants and in these

sample organisations. It is found that female respondents and employees working in the Logistics/Purchasing function and IT/Communication function spend more time on mobile devices. It is not clear why gender influences mobile device use in these organisations, and the literature reports mixed findings; while the heavier usage in Logistics/Purchasing and IT/Communication functions may reflect the nature of these jobs, which typically require more intensive communication with their key stakeholders.

Secondly, the results of quantitative analysis confirm that the 21 frequent activities drawn from Western literature are also conducted by users through mobile devices in these Chinese organisations. There are 11 activities found to be highly frequent where more than 50% of responses were rated as "Often" and "Very Often". By reviewing and comparing these 11 most frequent mobile activities, it was noted that these activities were focused on areas of communication, entertainment, acquiring information, and e-commerce. This finding reflects some similarities with previous research conducted on the Western context that mobile device users were focused on activities related to communication, entertainment, acquiring information, and e-commerce.

Thirdly, the results of quantitative study also explore the perception of m-learning among the respondents. The acceptance of using mobile devices for learning is identified, with 34% of the respondents reporting accessing organisational m-learning programs via mobile devices "often" or "very often", while only 5.2% of the respondents indicated that they never used mobile devices to access organisational m-learning programs, 27.3% of the respondents reported accessing self-arranged m-learning courses/activities "often" or "very often", while only 7.8% of respondents said they never did so. Positive attitudes towards m-learning were also found, with 78.2% of respondents claiming that they would like to use mobile devices for future learning, 74.5% respondents agreeing that m-learning can enhance learning efficiency, and 92% of the respondents believing that m-learning is most likely to be the mainstream learning method in the future. Results also suggest demographic differences in using mobile devices, in gender, educational background and job function groups. Such differences reflect that: for female employees, m-learning may support their effort to rise above the biases against their involvement in the workplace; for employees with lower educational background, m-learning may help them to increase their employability and competitiveness; and for the employees working in Sale/Marketing and Operation functions (who are mobile workers and

remote workers), m-learning activities may help them to maintain and enhance their relationship with HQ colleagues.

Thirdly, the present study found that the 17 affordances of m-learning drawn from analysis of the literature on the West also apply to the mobile learners in these Chinese organisations. Based on the ranking of the top seven important affordances, it is noted that the Chinese business environment as an emerging market, in terms of the high-pace working environment, rapidly changing and competitive business conditions, and the pressure of fast learning and development, has a strong influence on the intention of adopting mobile devices for learning. The ranking of these central themes shows that "Autonomy" is perceived as the most important attribute comparably, with "Real-world Relevance" second, and "Collaboration and Networking" third; which reveals the orientations of personalization focus, result/task focus, and relationship focus, in conducting m-learning activities in a Chinese business setting. Although relationship and social networking is still considered vitally important towards career and business success in the Chinese business environment, it is not perceived as more important than personalization and the relevance of result/task in m-learning as previous Western researchers have expected.

Finally, data analysis also reveals that m-learning was the most preferred method of learning in these organisations; however, classroom training was still perceived as the best training delivery method for leadership and managerial learnings. It is noted that, for Chinese managers, career development and acquiring social capital (social network) through face-to-face classroom activities could be critical for business success in the Chinese business environment.

The following chapter provides analysis of qualitative data captured in semi-structured interviews during the second phase of the study, in order to provide greater detail on the general tendency and overall description of m-learning characteristics identified from the quantitative analysis results. The combination of quantitative and qualitative data analyses seeks to answer the research questions and contribute to developing a framework/model of m-learning within a Chinese business setting.

Chapter Five: Qualitative Results and Analysis

5.1 Introduction

This chapter presents the results and overview of the qualitative analysis. Based on 40 interviews with managers and employees from the four sample Chinese organisations, this chapter aims to deepen the understanding of m-learning characteristics in the context of these four Chinese business settings. This qualitative approach of this research attempts to provide an in-depth study of the phenomenon by virtue of describing rich data from semi-structured interviews. Transcripts of forty interviews were collected, translated (from Chinese to English) and analysed to investigate and verify the key characteristics of m-learning in a Chinese business setting.

5.1.1 Process of analysis

The interviews were transcribed manually, because there was no available voice recognition software for the Chinese language that reaches a satisfying level of transcription. The interview transcriptions were checked and translated by the researcher, who is a native Chinese speaker and trained interviewer[18]. Comparison of a back-translation of selected transcripts to the original text was conducted by a NAATI[19]-certified professional as a quality check on the original translation. Later, the transcripts were coded using inductive analysis and Nvivo 11.4.3 software to identify patterns and thematic categories of the data (Patton, 2002). A number of steps were undertaken in the transcription analysis. Firstly, the relevant interview text was searched for aggregate repeating comments/ideas regarding the certain topic/segment, for example, personal benefits and organisational benefits of m-learning. The possibility that a comment/idea represents an important idea increases with the number of times the comment/idea repeats (Guest, 2012). Secondly, when coding a theme, the researcher was primarily looking for expressions of a comment/idea relevant to the research questions. The researcher sought to develop both descriptive and explanatory themes. An instance of a theme

[18] The researcher possesses more than 10 years' working experience as human resource executive at MNCs where he was trained as a professional interviewer.
[19] NAATI: Australian National Accreditation Authority for Translators and Interpreters.

may be text or concepts of any size, and a unit of text could be assigned to more than one theme simultaneously (Creswell, 2014; Elo & Kyngas, 2008). Thirdly, to ensure consistency of coding, a coding sample was done at the onset on each interview transcript. Coding consistency of the sample was constantly checked by the researcher through a re-examination of assigned coding throughout the coding process. Adjustments to the coding of themes (referred to as nodes in NVivo) were made. Once all themes were identified, the researcher looked for commonalities, differences, patterns, and structures to aid analysis and to help generate results and answers to the research questions.

The following research questions will be answered (or partially answered) by the qualitative data results and analysis.

RQ 1 What is the current status of using mobile devices for learning purposes in a Chinese business setting? (Description of mobile usage and m-learning facts of the Chinese organisations.)

RQ 2 What are the employees' perceptions of m-learning in the Chinese business context? (Employees' acceptance of and attitude toward using mobile devices for learning.)

RQ 3 From employees' perspectives, what are the benefits that m-learning could bring to individuals and organizations?

RQ 4 What issues need to be addressed or highlighted to enhance the successful adoption of m-learning in the Chinese business context?

RQ 5 What are the similarities and differences between the characteristics of Chinese m-learning and Western m-learning?

5.1.2 Participants' Demographics

As Table 5.1 displays, 12 males and 28 females from the selected four organisations volunteered to participate in an interview. The high ratio of female participates was due to the fact that a larger proportion of the office-based employees in these organisations were female. Most of the participants are in their 30s (Table 5.2), and the average age of the participants was 34 years. The majority of the interviewees (72.5%) were working in non-managerial positions (Table 5.3).

Table 5.1 Participants' demographics (Population and Gender)

Gender	Org 1	Org 2	Org 3	Org 4	Total	%
Male	4	3	2	3	12	30%
Female	7	9	7	5	28	70%
Total	11	12	9	8	40	100%

Table 5.2 Participants' demographics (Age)

	Age group	Frequency	Percent
Valid	20s	10	25.0
	30s	24	60.0
	40s	6	15.0
	Total	40	100.0

Table 5.3 Participants' demographics (Job Type)

		Frequency	Percent
Valid	Managerial	11	27.5
	Non-managerial	29	72.5
	Total	40	100.0

5.2 The current status of using m-learning

All the participants (n=40) said that they had experience of using mobile devices for learning in the past few months. It is noticeable that 37 of the participants claimed that they used mobile devices for learning every day. On average, participants said they spent 62 minutes per day on m-learning (ranging from 13 minutes to 180 minutes). Although all the interviewees' organisations have launched corporate m-learning programs, according to the respondents, most of their m-learning experiences are self-organised, using mobile applications, WeChat public accounts[20] (WPAs) and group chatting forums, etc. Frequently mentioned m-learning applications include *Dedao (得到), Himalaya FM(喜马拉雅), Mint Reading (薄荷阅读),*

[20] WeChat public (or official) accounts are the WeChat equivalent of a Facebook page: they are an interface a brand can use to: gather followers, send them push notifications, and redirect them to a website. Most WeChat public (or official) accounts appear in the "Chat" section of WeChat. This is the section of WeChat which is most similar to WhatsApp/Messenger. Upon sending notifications, WeChat public accounts are brought to the top; users can then open the account to access a conversation interface where they can either click on push notifications or access information through the bottom menu interface.

Fandeng (樊登), Zhihu (知乎), TED, CEIBS m-learning, and *Baicizhan(百词斩)*. Figure 5.1 presents the icons of the most mentioned m-learning Apps, or WPAs. (Appendix N also provides detailed information about each WPA and applications mentioned by participants.). The qualitative results indicate that m-learning is typically associated with informal learning activities, such as accessing social media or search engines for learning. For example:

> *"If the informal learning counts, like WeChat public accounts (WPA), yes, definitely I have (m-learning experience)".* *- Participant 3, Female, 30s, Non-Mgr.*

> *"Most of my m-learning experiences are from 'Mint Read' and 'Himalaya' ...You know, it is so convenient to listen to these audio programs when you are doing something else; and the audios are not necessarily (formal) training courses but are conversations or speeches sometimes."* *- Participant 20, Male, 30s, Mgr.*

> *"Honestly, I don't have much experience with company-organised m-learning programs, but I do have much personal m-learning experience. I don't know if you heard about 'Qingke'(轻课), a learning WPA for English learning, which provides various courses for different learners. I also tried 'Fandeng Reading Party'(樊登读书会) and 'Baicizhan'(百词斩) which my child is also using and we can learn together."*
> *- Participant 26, Female, 30s, Non-Mgr.*

Figure 5.1 Icons of most mentioned m-learning Apps.

This emphasis on informal learning reflects the quantitative finding regarding the type of frequent activities accessed through mobile devices. According to the quantitative survey results, the frequency of carrying out formal learning activities, such as accessing company arranged m-learning activities and self-arranged m-learning, is relatively low: 34% of the respondents reported accessing organisational m-learning programs frequently and 27.3% respondents accessing self-arranged m-learning courses/activities frequently (see Section 4.4.1 for details). However, according to the qualitative results analysis, with the emphasis on informal learning through apps and WPAs, the actual use of mobile devices in learning activities is much higher.

Compared with male participants, female participants said they spent more time on m-learning (70 min/day vs. 65 min/day). This finding supports the results from the survey data that females spend more time on mobile activities than the male group (see Section 4.3.3). Based on interview responses, participants in their 20s said they spent much more time on m-learning (102 minutes per day), while people in their 30s reported that they spent 64 minutes and people in their 40s said they spent 35 minutes per day. This finding also echoes the result from the survey data that younger age groups tend to spend more time on mobile activities, although the difference between the age groups in the quantitative study was not statistically significant. Interviewees with managerial roles reported that they spend less time (44.5 minutes per day) on m-learning than the interviewees with non-managerial roles (79.2 minutes per day). According to participants, managerial roles in their organisations usually have more learning resources (especially classroom learning resources) than the non-managerial group. This point is highlighted by the view expressed by two managerial participants below:

> *"Honestly, I don't spend much time on m-learning because I have got many off-line resources and so many other things to do. I usually use mobile phone for learning on commutes, around 15 minutes maximum each time, two to three times a week."*
>
> *– Participant 40, Female, 40s, Mgr.*

> *"Senior level employees are entitled to more learning resources than others, for example in-house training or other public courses in the market. Therefore, employees at senior level spend comparably less time on m-learning, especially company-organized m-learning."* *- Participant 23, Male, 40s, Mgr.*

The finding mirrors the quantitative finding (Section 4.4.4) that face-to-face classroom learning was the most preferred learning method for managerial and leadership programs/courses. Since managerial interviewees have more opportunities to assess face-to-face classes, they may feel less need to spend time on m-learning.

The significance of social influence on the adoption of m-learning was also evident in the interviews. Social influence in this situation refers to the degree to which an individual perceives that important others (peers and managers) believe that he or she should use mobile devices for learning (Venkatesh et al., 2003). As noted by three interviewees (Participants 26, 38 and 13), their behaviour or decision of adopting m-learning was influenced by the expectations of others within their reference group:

"You know, you are likely to start acting like the people who surround you. One of the reasons that I am using mobile devices for learning is the influence from my friends and peers around me…My kid is also adopting m-learning and I would like to set a good example for my kid." *- Participant 26, Female, 30s, Non-Mgr.*

"I think it (adopting m-learning) helps organization communication and group sharing. People can be encouraged and motivated by each other."

- Participant 38, Female, 40s, Mgr.

"We have a WeChat group chatting room in our team, we can share latest industrial information and good practices…we periodically have departmental meetings, and we share the good stuff (knowledge and information) that we learned from m-learning".

- Participant 13, Female, 30s, Mgr.

This finding reflects the significant and characteristic Chinese cultural value of collectivism. Collectivists tend to place the needs, interests and objectives of in-groups at a higher priority than those of the individual (Rhee, Zhao, Jun, & Kim, 2017; Wang & Chen, 2010). Therefore, as contended by many researchers (Rhee et al., 2017; Wang & Chen, 2010; Yang, 2010), Chinese people have a tendency to conform to social norms and expectations. The present study suggests that this collectivist value has an impact on participants' approach to m-learning.

5.3 The Perceived Benefits of M-learning

Within the literature, benefits or the affordances of m-learning are considered important characteristics driving m-learning (Berge & Muilenburg, 2013; O'Malley et al., 2005; Traxler, 2007). To investigate the key characteristics of m-learning, therefore, it is important to identify the themes and thematic categories from the interview texts regarding the perceived benefits of m-learning. The analysis of interview transcripts (as outlined in Sections 5.3.1 and 5.3.2) reveal 19 themes of personal benefits and 17 themes of organisational benefits.

5.3.1 Personal Benefits

Tables 5.4 below outline the number of interviewees and number of times reference was made to particular themes relating to personal benefits of m-learning. In this way, a rank order of significance of themes can be identified.

Table 5.4 Themes Identified in interview analysis (Personal Benefits)

Themes	No. of Participants	No. of References
Convenience	25	30
Support fragmented learning	16	20
Support work/task	14	16
Broadens my horizon	13	15
Timeliness/Immediacy	13	14
Anytime Anywhere	12	14
Efficiency and Effectiveness	12	14
Resourceful / Informative	10	13
Personalising learning experience	10	11
Enriches my life	9	10
Keep information/knowledge up to date	7	8
Social networking	7	8
Edutainment	7	8
Enriches my knowledge	6	6
Effective communication	5	6
Help problem solving	4	6
Cost saving	2	5
Support multi-tasking	2	4
Help in developing good habits	2	4

"Convenience" is the most common mentioned theme of personal benefit, which highlights the fact that mobile devices are easy to carry (portable) and can be used in different locations at any time. M-learning allows learners to personalise their learning based on their characteristics and preferences, as well as on the tools and applications available to them, without time and space limitations. The theme of Convenience was referred to by 25 of the 40 participants. For example:

> "*It's convenient and you don't need to carry a thick book, so it's pretty good.*"
>
> *- Participant 30, Female, 20s, Non-Mgr.*

> *"I think m-learning is very convenient, anytime anywhere, good accessibility."*
>
> *- Participant 38, Female, 40s, Mgr.*

> *"You know, it is so convenient to listen to these audio programs when you are doing something else."* *- Participant 20, Male, 30s, Mgr.*

The theme of personal benefit that m-learning can "support fragmented learning" was also mentioned by many participants (16) during the interviews. According to Xu and He (2016), fragmented learning is a process of learning small amounts of knowledge according to learners' needs, interests, and ways of thinking, in short periods of time and as needed. The frequent reference to fragmented learning demonstrates that this approach to learning has been well accepted by the employees in these organisations. Many participants highlighted that learning via their mobile devices is ideal for taking advantage of the variety of short periods of time that are available during the day:

> *"First, your fragmented time can be used more effectively, you can actually plan your fragmented time well rather than have no plan, no result."*
>
> *- Participant 11, Male, 30s, Mgr.*

> *"Learning in fragmented times is really good, because it is not easy to find big blocks of time for learning at home, there are so many distractions; while, on the bus you can actually focus on learning for a while." - Participant 15, Female, 30s, Non-Mgr.*

> *"It (m-learning) helps us managing our fragmented time well, for example, when you are on the bus or when you are waiting for a bus, you can check Weibo and acquire information." - Participant 19, Female, 20s, Non-Mgr.*

The theme of "Support work/task" refers to the benefit of m-learning to provide support to deal with work-related tasks. This finding is similar to results from the survey which also highlighted the importance of real-world relevance: the contextual and authentic affordances of m-learning. As mentioned by 14 participants, m-learning has actual, practical and real-world relevance to support their jobs and tasks in terms of timely information consumption, business/social interaction, and professional solutions consultation. For example:

> "*Every time, when my boss gives me a new task, I check the solution online first, at least you could always find some basic ideas." - Participant 23, Male, 40s, Mgr.*

> *"Even in the workplace, people use mobile phones more often than computers because you can do so many work-related things through mobile phone."*
>
> *- Participant 28, Female, 30s, Non-Mgr.*

> *"When I have any questions or difficulties in my work, I would also use search engines through mobile phone to find some ideas." - Participant 27, Female, 30s, Non-Mgr.*

"Broadens my horizon" refers to the use of m-learning to provide opportunities for individual exploration. Thirteen participants found that m-learning helps them to extend their professional expertise, cross-functional knowledge, and the areas with their personal interests. For example:

> *"…it (m-learning) can broaden my horizon. I know what's going on in my area, but I don't know other areas, and I'd like to broaden my perspective. For example, in Dedao (an m-learning app), I registered for a course on economics taught by Professor Xue from Peking University."* *- Participant 3, Female, 30s, Non-Mgr.*

> *"I think it can broaden my horizon and perfect (extend) my knowledge framework."*
> *- Participant 37, Male, 20s, Non-Mgr.*

The theme of "Timeliness/Immediacy" refers to the high speed of accessing information and learning content through m-learning. The perceived benefit of timely/immediate learning also reflects the contextual and authentic tendency that learning should have real-world relevance. As reported by 13 participants, timeliness/immediacy is considered one the most significant benefits of m-learning:

> *"It's immediacy (real time). Sometimes I don't want to wait, I just need the answer immediately. Immediacy is key, you know, I might not need it tomorrow or I even can't remember what do I want to know tomorrow, I just want to know it right now."*
> *- Participant 17, Female, 30s, Non-Mgr.*

> *"M-learning adopted current information technologies and provides a convenient and timely platform for learning."* *- Participant 22, Male, 20s, Non-Mgr.*

M-learning was also perceived as having the benefit of providing information "Anytime Anywhere". Portability, Connectivity and Flexibility, and the term of "Anytime Anywhere (随时随地)", was used by 12 of the participants during the interviews. Similar to the benefit of "Convenience", by using mobile devices, the learner builds and develops his/her own choice of when, where, what and how to learn (Naismith et al., 2004). As participant 9 and participant 5 said:

> "*Second, it has no site limitation. Yes, anytime anywhere."*
> *- Participant 9, Female, 30s, Mgr.*

> *"You can do it any time you want. For example, check the map and check the English dictionary. Or check the meaning of popular words/terms."*
> *- Participant 5, Male, 40s, Non-Mgr.*

The theme of "Resourceful/Informative" highlights the connectivity and large quantity of content of m-learning benefits, which is similar to the themes of "Support work/task" and "Broadens my horizon". As discussed previously in the quantitative results and analysis (Section 4.4.3, Chapter 4), with the development of mobile technology and the network coverage continuing to expand and develop better quality, more learners are likely to be attracted to m-learning (Imtinan et al., 2013; Kululska-Hulme & Traxler, 2005). Participants highlighted that m-learning, by accessing the internet through wireless networks, can provide a large amount of information and data:

> *"First, there is huge amount of information available through mobile devices. The range of knowledge and topics is much broader compared with library reading."*
>
> *- Participant 18, Female, 20s, Non-Mgr.*

> *"There are so many online resources accessed by mobile phones. If you want to search anything, you can definitely find what you want."*
>
> *- Participant 21, Female, 30s, Non-Mgr.*

"Personalising learning experience" provides learners with greater flexibility in terms of time, place, content, method and their own pace, according to the participants. This perceived benefit mirrors the perceived findings from quantitative results related to autonomy as an important aspect of m-learning. According to the respondents, m-learning allows learners to personalise their learning based on their characteristics and preferences, as well as the tools and applications available to them. For example:

> *"First is meet my need, what do I want to learn; second is meet my interest; then career development, and the last is location. Since we are using mobile phone, it doesn't matter where do we learn."* *- Participant 16, Female, 30s, Mgr.*

> *"You don't need to follow the prescribed courses, you know, learning courses (classroom) that are prescribed and organized by the company can never be tailor made for any individual or any specific team."* *- Participant 10, Female, 30s, Mgr.*

Another theme of personal benefit noted by participants is referred to as "Enriches my life" and relates to the capacity of m-learning to provide opportunities for individual exploration about personal interests/hobbies and other non-work-related areas. This benefit also mirrors the previous quantitative finding on the important aspect of autonomy, which highlighted the power and ability of developing individual learning choices. As participant 1, participant 3 and participant 10 commented:

"I followed one WeChat public account about plants and animals, I learnt a lot from the articles they posted, those things I have never known. You know, I don't want to learn too deep (about Botany and Zoology), this information is just enough. At least I can recognize flowers when summer comes…I also like cooking and I followed some food accounts. They often introduce new menus and recipes, and I really like to try them. For me, it's very interesting." *- Participant 1, Male, 30s, Non-Mgr.*

"…it can enrich my life. For example, in Himalaya (m-Learning app), they have a course about Arts History to develop my aesthetics and temperament."

- Participant 3, Female, 30s, Non-Mgr.

"Some courses involve off-line social activities and provide me opportunities to know more people, these kind of activities enrich my life."

- Participant 10, Female, 30s, Mgr.

The theme of m-learning benefit, "Keep information/knowledge up to date", supports the need for continuous learning in the workplace. As some participants mentioned, their current jobs require ongoing learning and updating of professional knowledge, which can be supported by m-learning, for example:

"*M-learning helps me in keeping up with the new information."*

- Participant 35, Male, 30s, Non-Mgr.

"Since I am a CPA (Certified Public Accountant), I need to attend the annual inspection every year, and starting from this year, the relevant training course for annual inspection can be done through mobile devices."

- Participant 33, Female, 30s, Non-Mgr.

"I followed some WPAs and they have many (legal) case study sharing and information updates, which is helpful for my work… Since some of WPAs that I follow are managed by authorities, such as the Industry and Commence Bureau, there are some detailed information and explanation regarding the new policies and regulations. For example, the recent Anti-Corruption Law." *- Participant 7, Female, 30s, Non-Mgr.*

Many m-learning apps also have functions that allow learners to engage with others. This capacity, referred to as "Social networking", was commented on by a number of participants who reported that m-learning allowed them to build and maintain social networks. As discussed in the quantitative analysis results, most m-learning theorists have included collaboration or

collaborative learning activities as driving factors in adopting m-learning (Imtinan et al., 2013; Motiwalla, 2007). Mobile devices, connected to social media and communication applications, can play an important role in collaboration that supports the learners' personal relationships and social interactions with other learners (Caballe et al., 2010). Moreover, the use of social media accessed easily through mobile devices can provide a means for connecting communities of learning and encouraging interpersonal growth (Hao et al., 2017):

> *"Second (benefit), it (m-learning) is beneficial to build and maintain social networks with other people."* *- Participant 35, Male, 30s, Non-Mgr.*

> *"…it (m-learning) has become a social networking tool gradually. For example, you may find it is easier to know unfamiliar colleagues via m-learning, you can discuss the learning materials and share experience, you may be in the same learning group."*
> *- Participant 28, Female, 30s, Non-Mgr.*

The theme of "Edutainment" refers to those m-learning courses designed to educate through entertainment. Given the role of mobile apps to entertain users, it would seem that some participants emphasise that good m-learning programs should include content intended to teach but also provide incidental entertainment value. As participant 19 and participant 30 commented:

> "*Those (m-learning) audios are not didactic but storytelling, I really enjoy them."*
> *- Participant 19, Female, 20s, Non-Mgr.*

> *"It (m-learning) has pictures, videos and other presentation forms, which are more interesting than reading books."* *- Participant 30, Female, 20s, Non-Mgr.*

The theme of "Enriches my knowledge" refers to the perceived benefit of m-learning to help users achieve their personal skill and knowledge development objectives. This perceived benefit mirrors the quantitative analysis results and many previous studies in the literature which have shown that m-learning makes learning processes more informal and more personalised (Caballe et al., 2010; Hsu & Ching, 2013; Iglesias Rodríguez et al., 2017; Troussas et al., 2014). As participant 12 and participant 10 stated:

> *"I think for those who want to enrich their lives and their knowledge, m-learning would also be a good platform."* *- Participant 12, Female, 30s, Non-Mgr.*

"Some courses involve off-line social activities and provide me opportunities to know more people, this kind of activities enrich my life."

- Participant 10, Female, 30s, Non-Mgr.

"Effective Communication" refers to the benefit that participants reported that m-learning increases interaction, communication and sharing of information with peers. As discussed in the literature, as the fundamental affordance of m-learning, the use of social media through mobile devices can provide a easily access for connecting communities of learning and encouraging interpersonal communication (Hao et al., 2017). Participant 7 and participant 18 provided their comments on this theme of "Effective communication":

"Communication is timelier via WeChat, and people are not making phone calls anymore since most of us using WeChat and we can make video call through WeChat. We can discuss on the same platform, and information sharing."

- Participant 7, Female, Non-Mgr.

"…the communication can be more effective. It is so easy to share knowledge or a useful link with others. Just like "Aihuoli" (爱活力:Mobile App. on sports), it shows everybody's learning progress, we can be encouraged by each other."

- Participant 18, Female, Non-Mgr.

The theme of personal benefit, "Help problem solving", refers to m-learning helping users in finding solutions to difficult or complex issues, as reported by the participants. Similar to the benefit of "Keeping information/knowledge up to date", this perceived benefit of "Help problem solving" echoes the previous finding and reveals the contextual and authentic nature of organisational learning. As Participant 8 and Participant 4 explain, m-learning can help them in finding solutions to real difficulties or problems in the workplace:

"Yes, I do have a very good example. You know, I often work with plants on project bases, and we usually need to teach them on how to use the (operation) system…With the help of m-learning, the effectiveness of our project management has been improved."

- Participant 8, Male, 20s, Non-Mgr.

"For example, when I was having a meeting about labour contracting, we had some questions about the labour law, of course no one can remember every item and clause, so we checked the relevant items through mobile phone."

- Participant 4, Female, 20s, Non-Mgr.

For "Cost saving", as referred to by the participants, m-learning helps in saving the cost of self-learning and self-development. This perceived benefit mirrors the findings from previous studies in the literature that the implementation of m-learning can comparatively reduce the heavy training costs for organisations and learners (Adkins, 2015; ADL, 2017; Ally, 2009). Meanwhile, relevant literature also reports that most Chinese consumers are highly sensitive to price (Zhu, 2013); therefore, it is unsurprising that "Cost saving" was perceived as one of the benefits of m-learning:

> *"Compared with attending an in-house training, m-learning saves your time and cost"*
> *- Participant 39, Male, 30s, Non-Mgr.*

> *"Cost saving, which is obvious. Participants don't need to travel to the same place to attend the same (in-house) training." - Participant 2, Male, 30s, Non-Mgr*

Another theme of benefit was "Support Multi-tasking", as some participants reported that m-learning allowed them to deal with more than one task at the same time or use more than one mobile application simultaneously. Similar to the benefit of "Personalising learning experience", this perceived benefit reflects the greater flexibility provided by m-learning in terms of time, place, content, method and learning at their own pace, according to the participants. For example:

> *"it is so convenient to listen to these audio programs when you are doing something else" - Participant 20, Male, 30s, Mgr.*

For the "Help developing good habits" theme, m-learning is reported as enhancing users' learning style and development of a good study routine to achieve learning goals. Effective study habits and skills can be learned at any age, and current technology makes it easier than ever before for people to study effectively (Murphy, 2016). As many participants claimed, m-learning is ideal for taking advantage of the variety of short periods of time that are available during the day. Improving the utilisation of fragmented learning is considered as a good learning habit. As Participant 11 refers to this:

> *"I think m-learning helps me in developing a good learning habit, in terms of managing fragmented times, since I don't have much big blocks of time."*
> *- Participant 11, 30s, Male, Mgr.*

5.3.1.1 Central themes (Categories) of Personal Benefits

To explore the "essence" or the "fundamental constituents" (Tesch, 1987) of the perceived personal benefits of m-learning and represent the themes at a higher level of abstraction than the original emergent 19 themes, central themes (Categories) of the perceived benefits of m-learning were captured. The three central themes ("Autonomy", "Real-World Relevance", and "Collaboration & Networking") drawn from examination of relevant literature (Section 2.3, Chapter 2), which provided general descriptions and overall tendencies of m-learning characteristics of the four sample organisations, were used as initial categories to help in capturing central themes of the perceived personal benefits in this section. The 16 affordances of m-learning, from which the central themes were merged from the previous literature review (Section 2.3, Chapter 2), were used as measures or references to identify the similarities and note unique themes in the process of categorisation. The results of the matching and categorisation process are presented in Table 5.5.

Table 5.5 Central themes (Categories) of the perceived personal benefits

Themes of Personal Benefits	Relevant Affordances	Central themes (Categories)
Convenience	"Portability/Mobility/Usability"	**Autonomy** The freedom and the capacity of the learner to exert power and ownership over their learning preference and experience.
Support fragmented learning	"Content"	
Anytime Anywhere	"Portability/Mobility/Usability"	
Personalising learning experience	"Personalisation"; "Individuality"	
Cost saving	"Cost"	
Support Multi-tasking	"Blending"	
Broadens my horizon	"Individuality"	
Enriches my life	"Individuality"	
Enriches my knowledge	"Individuality"	
Edutainment	No relevant "Affordance" matches	
Help developing good habits	No relevant "Affordance" matches	
Support Work/task	"Authenticity"; "Context and Situated"	**Real-world Relevance** The learning activities have actual, real time and real-world relevance, which can help learners achieve their goals in real situations.
Timeliness/Immediacy	"Connectivity"	
Help problem solving	"Authenticity"; "Context and Situated"	
Keep information/knowledge up to date	"Connectivity"	
Efficiency and Effectiveness	"Connectivity"; "Context and Situated"	
Resourceful/Informative	"Connectivity"	
Social networking	"Social network"	**Collaboration and Networking** Connecting and interacting with a variety of people, sharing ideas, information and experience.
Effective Communication	"Communication"	

As discussed in Section 5.3.1, m-learning allows learners to personalise their learning experience in terms of tools, applications and presentation methods without time and space

limitations. The theme of "Convenience" of the personal benefit highlights the portability and usability of mobile devices, which provide the freedom and the capacity of the learner to exert power over their learning preferences without time and space limitations. "Convenience" is in accord with the affordance of "Portability/Mobility/Usability" which refers to the ease of using mobile devices for learning anytime, anywhere, and is associated with the scope of "Autonomy"; therefore, "Convenience" was classified under the central theme (category) of "Autonomy".

The theme of "Support fragmented learning" reflects that the content of m-learning supports the learning strategy of learning small amounts of knowledge according to learners' needs, interests, and ways of thinking (Peng, 2015; Xu & He, 2016). This theme echoes the affordance of "Content", which highlights the learning resources for m-learning in a format compatible with mobile devices or fragmented learning. Both "Support fragmented learning" and "Content" allow freedom and capacity of the learner to choose their learning style and strategy based on their needs. Therefore, "Support fragmented learning" is aligned with the central theme (category) of "Autonomy".

Similar to the theme of "Convenience", the theme of "Anytime, Anywhere" of the personal benefit was also classified under the central theme (category) of "Autonomy". "Anytime, Anywhere" emphasises that, by using mobile devices, the learner builds and develops their own choice of when, where, what and how to learn (Naismith et al., 2004). "Anytime, Anywhere" conforms to the affordance of "Portability/Mobility/Usability" which highlights the great ease of using mobile devices for learning; and therefore, was classified into "Autonomy" in the previous quantitative analysis.

The theme of "Personalising learning experience" highlights the greater flexibility and freedom of learning choices and preferences, in terms of time, place, content, method and pace. This theme echoes two affordances of m-learning, "Personalisation" and "Individuality", both of which provide freedom and the capacity of the learner to exert power and ownership over their learning preferences and experience. Thus, "Personalising learning experience" is associated with the category of "Autonomy".

The theme of "Cost saving" highlights that m-learning can help in saving the cost of self-learning and self-development compared with traditional learning methods such as classroom learning. For the individual, lower cost broadens the access to and choice of learning activities,

which enhances personal control. Thus, “Cost saving” is exactly matched with the affordance of “Cost” and associated with the central theme (category) of “Autonomy”.

The theme of personal benefit, “Support multi-tasking”, highlights the advantage of m-learning in offering opportunities for learners to do two or more things at once in an educational context, which provides the capacity of the learner to choose an adequate learning style and strategy to support a multiple focus and variable task prioritization (Coens, 2011). This theme echoes the affordance of “Blending” which relates to a learning solution combining the benefits of various learning approaches and supporting multi-task learning. The freedom and the capacity of the learner to choose their learning approach and learning strategy is within the scope of the definition of “Autonomy”.

The theme of “Broadens my horizon” highlights that m-learning can provide opportunities for individual exploration; while the theme of “Enriches my knowledge” highlights that m-learning helps users to achieve their individual exploration in scholarship, and the theme of “Enriches my life” highlights the capacity of m-learning to provide opportunities for individual exploration about their personal interests or hobbies. These three themes are in accord with the affordance of “Individuality” which relates to m-learning providing opportunities for individual exploration and allowing persons to learn in their own way. Thus, “Broadens my horizon”, “Enriches my knowledge” and “Enriches my life” are classified under the central theme (category) of “Autonomy”.

There is no affordance directly linked to the themes of “Edutainment” and “Help developing good habits”. The theme of “Edutainment” reflects the preference of learners who are exposed heavily to mobile technologies and multimedia, that learning contents presented by animation, video games, music and ready-made images are more preferred than traditional teaching media such as books and class discussion (Okan, 2003). This preference of “Edutainment” reflects the learner’s power over the personal choice of learning preference and learning experience, and is thus associated with the category of “Autonomy”. Meanwhile, “Learning habits” can be described as routines of methods and means of obtaining information (Urh & Jereb, 2014), and the development of one’s learning habit reflects an individual’s preferred ways of absorbing, processing and retaining new information and skills (Reid, 1995). Therefore, the theme of “Help developing good habits” is also falls within the scope of the central theme of “Autonomy”. It appears that, in the Chinese business context, the perceived central theme of personal benefits of m-learning “Autonomy” covers a wider range of measurements and intensions than the Western literature has indicated. Given that the educational system in China

was formerly highly centralized, which didn't provide autonomy or allow students to choose the learning context, time, space, and location (Halstead & Zhu, 2009; Hua et al., 2011; Littlewood, 1999; Xia et al., 2017), this preference and wider expectation of autonomy in learning may be a re-balancing after a long history of centralised education in Chinese formal education.

The themes of personal benefit, "Support Work/task" and "Help problem solving", emphasise that m-learning can provide practical/realistic support to help learners to achieve their goals in real situations. These two themes echo the affordances of "Authenticity" and "Context and Situated", which highlight that m-learning allows the learner to interact with the surroundings and that m-learning activities are interwoven with real and practical tasks. Therefore, the themes of "Support Work/task" and "Help problem solving" were associated with the central theme (category) of "Real-world Relevance".

Conforming to the affordance of "Connectivity", the themes of "Timeliness/Immediacy" and "Keep information/knowledge up to date" highlight the high speed of accessing information and learning content through mobile devices, which reflects that m-learning has actual, real-time relevance. Therefore, "Timeliness/Immediacy" and "Keep information/knowledge up to date" are both classified under the central theme (category) of "Real-world relevance".

The theme of personal benefit, "Efficiency and Effectiveness", highlights the timely response, high accessibility and high relevance/practicality provided by m-learning, which help learners to achieve their goals in real situations. This theme mirrors two affordances of m-learning: "Connectivity" which highlights accessibility; and "Context and Situated" which highlights timely response and relevance. Therefore, this theme is associated with the central theme (category) of "Real-world relevance".

The theme of personal benefit, "Resourceful/Informative", highlights the connectivity and availability of a large amount of information provided by m-learning, which can help learners to achieve their goals in real situations. Therefore, this theme is considered as associated with the affordance of "Connectivity" and classified under central theme (category) of "Real-world relevance".

The theme of "Social networking" reflects that m-learning can help learners to develop their personal relationships and social interactions through the connection with social media and other communication applications. This theme precisely conforms to the affordance of "Social network" and falls within the scope of the central theme (category) of "Collaboration and

Networking": connecting and interacting with a variety of people, sharing ideas, information and experience.

The theme of "Effective Communication" highlights that m-learning increases interaction, communication and sharing of information with peers, which is accord with the affordance of "Communication". Thus, this theme is also classified under the central theme (category) of "Collaboration and Networking".

To reduce the potential bias and increase the validity and trustworthiness of the qualitative results, the categorising and matching process was duplicated by two academics through a peer-checking process[21]. Both of the academics are from management research field and have at least three years' working experience in the corporate business environment. They were asked to match the 19 themes of personal benefits written on separate little cards with the categories (central themes) drawn on a flip-chart, and they were also encouraged to create additional categories if necessary. The results of the peer-checking process confirm that all the perceived benefits can be matched and allocated into the three categories (central themes) provided, and the result of allocation was 97% (average) consistency[22] with the initial matching results obtained by the researcher (Appendix L). After further discussion, in which the researcher further explained each benefit based on the inputs from interview quotes, both the academics were convinced and supported the researcher's initial classification.

To sum up, the 19 themes of personal benefits can be classified into the initial three central themes (categories) derived from quantitative analysis, and there was no other distinguishable central theme found. As displayed in Table 5.3, there are 11 themes of personal benefits under the category of "Autonomy", 6 themes under "Real-World Relevance", and "Collaboration & Networking" contained 2 themes. Meanwhile, among the 19 themes, 17 of them match with the 16 affordances of m-learning from which the initial three categories derived. Those 2 themes that couldn't be matched with the 16 affordances were classified into the category of "Autonomy". It appears that, in the Chinese business context, the perceived central theme of personal benefits of m-learning "Autonomy" covers a wider range of measurements and

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[21] This peer-checking process was based on a workshop, during which the background information was given, all the themes (benefits) were presented by little cards with basic explanation, and the participants were asked to match the themes with the central themes independently.

[22] One academic's matching result is 94.7% (18 out of 19 themes), consistent with the researcher's initial matching, and the other academic's matching result has 100% consistency (19 out of 19 theme) with the researcher's initial result ("support multi-task" was put under "Real-world Relevance).

intentions than the Western literature has indicated. Based on the number of the themes allocated under each category, it is noted that the category of "Autonomy" involves the most themes, followed by "Real-world Relevance" and then "Collaboration & Networking". This finding echoes the results of the quantitative analysis (Section 4.4, Chapter 4) that respondents perceive "Autonomy" as the most commonly referred central theme of m-learning, followed by "Real-world Relevance" and "Collaboration & Networking". This finding (order/ranking of the central themes) further confirms the previous studies in the literature related to the approach of personalisation and learner-centredness in the trend of organisational learning and m-learning (Garavan et al., 2012; Mehdiabadi & Li, 2016; Sharples et al., 2005). Just as organisational learning is shifting from being company-centred to learner-centred, learning activity in the organisations, including m-learning, "is being re-conceived as a personalised and learner-centred activity" (Sharples et al., 2005). Given that the educational system in China was highly centralized, which didn't provide autonomy or allow students to choose the learning context, time, space, and location (Halstead & Zhu, 2009; Hua et al., 2011; Littlewood, 1999; Xia et al., 2017), this preference and wider expectation of autonomy in learning may be a re-balancing after a long history of centralised education in Chinese formal education systems. This order of the central themes may also imply that, although it is undeniable that social relationships are still important for achieving business success in China due to the high context culture and deep-rooted Confucian values, with the increasing influence from Western management practice under globalisation (Ahlstrom et al., 2001; Li & Nesbit, 2013) Chinese employees tend to be more task- and result-oriented.

5.3.2 Organisational Benefits

It is clear from the literature reviewed (Berge & Muilenburg, 2013; Pimmer & Grohbiel, 2008; Saleh, 2015; Troussas et al., 2014) that, besides mobile devices increasing engagement of individual learning, they have other benefits for learning, such as improved group information sharing and collaboration, which provide new opportunities and prospects to organisations. According to the interview responses, in addition to individual benefits, m-learning was also seen by participants to engender benefits to their organisations. As Table 5.6 presents, 17 themes relating to organisational benefits were derived from the interview transcripts. Among these themes, six had also been addressed previously in discussing personal benefits (these benefits have been marked with * in the table); however, eleven out of the seventeen are distinctive from the themes of personal benefits, these comprising "Information sharing",

"Encourage organisational learning", "Support employee centred learning", "Learning management/administration", "Achieve team/organisation goals", "Experience sharing", "Enhance team spirit", "Enhance organisational capabilities", "Transparency and fairness" and "Support employee development". These distinctive themes of organisational benefits are discussed below.

Table 5.6 Themes Identified in interview analysis (Organisational Benefits)

Themes	No. of Participants	No. of References
Information sharing	10	12
Encourage organisational learning	9	11
Cost saving*	8	10
Effective communication	8	9
Timeliness/Immediacy*	7	8
Efficiency and effectiveness*	7	7
Support employee centred learning	6	7
Learning management/Administration	6	7
Convenience*	7	7
Achieve team/organisation goals	6	6
Support work/task*	6	6
Experience sharing	6	6
Enhance team spirit	5	6
Social networking*	5	5
Enhance organisational capabilities	4	4
Transparency and fairness	3	4
Support employee development	2	2

Benefits with * mark are also personal benefits

"Information sharing" is the most mentioned organisational benefit and relates to the process of data/information exchange through mobile devices between the users in the group/organisation. The use of social media accessed easily through mobile devices can provide a means for connecting communities of learning and encouraging information sharing (Hao et al., 2017). According to the respondents, m-learning provides unprecedented options for social interaction that are being viewed as opportunities for knowledge seeking and sharing. For example:

> *"I can share what I learned with my team, and how I share is also through mobile devices, they can access to and be reached by mobile phones (easily). I share what I learned and communicate my ideas, my expectation to my team."*
>
> *- Participant 11, Male, 30s, Mgr.*

"You can share a great amount of information with your teams, for example the best practices of our peer companies." *- Participant 17, Female, 30s, Non-Mgr.*

"For example, if we find any good article or useful information, we can easily share with our team member via mobile devices. So, it is a very good sharing platform for the organization." *- Participant 27, Female, 30s, Non-Mgr.*

"Encourage organisational learning", as reported by 9 participants, relates to increased collaboration and connectivity with other learners through increased communication, interaction and information sharing provided by m-learning. Organisational learning is the process of creating, retaining, and transferring knowledge (Argote, 2013). According to the participants, the improved collaboration provided by m-learning leads to an enhanced organisational learning atmosphere. As participant 33 and participant 30 suggested:

"Some features of the m-learning Apps, like 'check-in' and 'Ranking Board', would be beneficial for creating and encouraging a learning organization."

- Participant 33, Female, 30s, Non-Mgr.

"I think the organization can use this kind of tracking and administrative tool to encourage group learning and group competition, otherwise, m-learning that is organized by the company would be boring… So, m-learning can help the organisation to build a learning organisation if we can use it well."

- Participant 26, Female, 30s, Non-Mgr.

"For example, if a team leader identifies a common learning need, he/she can make it a group learning (activity) through an m-learning system, which is easier to manage, discuss and feedback." *- Participant 9, Female, 30, Mgr.*

The effectiveness of employee development is one of the essential conditions of organisational capability enhancement (Collings & Mellahi, 2009; Collings, Scullion, & Vaiman, 2015; Kramar, Bartham, & Cieri, 2014). This theme, referred to as "Support employee centred learning", reflects the movement from organisations being mainly responsible for employee learning to allowing individuals to have a greater say in and responsibility for their learning processes. M-learning provides many more choices to meet individuals' needs, and it also allows learners to control and make changes to their learning plans; as noted by the following participants:

"M-learning also gives us a space of autonomy and personalisation."

- Participant 3, Female, 30s, Non-Mgr.

"M-learning also increased employees' learning motivation and initiative. Before, it was "organizational required learning", and now, it is "employee required learning", the T&D approach has been totally changed from organization-centred to employee-centred." *- Participant 23, Male, 40s, Mgr.*

"Since every individual is different and m-learning just makes the group learning easier." *- Participant 24, Male, 40s, Non-Mgr.*

"For the organization, it's convenient for its employees to find suitable learning courses for current job or career development purposes. Because, all the learning modules are online, and you may choose A, B or C that match your own needs."
- Participant 10, Female, 30s, Mgr.

The theme of "Learning management/administration" relates to the perception that m-learning is seen as a more effective training/learning management tool for the organisations, compared with "classroom learning", "on-job learning" and "e-learning". This is because m-learning is a very powerful tool to communicate easily and just-in-time with large groups of learners or even individually (Brown & Mbati, 2015); as explained by Participant 5 and Participant 40:

"We can do online assessment and track the learners' learning status (results). This can be a benefit from the learning and training (management/administration) perspective." *- Participant 5, Male, 40s, Non-Mgr.*

"Moreover, m-learning is easy to manage, control and monitor, with the ubiquity of mobile devices, organizational learning can be easily done through m-learning."
- Participant 40, Female, 40s, Mgr.

M-learning was also reported to be helping "achieve team/organisation goals" through effective communication, collaboration, and development. As discussed in the literature, the seemingly unlimited new media contexts, information access, and communications options in m-learning settings, are often regarded as venues for interactive and engaging team/organisational goal achievement (Lac et al., 2014; Pimmer et al., 2010; Troussas et al., 2014). According to the participants, m-learning provides strong support for group communication and information sharing in the business context, which are essential to achieving team/organisation goals, as referred to by participants 11, 30 and 37:

"To achieve the team's goal, it is important to improve every team members' performance through group learning and sharing. This can be more feasible by mobile devices." *- Participant 11, Male, 30s, Mgr.*

"As for the organisational benefits, for example, achieving the team goal, I think the m-learning or any other kinds of training could be helpful, however, it is difficult to quantify." *- Participant 1, Male, 30, Non-Mgr.*

"I think it (m-learning) is beneficial to the organization in terms of communication, sharing and achieving group objectives." *- Participant 37, Male, 20s, Non-Mgr.*

It was reported by the participants that team spirit could be enhanced through increased interaction, communication and sharing activities during the process of m-learning. Again, this perceived benefit of "Enhance team spirit" echoes previous discussion about the collectivism orientation in the Chinese business context. When there is a strong team spirit in the Chinese workplace, employees can easily obtain the benefits of collectivism, in terms of valuable information, power, and referrals, and can activate more citizenship behaviours by acting collectively (Rhee et al., 2017). This was noted by Participants 39 and 22:

"By implementing m-learning in the organisation, especially using some of the sharing features, like 'check-in' and 'ranking list', the team sprit would be enhanced, and an organisational learning environment could be created, in which way to enhance the organisational capabilities." *- Participant 39, Male, 30s, Non-Mgr.*

"Second, m-learning can bring all the team members together, the interaction can promote group sharing and group learning." *- Participant 22, Male, 20s, Non-Mgr.*

The benefit of "Enhance organisational capabilities" relates to the perception of increased individual capabilities through enhanced collaboration and enhanced learning atmosphere via m-learning, which in turn leads to enhanced organisational capabilities. An organizational capability is a company's ability to manage effectively resources such as employees' skills and knowledge to gain an advantage over competitors (Barney, 1991; Chong Tan, Oly Ndubisi, Mavondo, & Worthington, 2011). To maintain human resource capability, companies need to ensure that their workforce has the effective tools and resources available to improve continuously. M-learning provides an effective training/learning management system which helps to encourage and support the development of a knowledgeable workforce and leads to organizational capability enhancement (Kelchner, n.d.). Participants 15, 17, 11 and 20 noted:

"If every individual grows and develops well, the whole organization becomes stronger and more competitive, in this way it (organization) can catch up with the changing world." *- Participant 15, Female, 30s, Non-Mgr.*

"There many good skills and practices you can learn online, and you can easily share these with your peers, in this way, the whole organizational capability could be improved." *- Participant 17, Female, 30s, Non-Mgr.*

"Now we have opened the Greater China i-University (online corporate university), so I have the access to the latest information and various learning resources, which is the biggest learning channel for me. I believe, if everybody can improve themselves from these learning resources, it would be a great improvement for the organization as well."
- Participant 11, Male, 30s, Mgr.

"I think m-learning can help improve the generic skills and maybe organizational capabilities, not directly but indirectly." *- Participant 20, Male, 30s, Mgr.*

In a traditional training management system, who gets selected for training and why are they selected is often not clear or well communicated to employees, which may produce a feeling of unfairness and injustice, and consequently may hinder employee training and learning (Anlesinya, 2018). In contrast to the perception of lack of transparency of traditional training and development, m-learning, as noted by a number of respondents, increases the opportunities afforded to all employees to engage in learning activities ("Transparency and fairness"). With the open access learning environment that m-learning creates, every user has the same access to the learning resources and the learning experience, including course selection, enrolment, discussion with trainers/peers, and assessment, which thus is transparent and fair. The benefit of "transparency and fairness" from m-learning is evident in the following quotes by participants 6, 23 and 22:

"…it (m-learning) makes training resources more transparent and fairer. Some m-learning courses used to be targeted for senior managers only, and now every employee can access these programs with mobile phones."
- Participant 6, Female, 30s, Non-Mgr.

"…it (m-learning) frees up the learning resources (to everyone) since it provides low cost but rich learning resources. In the past, even the e-learning courses were very costly but now the m-learning has made the cost much lower"
- Participant 23, Male, 40s, Mgr.

"In the past, when we organised in-house training for our team, you couldn't bring everyone in." *- Participant 22, Male 20s, Non-Mgr.*

5.3.2.1 Central themes (Categories) of Organisational Benefits

Central themes (Categories) of the perceived organisational benefits of m-learning were captured to explore the "essence" or the "fundamental constituents" (Tesch, 1987) of the organisational benefits of m-learning and to represent the themes at a higher level of abstraction than the original emergent 17 themes. The three central themes ("Autonomy", "Real-World Relevance", and "Collaboration & Networking") derived from literature analysis (Section 2.3, Chapter 2) were used as initial categories to help in capturing central themes of the perceived personal benefits presented in this section. The 16 affordances of m-learning, from which the central themes merged in the previous literature review (Section 2.3, Chapter 2), were used as measures or references to identify the similarities and note unique themes in the process of categorisation. The results of the matching and categorisation process are presented in Table 5.7.

Table 5.7 Central themes (Categories) of the perceived organisational benefits

Themes of Organisational Benefits	Relevant Affordance	Central themes (Categories)
Timeliness/Immediacy*	"Connectivity"	**Real-world Relevance** The learning activities have actual, real time and real-world relevance, which can help learners achieve their goals in real situations.
Efficiency and Effectiveness*	"Connectivity"; "Context and Situated"	
Support Work/task*	"Authenticity"; "Context and Situated"	
Achieve team/organisation goal	"Authenticity"; "Context and Situated"	
Learning management/Administration	"Authenticity" ; "Context and Situated"	
Encourage organisational learning	"Authenticity"; "Context and Situated"	
Enhance organisational capabilities	"Authenticity"; "Context and Situated"	
Transparency and fairness	"Authenticity"; "Context and Situated"	
Cost saving*	"Cost"	
Effective Communication*	"Communication"	**Collaboration and Networking** Connecting and interacting with a variety of people, sharing ideas, information and experience.
Information sharing	"Personal Publish and Sharing"	
Experience sharing	"Personal Publish and Sharing"	
Social networking*	"Social network"	
Enhance team spirit	"Collaboration and Interactivity"; "Social network"	
Convenience*	"Portability/Mobility/Usability"	**Autonomy** The freedom and the capacity of the learner to exert power and ownership over their learning preference and experience.
Support employee centred learning	"Personalisation", "Individuality"	
Support employee development	"Personalisation", "Individuality"	

The benefits of m-learning for organisations has not been well researched and discussed, and has still remain scant in the relevant literature (Pimmer & Pachler, 2013). The important aspects of m-learning derived from the previous quantitative analysis were also found mostly to describe the benefits for the individuals. However, some of the themes of benefits were both addressed by the participants as individual benefits and as organizational benefits. For example,

the themes of "Support Work/task", "Timeliness/Immediacy" and "Efficiency and Effectiveness" were identified as personal benefits which reflect actual, real-time and practical relevance to help the individuals in their real-world situations; meanwhile, these themes were also highlighted as organisational benefits that provide contextual and authentic supports to the organisations to achieve their business goals and enhance their organisational capabilities. As discussed in Section 5.3.1.1, these themes were associated with the affordances of "Connectivity", "Authenticity" and "Context and Situated" which emphasise accessibility, real-world relevance and interaction with surroundings. Therefore, these three themes are classified under the central theme of "Real-world Relevance".

The themes of "Achieve team/organisation goal", "Learning management/Administration", "Encourage organisational learning", and "Enhance organisational capabilities", are distinctive themes of benefits for the organisations. "Achieve team/organisation goal" emphasises that m-learning provides strong support for group communication and information sharing in the business context to achieving team/organisation goals; "Learning management/Administration" relates to the benefit that m-learning provides as a more effective training/learning management tool for the organisation; "Enhance organisational capabilities" refers to the perception of increased individual capabilities through m-learning which can, in turn, lead to enhanced organisational capabilities; and "Encourage organisational learning" refers to the benefit that the improved collaboration provided by m-learning leads to an enhanced organisational learning atmosphere; "Transparency and fairness" refers to m-learning provides a transparent platform for organisational learning and this allows the building of employee trust and engagement. All of these themes are focussed on the practical, contextual and authentic benefits to the organisations to achieve their business/management goals and enhance their organisational capabilities. These four themes are all related to the affordances of "Authenticity" and "Context and Situated"; which highlights the interaction and relevance of m-learning with real tasks/goals. Therefore, these themes are classified into the category of "Real-world Relevance".

Similar to the theme of "Cost saving" discussed in Section 5.3.1.1 on personal benefits, the theme of "Cost saving" as organisational benefit highlights that m-learning helps in saving cost of employee learning and development. However, for organisations, the benefit of "Cost saving" tends to be more "real-world relevance" rather than empowering personal control of learning preference and experience. Because the cost of employee learning and development can be significantly reduced through m-learning (Tawadrous et al., 2016), and with the lower cost in

employee training and development, the organisational capability and competitive advantage could be increased (Harvey & Jones, 2013). Therefore, "Cost saving" has authentic benefit for the organisations, and was classified into "Real-world Relevance".

The theme of "Effective communication" was also addressed as both personal benefit and organisational benefit of m-learning. This theme highlights that m-learning increases interaction, communication and sharing of information within the organisations. As discussed in Section 5.3.1.1 on personal benefits of m-learning, this theme conforms to the affordance of "Communication" and falls within the scope of "Collaboration and Networking".

The themes of "Information sharing" and "Experience sharing" relate to the process of data/information exchange through mobile devices between the users in the organisations. These two themes highlight the benefit of m-learning connecting and interacting with a variety of people, encouraging sharing of ideas, information and experience, which is aligned with the affordance of "Personal Publish and Sharing". Therefore, these two themes are classified under the central theme (category) of "Collaboration and Networking".

As discussed in Section 5.3.1.1 on personal benefit of m-learning, "Social networking" reflects that m-learning can help learners to develop their personal relationships and social interactions through the connections with social media and other communication applications. This theme precisely conforms to the affordance of "Social network" and is associated with the central theme (category) of "Collaboration and Networking".

The theme of "Enhance team spirit" is a distinguishable theme of benefits for the organisations which emphasises that m-learning supported by social media communication tools can enhance psychological collectivism through intensive interactive and collaborative learning activities (Turel & Connelly, 2012). In turn, the enhanced team spirit can further develop collaboration and networking within the organization (Chen, Liou, Wang, Fan, & Chi, 2007). Therefore, the theme of "Enhance team spirit" reflects the affordance of "Collaboration and Interactivity" and the affordance of "Social network"; which highlights the interaction and teamwork with other users and supports building and maintaining social networking among the users. Thus, this theme was classified into the central theme (category) of "Collaboration and Networking".

The themes of "Convenience" and "Support Multi-tasking" were discussed as personal benefits of m-learning in Section 5.3.1.1 and were classified into the category of "Autonomy". From the organisational perspective, the benefits of "Convenience" and "Support Multi-tasking" also emphasise employees' personal power and ownership towards their learning preferences and

experience. Therefore, these two themes were considered to be associated with the central theme of "Autonomy" as organisational benefits as well. The themes of "Convenience" and "Support Multi-tasking" echo the affordances, "Personalisation" and "Blending".

As a distinguishable theme of organisational benefits, "Support employee centred learning" highlights that m-learning provides many more choices to meet individuals' needs and allows learners to control and make changes to their learning plans. Similarly, the theme of "Support employee development" emphasises that m-learning can provide personalised support for individuals with their career development needs. These two themes reflect the affordances, "Personalisation" and "Individuality", and thus fall into the scope of "Autonomy".

To reduce the potential bias and increase the validity and trustworthiness of the qualitative results, as with the peer-checking process for categorising and matching the themes of personal benefits (Section 5.3.1.1), the process of categorising and matching the organisational benefits was also duplicated by the two academics through a peer-checking process. They were asked to match the 17 benefits written on separated little cards with the categories (central themes) drawn on a flip-chart, and they were also encouraged to create additional categories if necessary. The results of the peer-checking process confirm that all the perceived benefits could be matched and allocated into the three categories (central themes) provided, and the result of allocation was 100% consistency with the initial matching result conducted by the researcher (Appendix L). After further discussion, in which the researcher further explained each benefit based on the inputs from interview quotes, both the academics were convinced and supported the author's initial classification.

To sum up, the 17 themes of organisational benefits can be classified into the initial three central themes (categories) derived from relevant literature analysis, and there was no other distinguishable central theme found. As displayed in Table 5.4, there are eight themes under the central theme (category) of "Real-World Relevance", five themes under the "Collaboration & Networking" category, and the "Autonomy" category contained four themes. Meanwhile, all the 17 themes could be matched with the 16 affordances of m-learning from which the initial three categories were derived in the previous quantitative analysis (Section 4.4.4, Chapter 4). Based on the number of the themes classified under each category, it appears that "Real-World Relevance" involves the most themes of the perceived benefits, followed by "Collaboration & Networking" and then "Autonomy". This order/ranking of the central themes of organisational benefits of m-learning may imply that, in the Chinese business context, organisational learning has an orientation of pragmatism, where contextual and authentic benefits were considered as

the most important motivational factors in learning implementation. This finding echoes the relevant literature regarding the pragmatic approach in Chinese organisational learning (Elkin et al., 2009). Elkin et al. (2009) report that organisations in China share a pragmatic philosophy and a relational worldview in building the learning organisations in China. Redding (1990) and Cone and Everett (2003) describe the characteristics of the organisational learning in the Chinese context where a pragmatic and utilitarian orientation is very much in evidence in looking for what works and establishing networks that help in absorbing complexity within the rapidly changing market conditions. It is interesting to note that establishing networks has more utilitarian profit than a socio-cultural purpose in the Chinese business context, which could also answer why "Collaboration & Networking" was perceived as the second most important central theme of organisational benefits of m-learning. Compared with the personal benefits of m-learning, individual needs and personal preference ("Autonomy") were considered less important, since they produce fewer pragmatic and utilitarian profits for the organisations.

5.4 The Perception of M-learning.

The previous quantitative analysis results have already revealed a general positive perception of using mobile devices for learning (Section 4.4, Chapter 4) among the sample organisations. The intent of the qualitative study in this section is not to repeat questions already asked in the survey but to increase understanding of the quantitative findings and gather additional data, providing more in-depth understanding of participants' perceptions of m-learning regarding the ideal (suitable) contents for m-learning and ideal users of mobile devices for learning.

5.4.1 The Ideal Content for M-learning

Perceptions on the ideal content for m-learning were derived from the interview responses to Question 4 (Do you see mobile devices as being useful for any specific learning activities you might have in the future?). When reviewing the relevant interview transcripts, it is noted that four kinds of preferred m-learning content/topics appeared most often: 1) content/topic should be simple and short; 2) content/topic should be work-related or practical; 3) content/activities should be interesting/edutainment; 4) content/topic should be fitted to personal needs.

Firstly, most of the respondents insisted that the ideal content/activity of m-learning must be simple and short, not requiring in-depth study and long-term focus. The following quotes support this idea:

"Maybe some instant courses that you can 'digest' in a short time, for example, presentation skills that I am studying right now, which can be learned by stages and can be learned in fragmented times, in other words, fragmentable courses. Leadership courses, on the other hand, require prolonged focus, wouldn't be suitable for m-learning."

- Participant 10, Female, 30s, Mgr.

"I believe the m-learning courses should be simple and short, the ideal fragmented learning must be within few minutes, otherwise, like some company-organised m-learning courses which take half an hour per time, it would be no different from computer-based e-learning." *- Participant 24, Male, 40s, Non-Mgr.*

"…it (m-learning) should be simple and less than 1-3 minutes if it is a video or audio course, like I said before, it should be fragmentable to fit the fragmented learning. Its logic should not be too complicated. If it is self-motivated learning, it should be simple, fragmented and simple logic." *- Participant 2, Male, 30s, Non-Mgr.*

This desire for simple and short m-learning content reflects a preference for surface learning rather than deep learning. Relevant literature reviewed has clearly stated that deep and surface learning are two learning approaches or learning strategies toward learning activities (Aharony, 2006; Dolmans et al., 2016; Howie & Bagnall, 2013). A deep learning approach results from an inner need to reach a complete understanding of the subject material, and behind the deep strategy hides a search for self-fulfilment (Aharony, 2006; Saravanamuthu, 2008); whilst a surface learning approach results from choosing the quickest way to accomplish the task, and behind the surface strategy hides a need to avoid failure and the desire to minimize effort when completing tasks (Aharony, 2006; Biggs & Moore, 1993). The findings in the present study show a major preference for adopting a surface learning approach in the Chinese business setting, which mirrors the outcomes of previous research regarding the differences in academic values between Western-culture learners and Confucian-culture learners. According to Ryan (2010) and Saravanamuthu (2008), the Western learners tend to be "Deep" learners, while the Confucian learners tend to be "Surface" or rote learners (Ryan, 2010; Saravanamuthu, 2008). This finding also consists with the previous finding related to perceived benefits of m-learning, that the concept of fragmented learning has been well accepted by the users of m-learning and m-learning is believed as beneficial for fragmented learning.

The second kind of ideal m-learning content/activity is practical and work-related topics. The respondents believed that the ideal topics of m-learning should be practical and support their

jobs or tasks, usually containing introductory or know-how (practical tips) information related to products or business/industry knowledge. Participant 1 and participant 13 provided some examples:

> *"I think, first of all, those functional and practical trainings (would be ideal m-learning contents). For example, for the sales function, the "Huashu" (sales talk/patter), how to start and lead a talk with clients or customers; or SOPs (Standard Operating Procedure) for the employees in the plants. The more practical, the closer to their work, the better."*
>
> *- Participant 1, Male, 30s, Non-Mgr.*

> *"I think those work-related courses (would be useful), for example, I am in the logistics industry and I am very interested in logistics-related courses and information."*
>
> *- Participant 13, Female, 30s, Mgr.*

This preference for contextual and real-world relevance reveals the orientation of utilitarianism and pragmatism to learning in the Chinese business environment. As reported in the literature, the utilitarian and pragmatic orientation in Chinese organisations is very much in evidence in looking for what works, what benefits, or how to absorb complexity and develop continuous innovation to meet the rapidly changing business environment (Elkin et al., 2009; Redding, 1990; Shen & Williams, 2016). Therefore, the preference for the contextual and authentic affordance further verifies the drive for organisational learning in Chinese organisations, that learning should have real-world relevance and help business. While all the organisations focus on business goals, as the biggest emerging economy in the world, the Chinese business environment requires its organisations to be more efficient in adaptation to the rapidly changing and competitive market conditions. In this process of continuous adaptation, there is no final business goal to be reached, but rather, learning and development are endless (Elkin et al., 2009).

The third kind of ideal m-learning content/activity mentioned by the respondents is that the methods of delivering and presenting m-learning contents should be interesting; for example, it should be edutainment/vivid, preferably in video/audio form. As participant 32 and participant 15 explained:

> *"I think the learning delivery or presentation forms must be interesting. Because m-learning is totally user controlled and it provides large autonomy to the mobile users, if the learning content or the delivery is not interesting, the users won't follow the courses. Therefore, the delivery or presentation forms should be interesting or*

attractive, and the content should be fragmentable."

- Participant 32, Female, 30s, Non-Mgr.

"Interesting video courses, something like "Luozhengyu's (a well-known management consultant in China) Speech". You know, every year, Luo gives a speech which provides a summary of the new ideas/concepts, new technologies and new trends. He's so humorous. I like this kind of courses." *- Participant 15, Female, 30s, Non-Mgr.*

The preference for interesting edutainment/vividness suggests a trend for "edutainment" in organisational training and educational technology in China. With the technical advancement of digital media and the medium of communication in recent years, "edutainment" has been recognised as an effective way of learning using modern digital media tools in the education domain (Zhang et al., 2010). This finding is consistent with previous research that "learning through playing" (Edutainment technology) has become a hot topic in the field of organisational learning and educational technology in China (Lupetti, Gao, Yao, & Mi, 2017; Wang, Zuo, & Li, 2007).

Fourthly, the ideal content/activity of m-learning also should be personalised based on an individual's needs and learning preferences. Participant 3 and participant 21 described their demand for personalisation:

"I think personalised courses. For example, most of the training courses that we provide and have received are generic courses, but each individual is different. If m-learning can provide tailor-made courses based on an individual's needs, his/her preferred method and frequency, it would be very welcome."

- Participant 3, Female, 30s, Non-Mgr.

"It should be practical, personalised, and experience-sharing learning courses. For example, some tips on parenting babies in the children and parenting WPAs."

-Participant 21, Female, 30s, Non-Mgr.

The preference for personalisation reflects the importance of autonomy in the learning process and learning experience. Given that the educational systems in China was formerly highly centralized, which didn't provide autonomy or allow students to choose the learning context, time, space, and location (Halstead & Zhu, 2009; Hua et al., 2011; Littlewood, 1999; Xia et al., 2017), this preference for autonomy in the learning process and experience may be a re-balancing after a long history of centralised education in Chinese formal education. This finding is also consistent with the previous quantitative finding (Section 4.4.3, Chapter 4) that

autonomy is an important theme of the important aspects of m-learning in the Chinese business context.

5.4.2 The Ideal User Group of M-learning

To identify whether using mobile devices for learning suited some people more than others, the researcher asked participants: *Do you see mobile devices as being more useful for any specific group of people in the organisation?* According to the responses, m-learning is more useful for some specific groups of people in the organisation. Through reviewing the transcripts, three groups of people are most often mentioned by the respondents: 1) younger age group; 2) mobile- or remote-based group; and 3) junior-level or first-line employees.

According to the respondents, young people are perceived by most of the respondents as the most ideal group for using mobile devices for learning. For example, as participant 18 and participant 13 said:

> *"Let me think about it…er…maybe younger people are comparatively good for m-learning, in terms of acceptance of new technologies, managing the mobile operation system and free time they have."* *- Participant 18, Female, 20s, Non-Mgr.*
>
> *"I would say, firstly, younger age group. In terms of using mobile device with great ease and accepting the mobile phone as a learning device, I think people below 45 years old would be more suitable for m-learning."*
>
> *- Participant 13, Female, 30s, Mgr.*

Most of the respondents considered younger age users as heavy users of mobile devices and those who can use mobile devices with greater ease; therefore, they would be the ideal group for m-learning. This finding echoes previous findings from both quantitative and qualitative results that the younger age group spend more time on mobile devices and m-learning.

Mobile and Remote workers who are involved in frequent business travels or employees based in distant locations were also perceived as an ideal group for m-learning. This viewpoint was shared by many participants for example:

> *"I think, in terms of departments or functions, those in other locations can be more benefited from m-learning."* *- Participant 15, Female, 30s, Non-Mgr.*

"Based on my experience, I found the employees working in the Hangzhou plant and working in branches located in other cities, especially those in the remote regions, they really like using mobile phones for learning." - Participant 29, Female, 40s, Mgr.

"People that work more on the first line, like sales and operation teams who can hardly have big blocks of time for a whole-day training. I mean those mobile employees, involve many business travels and don't have time for classroom training."
- Participant 16, Female, 30s, Mgr.

"Second is the group of employees who are involved in lots of travel, like our Sales Development team." - Participant 24, Male, 40s, Non-Mgr.

According to the responses, many formal or organisational learning resources require face-to-face and personal computer equipment; therefore, m-learning provides much greater accessibility than the traditional organisational learning methods for these people who have less access to the face-to-face or computer-based learning resources. This finding is consistent with previous findings on the use of m-learning based on quantitative results (Section 4.4.1, Chapter 4), that mobile/remote workers who are usually from the Sales/Marketing function or Operation function spend more time on m-learning.

In addition, junior-level or first-line employees can also be the ideal group for m-learning, as m-learning is ideal for simple training and introductory information. As participant 1 and participant 10 stated:

"I think m-learning is more useful for the first-line people and non-office-based people."
- Participant 1, Male, 30s, Non-Mgr.

"Like I said before, since I am still very junior in the job market, my main learning goal is to broaden my horizon and explore new ideas. So, people like me, who are curious in anything new, would be an ideal target group for m-learning."
- Participant 10, Female, 20s, Non-Mgr.

This finding mirrors the previous findings related to ideal content for m-learning and perceived benefits of m-learning, in further verifying that m-learning benefits surface or fragmented learning. Meanwhile, it also echoes the previous finding of m-learning usage that the non-managerial group spends more time on m-learning since the managerial group has more resources for face-to-face learning.

These findings on ideal groups for m-learning suggest trends in organisational learning and m-learning that: 1) m-learning is likely to be well accepted by the younger generation; 2) m-learning can reduce the gap of learning/training resources allocation between job functions and locations; and 3) m-learning has the potential to be accepted as a mainstream learning method for junior-level or first-line employees.

5.5 The Concerns and Improvement Areas of M-learning

To understand what issues need to be addressed or highlighted to enhance the successful adoption of m-learning in the Chinese business context (RQ 4), respondents were asked to address their concerns about m-learning and improvement areas for implementing m-learning. Two separate interview questions were asked to provide in-depth understanding regarding their concerns and perceived improvement areas: "What are your concerns when using a mobile device for learning?"; and "What can be done to increase the effectiveness of mobile learning?".

5.5.1 The Concerns of M-learning

To discover users' perceptions on the disadvantages, challenges, barriers and difficulties of using mobile devices for learning, respondents were asked to address their concerns about m-learning by answering the interview question 6: "What are your concerns when using a mobile device for learning?" All of the respondents in the study specified that there were a number of concerns which, while they did not prevent them from using their mobile devices for learning, were obstacles that they had to consider in order to successfully use their devices for learning.

One major concern derived from the interview transcripts is the depth of learning that can be obtained through m-learning. According the respondents, depth of learning refers to a level of understanding of the subject material and concepts/theories behind. Many respondents pointed out that m-learning provides access to the wide breadth of knowledge and broad online resources, but that the depth and quality of learning are questionable. The relevant literature review has clearly shown, in terms of deep and surface learning approaches or strategies towards learning activities (Aharony, 2006; Dolmans et al., 2016; Howie & Bagnall, 2013), that a deep learning approach results from an inner need to reach a complete understanding of the subject material and that behind the deep strategy hides a search for self-fulfilment (Aharony, 2006; Saravanamuthu, 2008), whereas a surface learning approach results from choosing the quickest way to accomplish the task and that behind the surface strategy hides a

need to avoid failure and the desire to minimize effort when completing tasks (Aharony, 2006; Biggs & Moore, 1993). The conflict of surface learning and deep learning in the process of m-learning was considered as a major concern, according to the respondents. As participant 20 and participant 35 said:

> *"M-learning provides the broadness (breadth) of knowledge but not the depth of knowledge"* *- Participant 20, Male, 30s, Mgr.*
>
> *"However, I am not sure whether the depth of learning is also increased when the breadth of knowledge is increased by m-learning."*
>
> *- Participant 35, Male, 30s, Non-Mgr.*

Referring to this issue, participant 39 described this issue (breadth vs. depth) as the "double-edged sword" of m-learning; and he took English learning as an example to explain his argument. According to participant 39, English learning not only requires surface learning that can be provided by fragmented learning modules through m-learning, but also requires deep learning such as literature study, cultural experience and writing skills that fragmented learning can hardly facilitate. As he stated:

> *"I think m-learning is just like a double-edged sword, which may be used by us, or may hurt us. People have become fickle and don't want to learn things deeply. Take English learning as an example, memorizing words or reciting words doesn't help in increasing your overall English skills (but only vocabulary), you need to learn how to use the words in contexts, you need to read novels, you need to know the culture (to increase your English skills)."* *- Participant 39, Male, 30s, Non-Mgr.*

Another concern of m-learning, according to the respondents, is how to select the right m-learning courses or programs from the richness and variety of online resources. This concern echoes the key point of Navigationism (Brown 2005, 2006) in the m-learning literature, which contends that the use of mobile devices for learning requires skills in navigating knowledge, and that these skills are very different from traditional learning methods. Many participants highlighted the difficulty of choosing the right or valid course or information; for example, Participant 7 used a new term, of "SQ (Searching Quotient)", to describe the skill of navigating knowledge, which is quite different from IQ (Intelligence Quotient) or EQ (Emotion Quotient) required in a traditional learning context which is typically strongly determined by the teacher and the syllabus. Technological development has introduced new and alternative views about

our interaction with information; and this concern reflects the skills and competencies increasingly required to survive in this knowledge era:

> *"It is not a question of whether you can find information but how to deal with too much information available online. You need to develop your "searching quotient", how to find the information you need effectively and efficiently. It is a new term, before we have IQ and EI, now SQ is calling. I am not good at it."*
>
> *- Participant 7, Female, 30s, Non-Mgr.*

> *"My concern is that the amount of information that m-learning provides is too huge and we don't know how to select. We never know what the most valuable information is. There are too many learning Apps and courses, I can only judge from their titles or topics, maybe I missed some valuable courses."*
>
> *- Participant 19, Female, 20s, Non-Mgr.*

With the high penetration of mobile devices and ubiquity of use of mobiles for learning, mobile users have a high exposure online, and many of them worry about the security of their personal information. There are increasing instances of personal information leakage that have been reported in recent years in China; and awareness of protecting privacy and personal information was a major concern by the participants. In particular, as the popularity of mobile pay[23] has been skyrocketing in China, this has made the personal information leakage through mobile devices a critical issue nowadays (China Daily, 2016). This finding disproves the stereotype existing in the literature that Eastern culture has less sensitivity on privacy and personal information (Nemati, Wall, & Chow, 2014; Zhang & Ok, 2011). Wang et al. (2011) investigated privacy attitudes and practices between different cultural groups of social networking users, and their results revealed that the Western (American) respondents were more privacy concerned than the Eastern (Chinese and Indian) respondents. Chinese people were considered to be using less privacy coping strategies (e.g. refusing to share or removing private information from social media platforms) and to have greater risk of privacy violations

[23] Mobile Pay refers to the payment applications for smart phones. By downloading these applications, users are required to connect a credit/debit card account and account information to their mobile number. Money payment/transfers are performed by entering a mobile phone number or scanning the QR code via the mobile phone, while the amount is transferred from the users' credit/debit card accounts (Dahlberg, Guo, & Ondrus, 2015).

but more information-sharing behaviours. As Nemati et al. (2014) state "Chinese respondents are more comfortable sharing information with a wider variety of people than US users". However, in the present study, high awareness and sensitivity of privacy and personal information has been identified. As participant 3 and participant 33 highlighted:

> *"Personal information leakage, I think. I am not sure if my privacy can be protected. You know some information, conversations regarding some topics, I don't want to share in a larger community."* *- Participant 3, Female, 30s, Non-Mgr.*

> *"I am worrying about the leakage of personal information. Since we have more and more apps, there are more chances to leak our private data."*
> *- Participant 33, Female, 30s, Non-Mgr.*

Insufficient interpersonal interaction is another concern of respondents about m-learning identified in this study. This concern reflects the previous research on the "Chinese learner", otherwise known as the "Confucian heritage culture learner" (Ryan, 2010), that Chinese learners prefer interacting with other learners. It is notable that, in the era of m-learning, the Confucian culture still has influence on the learning preferences in China. Traditionally, *Guanxi* required face-to-face communication; however, in many workplaces nowadays, face-to-face interaction would be a luxury (Chong, Lacka, Boying, & Chan, 2018; Davison et al., 2018). Thus, *Guanxi* may be developed and maintained through mobile technology and social media. This finding also reflects the latest research by Liu et al. (2018) that responsiveness is perceived as an important factor that affects user satisfaction with m-learning apps. Although feedback and interactive activities are included in many m-learning apps in the Chinese market, this finding suggests that mobile learners in China need further adaptive content or feedback according to a different user model, provide appropriate learning evaluation for learners to increase the responsiveness of m-learning. Many participants claimed that sharing and interaction play an important role in learning, especially face-to-face interaction, for example:

> *"However, the disadvantage is lack of face-to- face interactions."*
> *- Participant 36, Female, 30s, Non-Mgr.*

> *"Interaction and recapping, I think this is the missing part of current m-learning activities. This is the weak point compared with the classroom training, where the teachers or facilitators encourage interactions and providing recap session."*
> *- Participant 24, Male, 40s, Non-Mgr.*

While the concept of "Fragmented learning" has been well accepted by the participants in these organisations, they also noted problems with the quality and outcome of fragmented learning. As argued in the literature review (Section 2.4, Chapter 2), fragmented learning has different features from traditional face-to-face learning; for example, fragmented learning can expand original fixed learning time and space, and increase learning opportunities for learners (Peng, 2015); however, this new learning style via m-learning also has its drawbacks. As participant 13 and participant 20 said:

> *"Although the time (that I spend on m-learning) is fragmented and the learning is fragmented, I wouldn't like my learning results (the quality of learning) to be fragmented."* *- Participant 13, Female, 30s, Mgr.*

> *"I am also concerned about the quality of fragmented learning. Is it worthy to spend those fragmented times on m-learning? I know it's better than to do nothing, but does the fragmented learning provide the same learning results as traditional learning?"* *- Participant 20, Male, 30s, Mgr.*

The concern for physical health was also apparent as an issue of m-learning. As reported by the participants, long time using mobile phones may cause cervical syndrome[24], dry eyes[25] and other vision problems. Interestingly, this issue was reported by two participants from the younger age group in their 20s. Based on the results of mobile usage identified in the previous quantitative analysis, this concern is most likely a result of long-time use of mobile devices in the younger age group, as heavy users of mobile devices. Both defined themselves as heavy users of mobile devices, with participant 25 and participant 31 claiming:

> *"…it may be harmful to your health, I mean your neck and eyes. When I was in college, I spent a lot of time on iPad and mobile phone, then I got dry eye disease. So, I think we shouldn't rely on mobile devices too much unless the growing mobile technologies can ensure the health and safety."* *- Participant 25, Female, 20s, Non-Mgr.*

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[24] Cervical spondylosis is a common, age-related condition that affects the joints and discs in your cervical spine, which is in your neck. It's also known as cervical osteoarthritis or neck arthritis (Delgado & Nall, 2018).

[25] Dry eye syndrome is caused by a chronic lack of sufficient lubrication and moisture on the surface of the eye (Adler, 2018).

"My concern is about the health issue, it would be harmful to the eyes if we spend too much time on mobile devices." *- Participant 31, Female, 20s, Non-Mgr.*

The so-called FOMO (Fear of Missing Out), known also as nomophobia[26], was also referred to by participants as a concern of m-learning. According to Przybylski et al. (2013), when social media provide a multitude of opportunities for interaction, on the other hand, they often broadcast more options than can be pursued, given practical restrictions and limited time, which causes FOMO. Defined as a pervasive apprehension that others might be having rewarding experiences from which one is absent, FOMO is characterised by the desire to stay continually connected with what others are doing (Elhai, Levine, Dvorak, & Hall, 2016; Przybylski, Murayama, DeHaan, & Gladwell, 2013; Wegmann, Oberst, Stodt, & Brand, 2017). As participant 25 stated:

"The second concern is about something like FOMO. Sometimes we can't help keeping refreshing our mobile screen and being afraid of missing any updates or messages. This has become a kind of anxiety in our lives now."

- Participant 25, Female, 20s, Non-Mgr.

In summary, although m-learning provides new opportunities and prospects to employees' learning and development, its incorporation into the Chinese business environment presents challenges and concerns for both individuals and organisations. The conflict of surface learning and deep learning, the difficulty of selecting suitable content online, the risk of personal information leaking, the insufficient interpersonal interaction, the quality of fragmented learning, and the FOMO issue, have been addressed as the main concerns of adopting m-learning in the Chinese business context.

5.5.2 Improvement Areas for M-learning

To explore and understand how to enhance the successful adoption of m-learning in the Chinese business context, respondents were asked to address the improvement areas of m-learning by answering the interview question 7: "What can be done to increase the effectiveness of mobile learning?" This question sought to discover what issues need to be addressed or

[26] Nomophobia is the fear of being out of mobile phone contact (Yildirim & Correia, 2015).

highlighted to implement m-learning and what are the perceived initiatives that can increase the effectiveness and efficiency of m-learning in a Chinese business setting.

After analysing the transcripts regarding this question, four areas for improvement were identified. According to the respondents, to achieve better results of m-learning, first of all, more interactive activities in m-learning should be provided. This result echoes the previous findings of the present study regarding the importance of interaction for the "Chinese learner", otherwise known as the "Confucian heritage culture learner" (Ryan, 2010) (Section 5.4 and 5.5.1). This result further suggests that Chinese learners more prefer interacting with other learners during the learning process. It is notable that, in the era of m-learning, the Confucian culture still has influence on the learning preferences in China, where people are more likely to desire committed, close, and strong relationships with others (Nemati et al., 2014). Traditionally, *Guanxi* required face-to-face communication; however, in the digital era, *Guanxi* may be developed and maintained through mobile technology and social media. Bambaca and Sanderson (2011) also confirm from their research that Chinese learners with Confucian background prefer face-to-face interaction with classmates and teachers than online communication, in order to obtain stronger ties of interpersonal relationship (Bambacas & Sanderson, 2011). The concept of learning from others and learning from the interaction with others was shared by many participants interviewed, as participants 20 and 16 addressed:

> *"First (improvement area) is interaction. I think learning is not a one-way approach: from teacher to the students, but needs a multi-directional approach: teacher to students, students to teachers, and students to students. Interaction can motivate learning enthusiasm and deepen the understanding."- Participant 20, Male, 30s, Mgr.*

> *"M-learning sometimes can be lonely without interaction with others. While off-line training can involve discussion, I mean, it would be good if we can have interaction, instant interaction in the m-learning. With the instant interaction, the m-learning can upgrade to a higher level." - Participant 16, Female, 30s, Mgr.*

Meanwhile, the desire for further interpersonal interaction in m-learning also revealed the strong need for responsiveness (Liu et al., 2018) in the m-learning activities, or "instant interaction in the m-learning", as described by participant 16 above. Although feedback and interactive activities are included in many m-learning apps in the Chinese market, this result suggests that mobile learners in China need further adaptive content or feedback tools

according to different user models, to increase the responsiveness of m-learning; for example, in the "Bullet comment" mentioned by participant 32:

> *"Maybe we can add some interactions into the m-learning, for example the feedback to the facilitators. It would be ideal if we can communicate with someone else during the m-learning, maybe something like "Bullet screen" or "Bullet comment" when we watch the videos."* *- Participant 32, Female, 30s, Non-Mgr.*

The second area of improvement suggested by the respondents is that the company/organisers/trainers need to control the quality of m-learning courses, including the course design, content, assessment, and the length of course, and ensure that the courses are suitable for fragmented learning. According to the respondents, the company/organisers/trainers should provide good quality m-learning courses, and they refer good quality m-learning courses as "well designed and developed learning modules", which don't require further selection, modification and checking from the users' end. The request for providing "high quality" and "more personalised" content of m-learning products reflects the characteristics of the "dependent learner". Based on previous studies in literature, independent learning consists of self-selection, self-determination, self-modification and self-checking (Chen et al., 2005; Goode, 2007), while dependent learners tend to be more passive in selecting, determining, modifying and checking learning activities by themselves, relying instead on the teachers/trainers (Andrews, 2015). According to Ryan (2010), the Confucian heritage culture learners are passive learners, dependent on the teacher and following the teacher. Therefore, the Chinese learners usually have higher expectations of the teachers/trainers and the learning materials. As participant 19 and participant 25 mentioned:

> *"I hope someone can recommend or push some valuable courses to me instead of searching by myself. Is it possible that the m-learning platform can push some relevant information to me based on big data, my profile or the key words I used?"*
> *- Participant 19, Female, 20s, Non-Mgr.*

> *"Second (improvement area) is the quality of the m-learning resource; I mean the learning content could be more interesting and solid. There are too many learning resources online, among them, many courses' quality is not high."*
> *- Participant 25, Female, 20s, Non-Mgr.*

The third improvement area refers to further customised m-learning courses/programs which meet users' personal learning needs or provide better personalising learning experience.

Evidently, individual differences in technology use as well as in learning preferences may result in the need for a variety of personal learning approaches. According to Kurilovas, Kubilinskiene, and Dagiene (2014), learning software and all learning processes should be personalised according to the main characteristics or the needs of the learners. Learners have different needs and characteristics: prior knowledge, intellectual level, interests, goals, cognitive traits (working memory capacity, inductive reasoning ability, and associative learning skills), learning behavioural type (according to his/her self-regulation level), and finally, learning styles. However, personalisation can be an endless effort, and over-personalised learning may weaken a common curriculum and consequently lead to erosion of common knowledge (McQuiggan et al., 2015a; Melis & Monthienvichienchai, 2004; Traxler, 2007). As Traxler (2007) argued, highly personalised m-learning curricula may further weaken the capacity for independent learning and consequently lead to further demand for personalised learning materials. According to Melis and Monthienvichienchai (2004), over-personalisation could also result in the invalidation of the students' learning experience with respect to the community of practice that they want to join. Therefore, it is arguable whether the highly personalised curricula are necessary and beneficial to the mobile learners. Although, when the advantage of personalised learning through m-learning was highly appreciated, the disadvantage of over-personalisation hadn't been addressed during the interviews in the present study. Participants called for further personalised m-learning, without awareness of its drawbacks, as participant 14 and participant 17 addressed:

> *"The learning content need to be customized. For example, select some key managerial courses to us, the mid-level supervisors and provide opportunities for group discussion and sharing."* *- Participant 14, Female, 30s, Mgr.*
>
> *"I hope the m-learning can be more personalized, I mean instead of me looking for learning courses, the m-learning platform can push m-learning resources to me, based on big data and my personal needs."* *- Participant 17, Female, 30s, Non-Mgr.*

The fourth improvement area suggested by the participants refers to m-learning promotion and education sessions conducted by the organisations to create a better organisational m-learning environment. Although using mobile devices for learning has become ubiquitous, organisations still play a key role in promoting and educating their employees to adopt the use of mobile devices for learning. This echoes the previous findings by Brown (2005, 2006) regarding Navigationism. According to Brown (2005, 2006), to survive in the knowledge era, m-learners need to develop skills and competencies in navigating knowledge, and the role of

the trainer or teacher needs to be that of a coach to help learners in developing such skills. Participant 22 believed that the guidance in how to conduct m-learning from the company is the first important thing to do to achieve better results:

> *"I think more promotion of m-learning needs to be done by the company. I guess people haven't taken it (m-learning) seriously. If we want to make m-learning become a proper mainstream learning method in the organization, we need to do more promotion, education and systematic management."* *- Participant 22, Male, 20s, Non-Mgr.*

In summary, to achieve better uptake of m-learning in the organisations, respondents are expecting to have more interactive, higher quality and further personalised content of m-learning; meanwhile, further promotion and education campaigns arranged by the organisations were also considered as helpful to create a better m-learning environment in the organisations.

5.6 Chapter Summary

This chapter presented the qualitative results generated by the analysis of the interview data, which provide a further understanding of the characteristics of m-learning in Chinese business. Firstly, the qualitative results from interviews illustrated the high usage of mobile devices for learning purposes. On average, respondents spend 62 minutes on m-learning every day; and m-learning is usually associated with informal learning activities (apps, WPAs, etc.). Based on the high usage of m-learning, it is noted that using mobile devices for learning has become ubiquitous among the participants and in these sample organisations. It was found to be consistent with quantitative results that female respondents, the younger age group, and the non-managerial group, spend more time on m-learning. These group differences may reflect the tensions of employability in the female group and non-managerial group in the Chinese workplace. Meanwhile, the significance of social influence on adopting m-learning was also found, which reflects the collectivist roots of Chinese culture.

Secondly, the results of the qualitative analysis revealed 19 themes of personal benefits and 17 themes of organisational benefits of m-learning perceived by the respondents. All these themes could be matched and classified into three central themes (categories) derived from previous examination of the Western literature, which are "Autonomy", "Real-world Relevance" and "Collaboration and Networking". There were no other distinguishable central themes (categories) found. It is noticeable that, for the perceived personal benefits of m-learning, the

category of "Autonomy" comprised the most themes, followed by "Real-world Relevance" and "Collaboration & Networking". This result is consistent with the previous quantitative finding that respondents perceive "Autonomy" as the most important central theme of m-learning, followed by "Real-world Relevance" and then "Collaboration & Networking". Meanwhile, for the perceived organization benefits, the central theme (category) of "Real-World Relevance" involves the most themes of the perceived benefits, followed by "Collaboration & Networking" and "Autonomy". This order/ranking of the central theme of organisational benefits of m-learning may imply that, in the Chinese business context, organisational learning has an orientation of pragmatism, where contextual and authentic benefits are considered as the most important motivational factors in learning implementation.

The results obtained from the qualitative analysis also revealed some concerns and improvement areas of using mobile devices for learning. The conflict of surface learning and deep learning, the difficulty of selecting suitable resources online, the risk of personal information leaking, and the insufficient interpersonal interaction, have been highlighted as the main concerns in using mobile devices for learning in the Chinese business context. To achieve a better result of m-learning in the organisations, respondents are expecting to have more interaction, and higher quality and further personalised content of m-learning, while further promotion and education campaigns arranged by the organisations can help to create a better m-learning environment in the organisations.

In the following chapter, the results of the study will be discussed and summarised, and conclusions will be presented. Finally, the limitations and recommendations for future research will also be stated.

Chapter Six: Conclusion, Summary and Discussion

6.1 Introduction

This chapter highlights how this study addresses the research questions with its key findings and conclusions. Firstly, the results of the study will be discussed. Secondly, the contributions to the field of m-learning and their implementation for human resource development (HRD) practices will be discussed. Finally, the limitations and recommendations for future research will be stated. The five research questions proposed earlier guide the discussion, and are addressed individually.

6.2 Current Status of Mobile Usage and M-learning

RQ1 What is the current status of using mobile devices for learning purposes in a Chinese business setting? (Description of mobile usage and m-learning facts of the Chinese organisations)

The results of this study indicate that the conditions have appeared favourable for m-learning to flourish in Chinese business settings. In general, mobile usage and m-learning adoption have come to proliferate in China. A prosperous but competitive economic environment and strong social influence have been discovered to have a positive impact on this proliferation. Demographic differences in mobile device usage and m-learning adoption were identified and discussed.

6.2.1 Proliferation in mobile usage and m-learning adoption

Results from both the quantitative and qualitative analyses suggest that the penetration and usage of mobile devices in the sampled Chinese organisations is significantly high. Most of the respondents have 2-3 mobile devices, with the vast majority (90%) indicating that the smartphone is their most used mobile device. With regard to the years of experience of using mobile devices, 81% respondents have more than 6 years' experience of using mobile devices, and more than half of respondents (52%) indicated more than 10 years' experience; and 86%

of respondents claim that they can use mobile devices with great ease. On average, respondents spend 5 hours on mobile devices per day, and it is notable that 27% of the respondents spend more than 7 hours per day. Compared with mobile usage in the United States, which is 4 hours per day (eMarketer, 2018), the respondents in the sample organisations are spending more time on mobile devices, and the difference could be almost one hour per day. These findings mirror the reported increasing mobile phone penetration and mobile internet access in China by previous relevant research (Adkins, 2015; Gumeta & Khan, 2017; Yang & Wang, 2011). This could potentially translate into major opportunities for the use of mobile phones for educational purposes. The highest mobile phone usage worldwide and increasingly favourable market conditions (Gumeta & Khan, 2017) in China makes China the largest m-learning market worldwide, with estimated $2.3 billion revenue in 2019, up from the $1.1 billion reached in 2014 (Adkins, 2015).

The growth in mobile penetration and mobile usage has brought many opportunities for corporate learning and development via m-learning (Chee et al., 2017; Lac et al., 2014). Indeed, m-learning has been found to contribute to employee learning and development (Kahle-Piasecki, Miao, & Ariss, 2012). According to a survey conducted by PricewaterhouseCoopers (2010), the global mobility of the workforce is expected to increase significantly by 2020 due to the growing need to deploy talent around the world. Consequently, m-learning is playing a more important role in supporting the learning and development of mobile workers who often have little time during work hours to focus on their learning (Casuto, 2016; Lac, 2018). The Chinese organisations in the present study appear to have been at the forefront of adopting m-learning for employee training and development since the formal introduction of m-learning occurred in 2000 (Hao et al., 2017). These organisations have introduced and launched organisational m-learning programs, and respondents have shown a high level of awareness and acceptance of m-learning. According to the qualitative analysis, 93% of the interview respondents use mobile devices for learning purpose every day, and respondents spend around one hour per day on mobile devices for learning purposes; while quantitative results also support a high frequency of learning-related activities through mobile devices, especially on social media.

6.2.1.1 Economic Influence

The literature review in this study indicates that there is a growing need and interest in the field of m-learning in corporate business settings (Lac et al., 2014). For instance, m-learning is used

for employee training and development (Donnelly & Gimson, 2009; Freifeld, 2013), and this is perhaps even more evident in China where people development has become a top challenge for doing business (Cooke, Saini, & Wang, 2014; Wang-Cowham, 2011). China has become the biggest emerging market with economic and political influences in the world economy (Liu & Pearson, 2014). The nature of organisations and business has changed significantly in the past decades in China. As a result of its rapid economic growth, there is a stronger need to cope with greater market competition, higher employee turnover, greater job mobility, and rapid technological development in the workplace (Takeuchi et al., 2009). Having realised that mobile device and mobile technologies could dramatically increase the convenience and effectiveness of accessing information for business and employee development, many corporate and industry practitioners in China have adopted m-learning as a part of their employee training and development systems. Although there is little systematic knowledge available in the literature about how mobile technologies can be used effectively for learning and training purpose in the workplace, and the m-learning theoretical framework for Chinese business settings is still lacking, the rapid adoption of m-learning into organisational learning and development systems in business settings is happening in China, which has made the Chinese m-learning industry a booming and lucrative market (Adkins, 2015).

6.2.1.2 Social Influence

The significance of social influence on the adoption of m-learning was discovered from the results of analysis in the present study. As many researchers have argued (Balakrishnan & Gan, 2016; Gumeta & Khan, 2017; Mao, 2014), social media holds enormous potential in the delivery of educational content. Venkatesh et al. (2003) define social influence as "the degree to which an individual perceives that important others believe he or she should use the new system" (p. 451). According to the results of the present study, the high degree of social influence on the use of m-learning indicates that an employee's behaviour or decision is typically influenced by other employees, managers or important people in the Chinese business setting, which reflects previous research on social influence on m-learning. As many researchers (Caballe et al., 2010; Elhai et al., 2016; Hao et al., 2017; Park, Yang, & Lehto, 2007; Przybylski et al., 2013; Sharples, 2005; Troussas et al., 2014; Wegmann et al., 2017) have found, social influence has a significant positive effect on the behavioural intention to use m-learning. For example, Park et al. (2007) studied the role of social influence in the context of Chinese attitudes toward mobile technology, and found that it had a positive role in adoption.

Furthermore, Przybylski et al. (2013) suggest that, when social media provide a multitude of opportunities for interaction, on the other hand they often broadcast more options than can be pursued, given practical restrictions and limited time, which causes FOMO (Fear of missing out). Defined as a pervasive apprehension that others might be having rewarding experiences from which one is absent, FOMO is characterised by the desire to stay continually connected with what others are doing (Elhai et al., 2016; Przybylski et al., 2013; Wegmann et al., 2017). In the Chinese business context, the characteristic of FOMO in m-learning can be represented as the desire to stay continually connected with their social networks and quickly employ m-learning when others are starting to use mobile devices for learning. Given that China has a strong culture and deep-seated *Guanxi* (social relationship) values, the impact of social influence and FOMO on m-learning could be greater than in non-*Guanxi*-based contexts. As denoted earlier in the study, career success in the Chinese business context is strongly influenced by *Guanxi* – the importance of relationship. Once the employees in this study found that they could use m-learning empowered by social media to strengthen their *Guanxi*, their usage of m-learning would be promoted by the demand of *Guanxi*. In other words, *Guanxi* is leveraged by m-learning, and m-learning is further promoted by *Guanxi*.

6.2.2 Demographic difference in the usage of m-learning

Although female respondents and people with higher educational background spend more time on mobile devices, it was also found that female employees and people with lower (associate degree) education background adopt m-learning activities more readily. This may be due to their career ambition and competition from the emerging Chinese labour market. With the emerging but increasing market competition in China, job seekers and job incumbents worry about the abundant and high-quality nature of competitors in the emerging labour market (Knight & Yueh, 2008; Takeuchi et al., 2009). Job skills and competency requirements in the labour market have risen significantly in the last decades. The strong influence of the Confucian value of "respect education and scholarship" means that people with higher education background and higher scholastic value (Baruch, 2009; Zhang & Nesbit, 2018) are more respected in Chinese organisations (Fu & Kamenou, 2011). Therefore, the worry of losing competitiveness in fast-developing organisations pushes employees with lower educational background to pursue higher degrees and to utilise the learning and development resources to increase their workplace competitiveness. Meanwhile, female employees suffer disadvantages of career advancement based on prejudices related to gender, social role and managerial

stereotypes, as is supported by social role theory (Eagly, 1987; Stoker, Van der Velde, & Lammers, 2011). Given the strong belief that men have the breadwinner role and women have the housekeeper role (Zuo & Bian, 2001), in a Chinese business context, female employees usually face more rigorous criteria than male colleagues in job promotion (Cooke & Xiao, 2014; Xiu, 2013). Thus, female employees need to demonstrate a better educational and professional profile to compete with their male peers (Yang, 2011). This may explain why female employees and people with lower education level spend more time on m-learning activities.

Results also show the tendency that people working in an Operation function, Sales/Marketing function, and Logistics/Purchasing function, are more often accessing both company-organised m-learning activities and self-organised m-learning activities than other groups. Apparently, people working in these functions are usually involved with frequent business travel, and m-learning has become the most convenient and resourceful method of learning and development. Moreover, many people working in an Operation function are located in different cities/sites, and m-learning provides opportunities to build ties with colleagues at HQ or in other locations. As discussed previously, the ties or so-called *Guanxi* with peers and key persons in the corporates plays an important role in driving success in the Chinese business context (Gumeta & Khan, 2017; Lin et al., 2013; Ma & Tsui, 2015). Traditionally, *Guanxi* required face-to-face communication; however, in many workplaces nowadays, the face-to-face interaction would be a luxury. Thus, *Guanxi* may be developed and maintained through mobile technology and social media. According to the latest research, social media and other mobile apps through mobile devices have become amongst the major platforms to build up social networks and enhance *Guanxi* in China (Chong et al., 2018; Davison et al., 2018). Davison et al. (2018) found that informal knowledge exchange arrangements predicated by *Guanxi* were ubiquitous; and that the intertwined elements of knowledge, *Guanxi* and technology collectively comprise an informal learning system that supports work effectively in China. This may also explain why 70% of the m-learning resources are based on WeChat, China's most popular social media application (People Daily, 2018). Therefore, m-learning has also become a platform to develop and maintain social networks and *Guanxi* in the Chinese business context.

6.2.3 Summary for research question 1

In general, the conditions have appeared favourable for m-learning to flourish in Chinese business settings, based on the findings of this study. Firstly, mobile device penetration rate and mobile usage is significantly high in China, which has brought good opportunities for

adopting m-learning in Chinese business settings. Secondly, Chinese organisations have been actively leveraging mobile technologies to support their employee training and development. Thirdly, economic influence and social influence have a positive impact on m-learning adoption in the Chinese business context. Fourthly, due to the high competitiveness in the Chinese labour market and the dominance of male employees in management positions, female employees and people with lower educational background are more actively using m-learning to increase their competitiveness at the workplace. Fifthly, due to the heavy *Guanxi*-based business culture in China, mobile and remote workers are more actively using m-learning to enhance their social networks and *Guanxi* in the Chinese business context.

6.3 Perceptions of M-learning in the Chinese Organisations

RQ2 What are the employees' perceptions of m-learning in the Chinese business context? (Employees' acceptance of and attitude toward using mobile devices for learning)

The results of this study indicate a general positive perception of m-learning among the employees in the Chinese organisations. Preferred organisational learning methods, ideal m-learning content, ideal user of m-learning, and the important aspects of m-learning from the respondents' perspective, were discovered and discussed.

6.3.1 General perception of m-learning in the Chinese organisations

The general findings from the results of this study indicate that employees from the sample organisations have positive perceptions of m-learning. According to the quantitative analysis, 78.2% respondents state that they like using mobile devices to learn, 74.5% of the respondents agree (or strongly agree) that m-learning can enhance learning efficiency, 64.2% of respondents claim m-learning can enhance learning interest, 67% of respondents are satisfied with the results and effectiveness of m-learning, 65.3% of respondents believe m-learning can help with their career development, and 82% believe m-learning is most likely to be a mainstream learning method in the future. This positive perceptions of m-learning in these organisations echo recent research conducted by Liu et al. (2018), whose results show that Chinese mobile users have high satisfaction with the content conforming to the m-learning context.

The learner's perception of m-learning tends to be influenced by their experience and interaction with m-learning applications and m-learning activities (Liu et al., 2018; Narayan,

2017). According to the respondents, most of the m-learning activities were delivered through WeChat (social media platform). Social media has been playing a significant role in developing and spreading m-learning in China in the last decade (Churchill et al., 2018; Gumeta & Khan, 2017). There were more than 1 billion monthly active users (902 million daily active users) in 2018; with WeChat becoming the most popular social media app in China (Jao, 2018). As Gumeta (2017) reports, many of the social media apps and tools available to Chinese users are more advanced than those in the West (Gumeta & Khan, 2017). WeChat includes text messaging, voice messaging, video conferencing, video gaming, sharing of photographs and videos, and in addition, users can pay bills, shop online, transfer money and check-in for flights etc. An important feature of WeChat is the WeChat Public (Official) Account (WPA), which is a broadcasting and promotion service launched by famous persons, authorities, organisations and media. Although WeChat was never designed to act as a learning management system, through the WPA channel, learning content providers can push or broadcast information to their followers on a real-time basis. As Churchill et al. (2018) state, WPA, as a learning platform, has "succeeded where many traditional learning management systems have failed: in promoting social interaction and taking education to where students already are" (p.8). Zhang (2015) found that learning through WeChat is more effective than the traditional classroom learning for tertiary education. The positive perception of m-learning identified in the present study further confirms that m-learning through social media (WeChat) is an effective learning method for employees in the workplace. Together with the high penetration and usage of mobile devices identified, the positive perception of using mobile devices for learning further suggests the favourable conditions and huge potential for Chinese organisations to adopt m-learning for employee learning and development.

6.3.2 Preferred learning method for organisational learning

The present study reveals the preferred learning method for different topics/contents in these organisations. Compared with classroom learning, computer-based learning and on-the-job learning, m-learning is perceived as the most preferred learning method for most of the organizational learning programs/learning courses, including: product/industry information learning, compliance (regulations) learning, soft-skills learning, and job-related knowledge and skills. Findings in this study are consistent with the literature regarding the great need and high acceptance of m-learning in the workplace in China (Gumeta & Khan, 2017; Liu et al., 2018). As many researchers have argued, m-learning has already started to play an important role in

improving access to education and learning, and improving learning quality and efficiency, as well as increasing the learning intention in China (Yang & Wang, 2011; Zhong, Chow, & Chen, 2018). Based on the favourable responses in the present study on the intention of using m-learning, the satisfaction of m-learning results, and its effectiveness and efficiency, the users' positive perception towards m-learning in the Chinese context is confirmed. Although mobile learning in China is still far from being an integral part of formal teaching and education in schools, in light of such developments, the adoption of mobile learning will continue to grow in the workplace.

However, the results of this study also reveal that the preferred learning method of leadership and managerial courses/programs was the face-to-face classroom, which illustrates the desire of acquiring social capital (social networks) when choosing the method of managerial/leadership development in the Chinese business setting. In China, social networking has been identified as a very important factor in the pursuit of managerial and leadership training, such as in MBA programs (Huang & Jao, 2015; Zhang & Nesbit, 2018). The activities and the processes of developing leadership and management skills, within or between Chinese organisations, are considered an integral part of developing a broader relationship network for both the organisations and individual business success. (Gibb & Zhang, 2016; Warner, 2016; Xiao, 1996). Lowry et al. (2011) states that "collectivist cultures, such as in the Chinese culture, are more likely to desire committed, close, and strong relationship with others" (p. 176). Therefore, face-to-face classroom training would be an ideal method of acquiring social capital (social networks) in the Chinese business context. This finding echoes previous research on the importance of social capital in choosing managerial learning/training methods in China. For example, Zhang and Nesbit (2018) emphasise that social capital is the most important factor when the high potential talent in Chinese organisations consider managerial learning and leadership development options.

6.3.3 Perceived ideal content for m-learning

Perceptions of the ideal content for m-learning were derived from the present study. It is noted that four kinds of preferred m-learning content/topics appeared most often: 1) simple and short, 2) work-related and practical, 3) interesting and edutainment, and 4) personalised.

Firstly, the desire for simple and short m-learning content reflects the preference for the surface learning approach rather than the deep learning approach in the Chinese business context. The

literature review reveals that deep and surface learning are two learning approaches or learning strategies (Aharony, 2006; Dolmans et al., 2016; Howie & Bagnall, 2013). A deep learning approach results from an inner need to reach a complete understanding of the subject material, and behind the deep strategy hides a search for self-fulfilment (Aharony, 2006; Saravanamuthu, 2008). Meanwhile, the surface learning approach results from the quickest way to accomplish the task, and behind the surface strategy hides a need to avoid failure and the desire to minimize effort when completing tasks (Aharony, 2006; Biggs & Moore, 1993). The findings in this study show a major preference for adopting a surface learning approach in the Chinese business setting, which mirrors the outcomes of previous research regarding the differences in academic values between Western cultured learners and Confucian cultured learners. According to Ryan (2010) and Saravanamuthu (2008), Western learners tend to be "deep" learners while Confucian learners tend to be "surface" or rote learners (Ryan, 2010; Saravanamuthu, 2008). This finding is also consistent with the finding related to the perceived benefits of m-learning, that the concept of fragmented learning has been well accepted by the users of m-learning and m-learning is believed to be beneficial for fragmented learning. Based on the literature review (Section 2.4, Chapter 2), fragmented learning is an inevitable product of the era of information technology and an unavoidable new way of learning when mobile devices have become ubiquitous (Liang et al., 2018; Peng, 2015). Fragmented learning shows different features from traditional collective learning, which can expand original fixed learning time and space, and increase learning opportunities for learners (Peng, 2015). Fragmented learning is believed to be worth a try and may help to promote both formal and informal education systems (Li, 2014). However, earlier researchers addressed drawbacks of this new learning style: firstly, fragmented learning will make learners less discriminating and overwhelmed by the large amount of information through mobile devices; secondly, fragmentation of learning results in a lack of deep analytic thinking; and thirdly, fragmented learning interferes with systematic knowledge collation (Jiang, 2018; Peng, 2015). Liang et al. (2018) argue that fragmented learning requires improvement in the capacities of the mobile devices or mobile applications for "understanding" and "perceiving" individual learning needs in the process of organizing knowledge. Peng (2015) points out that fragmented learning is not conductive to the logic and integrity of individual knowledge systems, and is not suitable for learners to complete complex learning tasks.

Secondly, the perceived ideal content reflects the preference for work-related and practical m-learning content reveals the orientation of utilitarianism and pragmatism of learning in the

Chinese business environment. As reported in the literature, the utilitarian and pragmatic orientation in Chinese organisations is evident when looking for what works, who benefits, or how to absorb complexity and develop continuous innovation to meet a rapidly changing business environment (Elkin et al., 2009; Redding, 1990; Shen & Williams, 2016). Elkin and Cone (2009) find that "Western organisations have tended to expect the environment and people in the environment to adapt to the organisational way of doing things" while "East Asian organisations do not try to change the environment but rather try to change the organisation to their environment so as to fit better with it" (p. 70). This is a pragmatic basis for action that implies that what works is right. Therefore, the desire for contextual and authentic affordance further verifies the drive of organisational learning in the Chinese context and points to the fact that learning should have real-world relevance and help business. While all the organisations focus on business goals, as the biggest emerging economy in the world, the Chinese business environment requires its organisations to more efficiently adopt to the rapid changing and competitive market conditions. In this process of continuous adoption, there is no final business goal to be reached, but rather, learning and development are endless (Elkin et al., 2009).

Thirdly, the perceived ideal content refers to the preference for interesting/edutainment content/activities suggests the trend for "edutainment" (education through entertainment) in organisational training and educational technology in China. With the technical advancement of digital media and the media of communication in recent years, "edutainment" has been recognised as an effective way of learning using modern digital media tools in the education domain (Zhang et al., 2010). This finding is consistent with previous research, that "learning through playing" (Edutainment technology) has become a hot spot in the field of organisational learning and educational technology in China (Lupetti et al., 2017; Wang et al., 2007). However, it is arguable that motivating learners is more than adding entertainment value to lessons or tests; otherwise, as Healey (1998) puts it, learners will not be motivated to learn but just to play with the computer (Okan, 2003). Edutainment doesn't guarantee motivating learners nor the effectiveness of learning. Schnotz (2002) argues that visual displays can support communication, thinking, and learning only if they interact appropriately with the individual's cognitive system. Such awareness of the drawbacks of edutainment wasn't identified during the interviews in the present research. Therefore, the demands of adopting edutainment feature as a benefit of m-learning, while both educators and learners need to question the pedagogical and didactic philosophy that the edutainment software design incorporates.

Fourthly, the preference for personalisation on m-learning content reflects the importance of autonomy in the learning process and learning experience. Given the educational system in China was formerly highly centralized, which didn't provide autonomy or allow students to choose learning context, time, space, and location (Halstead & Zhu, 2009; Hua et al., 2011; Littlewood, 1999; Xia et al., 2017), this preference for autonomy in the learning process and experience may be a re-balancing after a long history of centralised education in the Chinese formal education system. This finding is also consistent with the previous quantitative finding (Section 4.4.3, Chapter 4) that autonomy is an important theme of the important aspects of m-learning in the Chinese business context.

6.3.4 Perceived ideal users for m-learning

According to the qualitative results, m-learning is perceived to be more useful for three specific groups of people in the organisation: 1) the younger age group, 2) the mobile or remote-based group, and 3) the junior-level or first-line employee group.

The first kind of ideal user of m-learning, according to the present study, is the younger age group. Age was repeatedly found to have moderating effect in many ICT and mobile usage-related studies (Lu, Yu, & Liu, 2006; Snell & Snell-Siddle, 2013; Wang, Wu, & Wang, 2009). Both quantitative and qualitative results of the present study indicate that the younger age group spend more time on mobile devices and m-learning. Based on interview responses, participants in their 20s were the heaviest users of m-learning (102 minutes per day), while people in their 30s reported that they spent 64 minutes, and people in their 40s said they spent 35 minutes, per day. These findings echo the results in previous studies that increased age was shown to be associated with difficulty in processing complex stimuli and allocating attention to information in the interaction with ICT (Lu et al., 2006; Plude, 1985). Lu et al. (2006) have reported that Chinese people attribute an imbalance across age levels to the adoption of learning through mobile and the internet. This imbalance may due to the fact that the Chinese typing method is complex, and for the aged people who have problems with vision, neck, hands and spinal cord and lack ICT knowledge (Lu et al., 2006; Wang et al., 2009), they may feel difficulty in using mobile devices and learning apps for their learning. Meanwhile, younger people tend to have higher computer self-efficacy (Snell & Snell-Siddle, 2013), and thus have greater ease in applying mobile technology to their learning activities. Besides this, younger people have grown up immersed in technology as 'digital natives' (Snell & Snell-Siddle, 2013; Wang et al., 2009): unlike the older age group who are digital immigrants, the younger group have strong

confidence and bravery to try new mobile technologies and new applications. This mental confidence also drives the younger mobile device users to believe that m-learning is easy to adopt. As Chris Jones (2010) suggests that there are significant age-related changes in mobile usage and the ease of using mobile devices, but he suggests that these changes are mediated by the active appropriation of technology by young people who act purposively and in relation to influential institutional contexts (Bullen, 2007; Jones, 2010). Therefore, it is not surprising that the younger age group is perceived as the ideal users for m-learning in these organisations. This further supports the age difference in the ability to adopt m-learning in Chinese context.

The second group of ideal users of m-learning are those "mobile employees" who are involved in frequent business travel and "remote employees" who are based in distant locations away from the HQ. These differences between the job function groups were found in both quantitative and qualitative analysis results; which may reflect the fact that, compared with HQ-based employees (typically, employees who work in HR/Fin/Admin/Training functions), mobile workers and remote workers (typically, employees work in Sale/Marketing and Operation functions) tend to spend more time on m-learning activities to maintain and enhance their relationship with HQ colleagues. This is because the distance impacts the effectiveness of networking between employees and HQ, and those distance-based workers are more likely to emphasise building and maintaining ties with HQ to enhance their corporate network (Clegg et al., 2007; Taggart, 1999). Given the m-learning activities through social media provide intensive opportunities to build and maintain networks with other learners in different locations, remote/mobile workers are more likely take advantage of m-learning activities to maintain these for the benefit of *guanxi*. As Davison et al. (2018) assert:

> "when employees can leverage social media for informal knowledge exchange in their guanxi network in order to get work done, the guanxi itself will also benefit from the act of using it, as this is also the act of maintaining and enhancing it" (p.231).

Thus, this finding on perceiving mobile/remote employees as ideal users of m-learning illustrates the social networking function of m-learning in the business context.

Junior-level or first-line employees were perceived as the third kind of ideal users of m-learning by the respondents. This finding echoes the previous finding about the preferred organisational learning method, that m-learning is perceived as the preferred method for compliance, product information, and soft-skills and job-related learning in these organisations. Meanwhile, this finding also mirrors the findings of the present study related to ideal content of m-learning and

perceived benefits of m-learning; which further verifies that m-learning benefits surface or fragmented learning. Given that the learning focus for junior-level employees and first-line employees is about introductory information on the organisation, products, process, compliance and how to perform a specific task (Barzegar & Farjad, 2011), it is understandable that the learning content for junior-level or first-line employees can be well converted into a format compatible with learning that is fragmented and delivered on mobile devices. Therefore, compared to the mid-level and senior-level employees, whose learning focus is about managerial/leadership development and face-to-face classroom learning, junior-level and first-line employees may be the ideal group for m-learning.

6.3.5 Important Aspects (Affordances) of M-learning

The present study has found that the 17 important aspects (corresponding to 16 affordances) of m-learning drawn from analysis of literature on the West also apply to the mobile learners in the Chinese organisations. These 17 important aspects were categorized into three categories (central themes): "Autonomy", "Real-world Relevance", and "Collaboration and Networking"; and the ranking of importance of these 17 items was also illustrated.

Based on the ranking of the top seven important affordances, it is noted that the Chinese business environment, as an emerging market, in terms of the high-pace working environment, rapidly changing and competitive business conditions, and the pressure of fast learning and development, has a strong influence on the intention of adopting mobile devices for learning. As the biggest emerging economy in the world, the Chinese business environment requires its organisations to more efficiently connect with the rapidly changing and competitive market, and therefore, to quickly adapt to such challenges and changes (Elkin et al., 2009). Meanwhile, employees in the current Chinese working environment are more mobilised. According to the current "Develop the west" and "One belt, one road"[27] initiatives raised by the Chinese central government, high-skilled workers are assigned to projects in the less developed areas in the central and west part of China from the more developed coastal areas in the east. Meanwhile, low-skilled labour workers from the central and west parts are migrating to the east for better job opportunities (Ferdinand, 2016; Tian, 2004). This mobilised working environment requires

[27] "One belt, one road" is a development strategy adopted by the Chinese government involving infrastructure development and investments in 152 countries and international organizations in Europe, Asia, Middle East, Latin America and Africa, which are located alone with the old Silk Road routes.

a more spontaneous response to the rapidly changing world (Elkin et al., 2009; Ferdinand, 2016). Apparently, m-learning has become the most practical learning method for such a workforce with high mobility. Although training in every organisation can be practical and work-related, the perceived importance of "Authenticity" reflects the utilitarian and pragmatic orientation in Chinese organisations, reflected in looking for what works, who benefits, or how to absorb complexity and develop continuous innovation to meet rapidly changing market conditions (Elkin et al., 2009; Redding, 1990; Shen & Williams, 2016)

The three central themes that have been confirmed as the most important attribute of m-learning in the Chinese business setting, Autonomy, Real-world Relevance, and Collaboration and Networking, respectively reflect the orientations of personalisation focus, result/task focus, and relationship focus, in conducting m-learning activities. According to the ranking of these central themes, "Autonomy" is perceived comparably as the most important attribute, followed by "Real-world Relevance", and then "Collaboration and Networking". This finding indicates that the traditional, highly centralised education system may have given rise to the demand for autonomy in the learning experience. Given that the formal educational system in China has a long history of centralisation and didn't provide autonomy or allow students to choose the learning context, time, space, and location (Halstead & Zhu, 2009; Hua et al., 2011; Littlewood, 1999; Xia et al., 2017), this preference for autonomy in the learning content may be a re-balancing after a long history of centralised education. Meanwhile, this finding disproves and contradicts previous research conducted by Mujtaba et al. (2013), which found that Chinese respondents have significantly higher scores on the relationship orientation than task orientation. As Zhang and Nesbit (2018) argue, "the rapid economic development and the strong influence from Western cultural values have offset traditional cultural behaviour, thereby shifting the cultural climate from Confucianism to modern neo-Confucianism" (p. 384). The neo-Confucianism has made a substantial influence on Chinese business culture, where Western managerial values and applications are embraced by organisations in China (Zhang, Lamond, Dolan, & Zhou, 2009; Zhang & Nesbit, 2018). Although it is undeniable that relationship and social networking are still considered vitally important for achieving career and business success, in the Chinese business environment, the increasing influence from Western management practice (Ahlstrom et al., 2001; Li & Nesbit, 2013), at least in the present study, result/task is perceived as more important than relationship in m-learning.

6.3.6 Summary for research question 2

The general findings from the results of this study indicate that employees in the Chinese business setting have positive perceptions of m-learning. This positive perception of m-learning further confirms that m-learning through social media (WeChat) is an effective learning method for employees in the workplace. Together with the high penetration and usage of mobile devices identified in this study, the positive perception of using mobile devices for learning further suggests the favourable conditions and huge potential for Chinese organisations to adopt m-learning for employee learning and development.

Although m-learning is considered as a preferred learning method for most of the training topics in the organisations, the result of this study also reveals the preference for face-to-face learning methods for leadership and managerial courses/programs. There are four kinds of preferred m-learning content/topics appearing most often: 1) simple and short, 2) work-related and practical, 3) interesting and edutainment, 4) personalised. The desire for simple and short m-learning content reflects the preference for a surface learning approach rather than deep learning approach. The preference for work-related and practical m-learning content reveals the orientation of utilitarianism and pragmatism of learning in the Chinese business environment; the preference for interesting/edutainment content/activities suggest the trend for "edutainment" in organisational training and the educational technology in China; and the preference for personalisation and autonomy in learning process and experience may be a re-balancing after a long history of centralised education. Meanwhile, three specific groups of people in the organisation were perceived as ideal users of m-learning: 1) the younger age group, 2) the mobile or remote-based group, and 3) junior-level or first-line employees. This finding may reflect the fact that Chinese respondents attributed an imbalance across age levels to the adoption of learning through mobile and the internet; the social networking function of m-learning is highly respected and utilised by mobile workers and remote workers; and m-learning benefits junior/first-line employees by surface or fragmented learning through m-learning.

The present study found that the 17 perceived important aspects (corresponding to 16 affordances) of m-learning drawn from analysis of the literature from the West also apply to the mobile learners in these Chinese organisations. The ranking of the importance of these aspects reveals that, first, the central theme of "Autonomy" is perceived as the most important attribute comparably, second, "Real-world Relevance", and third, "Collaboration and

Networking"; which, respectively, reflect the orientations of personalization focus, result/task focus, and relationship focus, in conducting m-learning activities in a Chinese business setting.

6.4 Perceived Benefits of M-learning

RQ 3 From employees' perspectives, what are the benefits that m-learning could bring to individuals and organizations?

The results of this study reveal that 19 themes of personal benefits and 17 themes of organisational benefits of m-learning were perceived by the respondents (Table 6.1). All these themes could be matched and classified into the three central themes (categories) derived from previous examination of the Western literature, which are "Autonomy", "Real-world Relevance" and "Collaboration and Networking". There are no other distinguishable central themes (categories) found.

Table 6.1 Overview of the themes of perceived benefits of m-learning

Personal Benefits Themes	Central themes (Categories)	Organisational Benefits Themes
Convenience	**Autonomy** The freedom and the capacity of the learner to exert power and ownership over their learning preference and experience.	Convenience
Support fragmented learning		
Anytime, anywhere		
Personalising learning experience		
Cost saving		
Support multi-tasking		Support multi-tasking
Broadens my horizon		
Enriches my life		
Enriches my knowledge		
Edutainment		
Help developing good habits		
		Support employee centred learning
		Support employee development
Support work/task	**Real-world Relevance** The learning activities have actual, real-time and real-world relevance, which can help learners achieve their goals in real situations.	Support work/task
Timeliness/Immediacy		Timeliness/Immediacy
Help problem solving		
Keep information/knowledge up to date		
Efficiency and effectiveness		Efficiency and effectiveness
Resourceful/Informative		
		Achieve team/organisation goal
		Encourage organisational learning
		Enhance organisational capabilities
		Cost saving
		Learning management/Administration
Effective communication	**Collaboration and Networking** Connecting and interacting with a variety of people, sharing ideas, information and experience.	Effective Communication
Social networking		Social networking
		Experience sharing
		Information sharing
		Enhance team spirit

6.4.1 Perceived Personal Benefits of M-learning

According to the results of qualitative analysis, the themes of Personal benefits include 19 items: Convenience, Support Fragmented learning, Support work/task, Broaden my horizon, Timeliness/Quick, Anytime Anywhere, Efficiency and Effectiveness, Resourceful/ Informative, Personalising learning experience, Enriches my life, Keeping information/knowledge up to date, Social networking, Edutainment, Enriches my knowledge, Help Communication and Sharing, Help problem solving, Cost saving, Support multi-tasking, and Help developing good habits. All these themes could be matched and classified into the three central themes, with no other distinguishable central themes (categories) found. There are 11 themes of personal benefits under the category of "Autonomy", 6 themes under "Real-World Relevance", and "Collaboration & Networking" contained 2 themes. Meanwhile, among the 19 themes, 17 match with the 16 affordances of m-learning from which the initial three categories derived. Those 2 themes that couldn't be matched with the 16 affordances were classified into the category of "Autonomy".

Reviewing the results of perceived personal benefits leads to some interesting discussions. Firstly, in the Chinese business context, the perceived central theme of personal benefits of m-learning "Autonomy" covers a wider range of measurements and intensions than other central themes, and "Autonomy" was perceived as the most important central theme of m-learning. This finding echoes the results of the quantitative analysis (Section 4.4, Chapter 4), that respondents perceive "Autonomy" as the most important central theme of m-learning, followed by "Real-world Relevance" and then "Collaboration & Networking". This high ranking of "Autonomy" supports the previous studies related to the trend of employee-centredness in organisational learning. Since organisational learning is shifting from being company-centred to learner-centred (Garavan et al., 2012; Mehdiabadi & Li, 2016; Sharples et al., 2005), a learning activity in an organisation, including m-learning, "is being re-conceived as a personalised and learner-centred activity" (Sharples et al., 2005). The previous, highly centralised education system in China, which didn't provide autonomy or allow students to choose learning context, time, space, and location (Halstead & Zhu, 2009; Hua et al., 2011; Littlewood, 1999; Xia et al., 2017), mean that this preference and wider expectation of autonomy in learning may be a re-balancing after this long history of centralised education. However, personalisation can be an endless effort, and over-personalised learning may weaken a common curriculum and lead to erosion of common knowledge (McQuiggan et al., 2015a; Melis & Monthienvichienchai, 2004; Traxler, 2007). Apparently, a highly personalised

curriculum doesn't require learners' further selection, modification or checking. As Traxler (2007) argues, highly personalized m-learning curricula may further weaken the ability for independent learning and consequently lead to further demand for personalised learning materials. According to Melis and Monthienvichienchai (2004), over-personalisation could also result in the invalidation of the students' learning experience with respect to the community of practice that they want to join. Therefore, it is arguable whether the highly personalised curricula are necessary and beneficial to the mobile learners. Apparently, while the advantage and importance of personalised learning through m-learning is highly appreciated, the disadvantage of over-personalisation hasn't been realised by the respondents in the present study.

Secondly, this order of the central themes may also imply that, although it is undeniable that social relationships are still important for achieving business success in China due to the high context culture and deep-rooted Confucian values, the increasing influence from Western management practice (Ahlstrom et al., 2001; Li & Nesbit, 2013) encourages Chinese employees to be more task- and result-oriented in the workplace context. The modern Western management practice has a strong driven of efficiency and productivity, although the Western learning are more likely to be deep learners, but within the workplace context that Western learners seek quick, superficial solutions to maximise the efficiency and productivity. This finding mirrors the previous findings of the present study that Chinese organisations have a utilitarian and pragmatic orientation in looking for what works, what benefits, or how to absorb complexity and develop continuous innovation to meet a rapidly changing business environment.

6.4.2 Perceived organisational benefits of m-learning

Qualitative study identified 17 themes of organisational m-learning benefits, comprising: Information sharing, Encourage organisational learning, Cost saving, Effective communication, Timeliness/Quick, Efficiency and effectiveness, Support employee centred learning, Learning management/Administration, Convenience, Achieve team/organisation goals, Support work/task, Experience sharing, Enhance team spirit, Social networking, Enhance organisational capabilities, Transparency and fairness, and Support employee development. All these themes could be matched and classified into the three central themes with no other distinguishable central themes (categories) found. There are 8 themes under the central theme

of “Real-World Relevance”, 5 themes under the “Collaboration & Networking” category, and the “Autonomy” category contained 4 themes.

Based on the number of the themes classified under each category, “Real-World Relevance” involves the most themes of the perceived benefits, followed by “Collaboration & Networking” and “Autonomy”. This order of the central theme of organisational benefits of m-learning may imply that, in the Chinese business context, organisational learning has an orientation of pragmatism, where contextual and authentic benefits were considered as the most important motivational factors in learning implementation. This finding echoes the relevant literature regarding the pragmatic approach in Chinese organisational learning (Elkin et al., 2009). Elkin et al. (2009) report that organisations in China share a pragmatic philosophy and a relational worldview with Western organisations in building learning organisations in China. Redding (1990) and Cone and Everett (2003) describe the characteristics of organisational learning in the Chinese context, where a pragmatic and utilitarian orientation is very much in evidence in looking for what works and establishing networks that help in absorbing complexity with the rapidly changing market conditions. It is interesting to note that establishing networks has more utilitarian profit rather than socio-cultural purpose in the Chinese business context; which could also answer why “Collaboration & Networking” was perceived as the second important central theme of organisational benefits of m-learning. Compared with the personal benefits of m-learning, individual needs and personal preference (“Autonomy”) were considered less important since these have fewer pragmatic and utilitarian profits for the organisations.

6.4.3 Summary for research question 3

This study reveals 19 themes of personal benefits and 17 themes of organisational benefits of m-learning perceived by the respondents. All these themes could be matched and classified into the three central themes (categories) derived from the previous examination of the Western literature, which are “Autonomy”, “Real-world Relevance” and “Collaboration and Networking”. There were no other distinguishable central themes (categories) found. It is noticeable that, for the perceived personal benefits of m-learning, the central theme of “Autonomy” involves the largest number of themes, followed by “Real-world Relevance” and then “Collaboration & Networking”. This order of central themes reflects the approach of personalisation and learner-centredness in the trend of organisational learning and m-learning. As mentioned previously, this trend of personalisation and learner-centredness is more evident in Chinese organisations as a result of re-balancing from the former, highly centralised

educational system in China. Meanwhile, for the perceived organization benefits, the central theme (category) "Real-World Relevance" comprises the largest number of the themes of organisational benefits, followed by "Collaboration & Networking" and then "Autonomy". This order of the central theme of organisational benefits of m-learning may imply that, in the Chinese business context, organisational learning has an orientation of pragmatism, where contextual and authentic benefits were considered as the most important motivational factors in learning implementation.

6.5 Concerns and Issues of M-learning

RQ 4. What issues need to be addressed or highlighted to enhance the successful adoption of m-learning in the Chinese business context?

This study reveals four concerns of using mobile devices for learning in the Chinese business context: the conflict of surface learning and deep learning; the difficulty of selecting suitable resources online; the risk of personal information leaking; and the insufficient interpersonal interaction. Meanwhile, three improvement areas have also been discovered: insufficient interpersonal interaction; the lack of Navigationist ability; and the request for further personalised learning content.

6.5.1 Concerns of M-learning Implementation

Interview respondents in the study specified that there were a number of challenges, concerns and improvement areas, which did not prevent them from m-learning but were roadblocks or hurdles that they had to manoeuvre in order to successfully adopt m-learning.

The conflict of surface learning and deep learning was a major concern that participants addressed when using their mobile devices for learning. According to the respondents, m-learning is favourable to surface learning rather than deep learning, and participants are mainly using mobile devices for surface learning although they have realised the weakness of a surface learning approach in the process of their professional development. The literature review clearly states that deep and surface learning are two learning approaches or learning strategies towards learning activities (Aharony, 2006; Dolmans et al., 2016; Howie & Bagnall, 2013); with deep learning approach resulting from an inner need to reach a complete understanding of the subject material and behind which is hidden a search for self-fulfillment (Aharony, 2006; Saravanamuthu, 2008); while surface learning approach results from choosing the quickest

way to accomplish the task, hidden behind which strategy lies a need to avoid failure and the desire to minimize effort when completing tasks (Aharony, 2006; Biggs & Moore, 1993).

In the m-learning environment, users can choose their own path, and their own strategies in the learning process, according to their personal tendencies, their abilities and their own pace (Aharony, 2006). The findings in the present study show a major preference for adopting a surface learning approach in the Chinese business setting, which reflects the outcomes of previous research regarding differences in academic values between Western cultured learners and Confucian cultured learners.

According to Ryan (2010) and Saravanamuthu (2008), Western learners tend to be "deep" learners while Confucian learners tend to be "surface" or rote learners (Ryan, 2010; Saravanamuthu, 2008). Although the fact of adopting a surface approach may be also caused by emergent and ad hoc tasks in the Chinese business environment as an emerging market (Du & Choi, 2009; Wei, Ouyang, & Chen, 2018), the cultural influence towards learning habits is not deniable. Apparently, it is difficult to expect that Eastern learners who have been influenced by Confucian values for many years as passive learners, and who have used essentially surface learning strategies, will immediately exploit all the advantages that are provided to them in an open m-learning environment, and will turn into active learners who use deep learning strategies. Therefore, the conflict of surface learning and deep learning in adopting m-learning also implies the influence of traditional Chinese learning habits upon m-learning activities.

The difficulty of selecting suitable courses or resources via the internet appeared to be the second concern of m-learning in the present study. According to the respondents, there is too much information online and it takes for a long time to select, determine or check suitable information or resources to meet their personal learning needs. This difficulty of navigating knowledge through mobile devices reflects the recent m-learning perspective of Navigationism; which approach makes fewer demands on the teacher as a font of all knowledge, or prescriber of content, but rather requires learners themselves to find, identify, manipulate and evaluate information and knowledge independently (Brown, 2006; Moran, 2008). Navigationism of m-learning considers that mobile learners need independent skills in navigating knowledge, and that these skills are very different from traditional passive learning requirements (Moran, 2008). Apparently, aside from the debates about deep and surface learning strategies in the Chinese business context, in the "independent learning" settings of m-learning (Chen et al., 2005), the typical learning preference for "dependent learning" among Eastern (Confucian) learners has also been identified.

Based on previous research in the literature, independent learning consists of self-selection, self-determination, self-modification and self-checking (Chen et al., 2005; Goode, 2007); while dependent learners tend to be more passive in selecting, determining, modifying and checking learning activities by themselves, instead relying on teachers/trainers (Andrews, 2015). Previous studies state that, when the learners have possessed a certain level of ability, independent learning can be encouraged, and learners are able to and willing to select, determine, modify and check their learning activities by themselves (Chen et al., 2005). However, the findings of this study doesn't support the findings of previous studies that m-learning encourages independent learning behaviours (Chen et al., 2005). After 6 to 10 years' experience in using mobile devices, it appears that the deep-rooted Confucian culture and traditionally highly centralised educational system in China still have a strong influence on the learning preferences through mobile devices, at least in the business setting. Meanwhile, the claim of respondents finding it "difficult to search for suitable courses/resources online" also surfaces, with the demand for more personalised curricula from the participants.

Apparently, a highly personalised curriculum doesn't require learners' further selection, modification or checking. However, the highly personalized learning curricula may further weaken the ability of independent learning (Traxler, 2007, 2010) in the process of m-learning, and consequently lead to further demand for personalised learning materials. Therefore, it is arguable whether the highly personalised curricula are necessary and beneficial to the mobile learners. As Traxler (2010) points out, over-personalised learning may lead to erosion of a common knowledge base among all the people within a society or organisation. Therefore, in the process of implementing m-learning in the business context, it is important to develop users' Navigationist ability and balance the level of personalisation of the learning content.

The risk of personal information leaking was identified as the third concern of m-learning in the present study. Mobile devices are privately owned, constantly carried, and may be considered part of one's private space (Traxler, 2010). With the advent of mobile devices equipped with mobile sensing technology into education realm, large-scale collection of personal specific data is now possible, and learning has become one of the frequent activities that may require exposure to the public space (Obiria, Kimwele, & Cheruiyot, 2015; Yong, 2011). Therefore, using mobile devices for learning blurs public and private spaces and may cause privacy concerns (Mehdipour & Zerehkafi, 2013; Obiria et al., 2015; Traxler, 2010; Yong, 2011).

Given the facts that the popularity of using the most popular social media, WeChat, to pay bills, shop online, transfer money and check-in for flights etc. is increasing in China, this could be risky and may cause significant personal loss by leaking personal information through WeChat and its learning apps. The findings of the present study confirm recent research that personal information privacy has become one of the most important ethical issues in the contemporary, information society (Jiang, 2017; Zhang & Ok, 2011; Zhou & Li, 2014). However, the present study doesn't support the findings of previous research regarding the relatively low level of awareness of information privacy among Chinese internet users (Zhang & Ok, 2011). According to the present study, the respondents generally demonstrated a high level of concern and sensitivity on personal information and privacy issues. Thus, privacy preservation has become a critical issue for m-learning adoption into organisational learning.

Insufficient interpersonal interaction has been highlighted as the fourth concern of using mobile devices for learning. It is proven that mobile devices as mediated tools for collaboration support the learners' personal relationships and social interaction with other learners (Caballe et al., 2010). Moreover, the use of social media accessed easily through mobile devices can provide a means for connecting communities of learning and encouraging interpersonal growth (Hao et al., 2017). The claim of insufficient interpersonal interaction reveals the strong need for responsiveness (Liu et al., 2018) in the m-learning activities and the strong need for interpersonal relationships to build social networking (Ma & Tsui, 2015) in the Chinese business setting. Firstly, this finding consistently proves the importance of social networking or *Guanxi* in the Chinese business environment, highlighted by other findings of the present study and previous research in the literature. For example, Bedford (2011) states that Chinese culture, especially personal relationships (*Guanxi*), play an important role in driving success in the Chinese business context; and Bambaca and Sanderson (2011) also confirm that Chinese learners with Confucian background prefer face-to-face interaction with classmates and teachers than online communication, in order to obtain stronger ties of interpersonal relationship (Bambacas & Sanderson, 2011). Secondly, this finding also reflects the latest research by Liu et al. (2018), that responsiveness is perceived as the important factor that affects user satisfaction with m-learning apps. Although feedback and interactive activities are included in many m-learning apps in the Chinese market, the present study suggests that mobile learners in China need further adaptive content or feedback according to the different user model, providing appropriate learning evaluation for learners to increase the responsiveness of m-learning.

6.5.2 Improvement Areas of M-learning

Four areas for improvement were derived from analysing the interview transcripts regarding this topic. First of all, more interactive activities in m-learning should be provided. This result echoes the previous findings of this study regarding the importance of interaction for the "Chinese learner", otherwise known as the "Confucian heritage culture learner" (Ryan, 2010). This result further suggests that Chinese learners more prefer interaction with other learners during the learning process. It is notable that, in the era of m-learning, the Confucian culture still has an influence on the learning preferences in China, where people are more likely to desire committed, close, and strong relationships with others (Nemati et al., 2014). Traditionally, *Guanxi* required face-to-face communication, but in the digital era, *Guanxi* may be developed and maintained through mobile technology and social media. Bambaca and Sanderson (2011) also confirm in their research that Chinese learners with Confucian background prefer face-to-face interaction with classmates and teachers than online communication, in order to obtain stronger ties of interpersonal relationship (Bambacas & Sanderson, 2011). Meanwhile, the desire for further interpersonal interaction in m-learning also reveals the strong need for responsiveness (Liu et al., 2018) in m-learning activities. Although feedback and interactive activities are included in many m-learning apps in the Chinese market, this result from the present research suggests that mobile learners in China need further adaptive content or feedback tools according to a different user model to increase the responsiveness of m-learning.

The second perceived area of improvement is that the company/organisers/trainers need to control the quality of m-learning courses, including the course design, content, assessment, and the length of the course, and to ensure that the courses are suitable for fragmented learning. According to the respondents, the company/organisers/trainers should provide good quality m-learning courses; and they refer to good quality m-learning courses as "well designed and developed learning modules", which don't require further selection, modification and checking from the users' end. The request for providing "high quality" and "more personalised" content of m-learning products reflects the characteristics of "dependent learner". Based on previous research in the literature, independent learning consists of self-selection, self-determination, self-modification and self-checking (Chen et al., 2005; Goode, 2007), while dependent learners tend to be more passive in selecting, determining, modifying and checking learning activities by themselves, instead relying on the teachers/trainers (Andrews, 2015). According to Ryan (2010), the Confucian heritage culture learners are passive learners, dependent on and

following the teacher. Therefore, the Chinese learners usually have higher expectations of the teachers/trainers and the learning materials.

The third improvement area refers to further customised m-learning courses/programs which meet users' personal learning needs or provide a better personalising learning experience. Evidently, individual differences in technology use as well as in learning preference may result in the need for a variety of personal learning approaches. According to Kurilovas, Kubilinskiene, and Dagiene (2014), learning software and all learning processes should be personalised according to the main characteristics or the needs of the learners. Learners have different needs and characteristics; that is, prior knowledge, intellectual level, interests, goals, cognitive traits (working memory capacity, inductive reasoning ability, and associative learning skills), learning behavioural type (according to his/her self-regulation level) and, finally, learning styles. This finding mirrors the results of perceived personal benefits of m-learning, highlighting that the respondents in the Chinese business setting put much emphasis on personalisation and autonomy towards learning experiences.

However, personalisation can be an endless effort, and over-personalised learning may weaken a common curriculum and consequently lead to erosion of common knowledge (McQuiggan et al., 2015a; Melis & Monthienvichienchai, 2004; Traxler, 2007). As Traxler (2007) argues, highly personalized m-learning curricula may further weaken the capacity for independent learning and consequently lead to further demand for personalised learning materials. According to Melis and Monthienvichienchai (2004), over-personalisation could also result in the invalidation of the students' learning experiences with respect to the community of practice that they want to join. Therefore, it is arguable whether the highly personalised curricula are necessary and beneficial for the mobile learners. Apparently, while the advantage of personalised learning through m-learning is highly appreciated, the disadvantage of over-personalisation hasn't been addressed during the interviews in the present study.

The fourth improvement area suggested by the participants refers to m-learning promotion and education sessions conducted by the organisations to create a better organisational m-learning environment. Although using mobile devices for learning has become ubiquitous, organisations still play a key role in promoting and educating their employees to adopt mobile devices for learning. This echoes the previous findings by Brown (2005, 2006) regarding Navigationism. According to Brown (2005, 2006), to survive in the knowledge era, m-learners need to develop skills and competencies in navigating knowledge, and the role of trainer or teacher needs to be that of a coach to help learners in developing such skills.

6.5.3 Summary for research question 4

This study reveals four concerns and three improvement areas of using mobile devices for learning. The conflict of surface learning and deep learning, the difficulty of selecting suitable resources online, the risk of personal information leaking, and the insufficient interpersonal interaction, have been highlighted as the main concerns in using mobile devices for learning in the Chinese business context. Meanwhile, respondents are expecting to have more interactions, higher quality and further personalised content of m-learning, and further promotion and education campaigns arranged by the organisations, which can help to create a better m-learning environment in the organisations. These three improvement areas thus consist of the perceived concerns of m-learning related to insufficient interpersonal interaction, the lack of Navigationist ability, and the request for further personalised learning content.

These perceived concerns and improvement areas of m-learning reflect the preferred learning strategy of surface learning, passive learning habits formed by the traditional formal education system, increased online privacy awareness, and the still existing orientation of Guanxi influenced by Chinese traditional culture.

6.6 Similarities and Differences between Chinese m-learning and Western m-learning

RQ 5 What are the similarities and differences between the characteristics of Chinese m-learning and Western m-learning?

The characteristics of m-learning in a Chinese business setting identified in this study reveal some similarities and distinctions with the characteristics of m-learning indicated in the Western literature. Recognising these similarities and distinctions is important for understanding how context may influence m-learning adoption and implementation, especially in a context different than that of an Anglo-American setting.

6.6.1 Similarities

This study has provided empirical evidence supporting that both Chinese mobile users and Western mobile users have some similarities in the use of mobile devices, mobile activities and perceived affordances of m-learning.

6.6.1.1 High usage of mobile device and m-learning

The results of this empirical research and previous studies conducted in the West both suggest high usage of mobile devices and ubiquitous use of mobile devices for learning purposes. In these Chinese organisations, on average, respondents have 2-3 mobile devices and spend almost 5 hours on mobile devices per day, which includes one hour on m-learning activities every day; which indicates that using mobile devices for learning has become ubiquitous among the participants and in the Chinese business setting. Similar results of high usage of mobile devices can be found in the Western literature as well; for example, the average mobile user owns and uses more than three personal devices in the United States (Gartner, 2018) and the average mobile usage is 4.2 hours per day (eMarketer, 2018); while another study, conducted by Flurry (2017), shows that U.S. users actually spend around 5 hours a day on mobile devices. According to the findings of a survey by Lynda.com in 2015, 30% of mobile users in the U.S. reported using their phones to consume organisational training content. Marketsandmarkets Inc. conducted a global survey and predicted that the worldwide market for m-learning would grow from $7.98 billion in 2015 to $37.6 billion by 2020 with a 36.3% growth rate during the forecast period. Ambient Insight 2014-2019 Mobile Learning Market Forecast also foresees that the revenues for m-learning will more than double in 66 countries out of 119 countries and triple in 32 countries, by 2019. It is noticeable that China was predicted to be the largest mobile education market worldwide, with $2.3 billion revenues in 2019, up from the $1.1 billion reached in 2014 (Adkins, 2015). By reviewing the relevant literature and comparing with the results of the present study, it is noted that using mobile devices for learning has become ubiquitous worldwide and that the increasing high usage of mobile devices and mobile device penetration indicates favourable conditions and huge potential for organisations to adopt m-learning for employee learning and development.

6.6.1.2 Activities carried out through mobile devices

The study of frequent activities carried out through mobile devices in this study has found some similarities with previous research conducted in the Western context. Firstly, the list of mobile phone activities derived from literature review captured the full gamut of mobile device activities carried out by respondents in the Chinese business context (see Section 4.3.3, Chapter 4). Secondly, the most frequent activities identified in this study relate to four broad themes, which are: communication, acquiring information on local and non-local environment, e-commerce, and entertainment/leisure. These themes of mobile activities reflect the previous

research conducted in the West, that the most frequent activities carried out by mobile device users have focused on communication, entertainment, acquiring information, and e-commerce (Fawkes, 2018; Goldstein, 2017; Statista, 2018). China is one of the fastest growing m-commerce and m-learning markets (Adkins, 2015; Gumeta & Khan, 2017; Song et al., 2015), and a study of Chinese mobile users' behaviour will help mobile application providers and m-commerce marketers to formulate appropriate marketing strategies. Based on the results of the present study, it is noted that mobile users in the Chinese business context engage in the same types of mobile activities engaged in by the users in the West.

6.6.1.3 Affordance of M-learning

With the ubiquitous use of mobile devices and mobile technologies in our lives, it is evident that the affordances of mobile devices can help learning and teaching. The distinction between m-learning and other learning methods can specifically rest with the various affordances of mobile technology. The affordances are not static or fixed within a technology but are rather how an individual imagines a technology's use and how this is enacted in differing settings (Lloyd, 2018); which are partially determined by the actors' cultural backgrounds, individual experiences and the contexts the actors dwell within (Xiangming & Song, 2018). The "perceived affordance" here was emphasised and interpreted into "important aspects of m-learning" (in the quantitative study) and "benefits of m-learning" (in the qualitative study) in the present research. The results of this study have provided empirical evidence in support of both Chinese mobile learners and Western mobile learners using and emphasising similar mobile affordances for their learning and teaching activities.

Firstly, the quantitative results of the present study find that the 17 important aspects which correspond to 16 affordances of m-learning, drawn from the analysis in the literature on the West, also apply to the mobile learners in these Chinese organisations. As discussed in the Chapter 2 literature review, since the 16 various affordances of m-learning can be outlined and abstracted into three broader themes (central themes), Autonomy, Real-world Relevance, and Collaboration and Networking (see Section 2.3), these three central themes highlight common and key characteristics of m-learning of both the Chinese business context and Western context.

Secondly, the results of the qualitative analysis reveal 19 themes of personal benefits and 17 themes of organisational benefits of m-learning perceived by the respondents. Although these themes underpin and indicate the various perspectives, all these themes could be matched and classified into the three central themes (Autonomy, Real-world Relevance, and Collaboration

and Networking) derived from the previous examination of the Western literature, and there were no other distinguishable central themes found. This finding is consistent with the previous quantitative finding and further confirms that the three central themes highlight the key affordances of m-learning perceived by both Chinese mobile learners and Western mobile learners.

It is noticeable that the three central themes of m-learning identified and discussed in this study align with the core features of m-learning frameworks/models addressed in contemporary Western literature; for example, the FRAME model of m-learning, which was developed by Koole (2009) to examine key characteristics of a collection of mobile devices within the context of distance education at the post-secondary level. In the FRAME model (Koole, 2009), there are three intersecting aspects connected with the process of m-learning: the learner aspect, the device aspect, and the social aspect. Similarly, Kearney et al. (2012) introduce a framework with three critical attributes of m-learning that highlight a pedagogical perspective: Personalisation, Collaboration, and Authenticity. By comparing the three central themes of m-learning with Koole's (2009) and Kearney et al.'s (2012) frameworks/models, it is found that similar aspects to the learner aspect and social aspect can be found in both these frameworks and the themes derived from the present study. Although the device aspect is not directly present in Kearney et al.'s (2012) framework, the mobile device aspect enables a variety of technical affordances to involve high degrees of contextualisation of tasks and real-world practice. Meanwhile, the three central themes can also be found in Sharples' (2005) model, for instances, its "control" can be presented by "Autonomy", its "context" can be referred by "Real-world Relevance", and its "communication" can be reflected by "Collaboration and Networking". However, the three central themes don't match with the features of early-stage m-learning models, such as Leung and Chan's (2003) and Shih's (2007) models, which are emphasis on technological attributes of mobile devices (Techno-Centric) and the process of m-learning but ignore the socio-cultural factors (Kululska-Hulme & Traxler, 2005). In general, these critical constructs of m-learning have been incorporated and researched in one way or another in most of the m-learning studies dealing with the subject in the Western contexts. The results of the present study demonstrate that these Western critical attributes of m-learning identified in the literature are highly relevant to the Chinese business context, and can also represent and describe the general important aspects of m-learning in the Chinese business setting.

6.6.2 Differences

While the key characteristics of m-learning, in terms of affordances and central themes of m-learning, exist irrespective of context, some distinctions and significance of m-learning characteristics in a Chinese business setting are identified in this study, which have not been explicitly highlighted in previous work. Firstly, this study indicates the important level of each affordance and examines the order of the affordances by their importance level. Secondly, this study explores the perceived benefits of m-learning for organisations, which are independently discussed from the perspective of personal benefits. Meanwhile, sociocultural factors that may influence these distinctions were also discussed.

6.6.2.1 The order of importance of m-learning affordance and the central themes

Past studies have addressed the various affordances of mobile devices (see Section 2.3, Chapter 2) and mobile technology for learning purposes; however, those studies did not indicate the importance of each affordance or the order of the affordance by their importance level. This is one of the first known studies that examines the importance level of the affordances and ranks these affordances by their perceived importance level. The ranking of the affordances by their importance and the ranking of central themes reveal the driving factors related to learners' cultural background, individual experience and the social setting influence. As Li and Song (2018) argue, the perceived affordance of mobile technology may be determined by the actors' cultural background, individual experience and the social settings in which the actors dwell.

Based on the ranking of the top seven important affordances, it is noted that the Chinese business environment, in terms of the high-pace working environment, rapidly changing and competitive business conditions, and the pressure of fast learning and development, has a strong influence on the adoption of m-learning. The ranking of the central themes shows that "Autonomy" is perceived as the most important attribute, followed by "Real-world Relevance", and then "Collaboration and Networking". This ranking reveals that the traditional, highly centralised education system may give rise to the demand for autonomy in the learning experience. Meanwhile, the ranking of the central themes also indicates that, although relationship and social networking is still considered vitally important for achieving career and business success in the Chinese business environment, with the increasing influence from Western management practice (Ahlstrom et al., 2001; Li & Nesbit, 2013), in the present study, result/task is perceived as more important than relationship in m-learning.

6.6.2.2 Organisational benefits of m-learning

This study has taken a further step toward understanding the perceived benefits of m-learning for organisations, which have not been well discussed in previous research. However, understanding the organisational benefits of m-learning is important to forge the adoption of m-learning for employee learning and development in business settings. As discussed earlier in Chapters 1 and 2, the relevant research on m-learning to date has concentrated on the schooling/educational context (Jackson-Butler, 2016; Pimmer & Grohbiel, 2008; Pimmer & Pachler, 2013; Pimmer et al., 2010), with a tendency to focus on pedagogy, and technology affordance and adoption (Lac, 2018). Empirical research on a business/corporate context with a focus on organisational aspects is scant. This is even more evident when it comes to China, as most of the research has been conducted in the Anglo-American environment. The present study is one of the first studies that explores the characteristics of m-learning in a Chinese business setting and investigates the perceived benefits of m-learning for organisations.

The results of this research reveal 17 themes of organisational benefits of m-learning perceived by the respondents. All 17 themes have been classified into three central themes (see Table 6.2). This categorisation was derived from relevant literature analysis, and there were no other distinguishable central themes found. Based on the number of the themes classified under earlier categories, it is noted that "Real-World Relevance" involves the most themes of the perceived benefits, followed by "Collaboration and Networking" and then "Autonomy". This order/ranking of the central theme of organisational benefits may imply that the organisational learning in China has an orientation of pragmatism, which means that the contextual and authentic benefits were considered as the most important motivational factors in learning implementation. This finding echoes the extant literature regarding the pragmatic approach in Chinese organisational learning (Elkin et al., 2009). Elkin et al. (2009) report that organisations in China share a pragmatic philosophy and a relational worldview with Western organisations in building the learning organisations. Redding (1990) and Cone and Everett (2003) describe the characteristics of the organisational learning in Chinese context, where a pragmatic and utilitarian orientation is very much in evidence in looking for what works and establishing networks that help to absorb complexity within the rapidly changing market conditions. It is interesting to note that establishing networks has more utilitarian profit rather than socio-cultural purpose in the Chinese business context; which could also answer why "Collaboration and Networking" was perceived as the second most important central theme of organisational benefits of m-learning. Compared with the personal benefits of m-learning, individual needs

and personal preference "Autonomy" was considered less important since it has fewer pragmatic and utilitarian profits for the organisations.

Table 6.2 Themes and Central themes of organisational benefit of m-learning

Themes of Organisational Benefits	Central themes (Categories)
Timeliness/Immediacy	**Real-world Relevance** The learning activities have actual, real-time and real-world relevance, which can help learners to achieve their goals in real situations.
Efficiency and effectiveness	
Support work/task	
Achieve team/organisation goal	
Learning management/Administration	
Encourage organisational learning	
Enhance organisational capabilities	
Cost saving	
Effective Communication	**Collaboration and Networking** Connecting and interacting with a variety of people, sharing ideas, information and experience.
Information sharing	
Experience sharing	
Social networking	
Enhance team spirit	
Convenience	**Autonomy** The freedom and the capacity of the learner to exert power and ownership over their learning preference and experience.
Support multi-tasking	
Support employee centred learning	
Support employee development	

Independently, perceived personal benefits were also identified and discussed. It is noticeable that, for the perceived personal benefits of m-learning, the central theme of "Autonomy" involves the most numerous themes, followed by "Real-world Relevance" and then "Collaboration & Networking". This result is consistent with the previous quantitative finding of this study that respondents perceive "Autonomy" as the most important central theme of m-learning, followed by "Real-world Relevance" and then "Collaboration & Networking". The difference between the personal benefits and organisational benefits confirms that the perceived affordances of mobile technology are influenced by the actors' cultural background, individual experience and the social setting (context) of the actors.

6.6.2.3 Sociocultural influence

Many researchers have sought to explain the sociocultural influence of mobile use, which may affect the use and successful implementation of m-learning (Almaiah & Alismaiel, 2019; Chavoshi & Hamidi, 2018). Therefore, understanding the sociocultural influence of the Chinese business environment may inform both m-learning adoption and implementation within China and within other countries with similar culture and social values. The distinctions of m-learning characteristics identified in this study indicate four sociocultural factors which

have influence on m-learning adoption and usage in the Chinese business setting. Culture and social settings play an important role in mobile technology adoption and use (Tam & Oliveira, 2018). These four sociocultural factors are related to many results and findings of the present study and have been discussed repeatedly across different chapters.

The first factor is the traditional Chinese value of education, which has a substantial impact on the utilitarian and pragmatic orientation in m-learning. According to traditional Chinese culture, learning has a utilitarian and pragmatic value. In ancient China, success in learning and the imperial examination (*Keju* 科举) opened the door to a successful career as a government official, and the legacy of this belief of "learning brings career success and rewards" may have influenced the current emphasis on the pragmatic result of learning (Guo, 2015; Yung, 2015). The Chinese idiom, "There are golden houses and beautiful women in books", reflects the seeking of external rewards, such as fame, wealth, and social status in learning (Guo, 2015). Students in China generally believe that learning should provide them with decent jobs and high social status (Volet, 2001). In contemporary China, this utilitarian and pragmatic orientation has been translated into a preference for practical issues rather than theoretical issues among the Chinese learners. Thus, in order to motivate the Chinese learners, educators and trainers need to make sure that the learning content has practical outcomes, for example, support job hunting or help future career development.

In the era of mobile technology, when m-learning has become pervasive in Chinese business settings, it is not difficult to understand that m-learning has inherited the orientation of utilitarian and pragmatism from the Chinese traditional value of education. Although the utilitarian value is one of the basic needs for consumers and one of the important antecedents of consumption according to Western marketing researchers (Batra & Ahtola, 1991; Song et al., 2015), the utilitarian and pragmatic orientation in m-learning in China receives influences from its traditional cultural roots.

The second factor is China's current economic environment as an emerging market, which reinforces the orientation of utilitarian and pragmatism of m-learning. In a Chinese business setting, the orientation of utilitarian and pragmatism can be more evident since organisational learning focuses on how organisations successfully acquire, share and use knowledge to achieve organisational goals (Roper & Pettit, 2002); and there is a strong emphasis on creating 'knowledge for action', not knowledge for its own sake, in such a business context (Argyris, 1993). With the rapid economic development, this pragmatic orientation has been reinforced by China's more competitive business environment as the largest emerging market, which

requires its organisations and employees to seek what works, what benefits, or how to absorb complexity and develop continuous innovation to meet the rapidly changing market conditions (Elkin et al., 2009; Redding, 1990; Shen & Williams, 2016). Previous research has reported on the utilitarian and pragmatic orientation in Chinese organisations; for example, Elkin et al. (2009) report that organisations in contemporary China have a strong pragmatic approach in building their learning organisations. Meanwhile, with the emerging but increasing market competition in China, job seekers and job incumbents worry about how to outperform the abundant and high-quality competitors in the emerging labour market (Knight & Yueh, 2008; Takeuchi et al., 2009). Job skills and competency requirements have risen significantly in the last decades. Therefore, the worry of losing competitiveness in the fast-developing market place pushes employees to utilise m-learning to increase their workplace competitiveness. Consequently, the utilitarian and pragmatic orientation has been further reinforced, and constantly, learning is not merely for the sake of learning itself but for obtaining employability or other external rewards.

The third factor is collectivism and *Guanxi* orientation rooted in Confucianism. Chinese culture borrows much of its practices from Confucianism, which emphasises collectivism and personal relations (*Guanxi*) (Lin et al., 2013; Monkhouse, Barnes, & Hanh Pham, 2013). *Guanxi* plays a fundamental role within the Confucian doctrine as an emphasised practice of collectivism, which sees the individual as part of a community and a set of family, hierarchical and friendly relationships (Luo, Huang, & Wang, 2012). According to the results of the present study, the high degree of social influence on the use of m-learning indicates that an employee's behaviour or decision is typically influenced by other employees, managers or important stakeholders in the Chinese business. This reflects the orientation of collectivism and *Guanxi*. With Confucianism regarded as the philosophical basis of collectivism (Kim, 1994), collectivism denotes the need, interest, and objective of in-groups as at a higher priority than that of the individual (Rhee et al., 2017; Wang & Chen, 2010). Therefore, as contended by many researchers (Rhee et al., 2017; Wang & Chen, 2010; Yang, 2010), Chinese people have a tendency to conform to social norms and expectations, and the social influence of collectivism has a significant positive effect on the behavioural intention to use m-learning. For example, Park et al. (2007) investigated the role of social influence in the context of Chinese attitudes toward mobile technology, and found that social influence of collectivism had a positive role in adoption. The present study further confirms that, in the Chinese business context, a collectivistic orientation plays an important part in the use of mobile devices and adoption of

mobile devices for learning and development. As an emphasised practice of collectivism, the orientation of *Guanxi*, which is also considered to be rooted in Confucianism (Bedford, 2011; Cha, 2003; Child & Möllering, 2003; Davison et al., 2018; Ding & Xu, 2015; Hao et al., 2017; Zhang & Nesbit, 2018), was evidenced as an influential factor in the present study. Traditionally, *Guanxi* required face-to-face communication; however, in many workplaces nowadays, face-to-face interactive is a luxury. Thus, *Guanxi* may be developed and maintained through mobile technology and social media.

Davison et al. (2018) conducted an intensive investigation into interpersonal knowledge exchange and the impact of social media in China. They found that informal knowledge exchange arrangements predicated on *Guanxi* through social media were ubiquitous; and the intertwined elements of knowledge, *Guanxi* and mobile technology collectively comprise an informal learning system that supports work effectively (Davison et al., 2018). Other researchers suggest that social media provides a multitude of opportunities for interaction. On the other hand, they often broadcast more options than can be pursued, given practical restrictions and limited time, which causes FOMO (Fear of missing out) (Przybylski et al., 2013). In the Chinese business context, the characteristic of FOMO in m-learning can be represented as the desire to stay continually connected with their social networks and quickly employing m-learning when others are starting to use mobile devices for learning. The impact of social influence and FOMO on m-learning could be greater than in a non-*Guanxi*-based context. Therefore, in the Chinese business context, mobile learners can benefit from the advantages of *Guanxi* acquired from social media (WeChat) and m-learning apps, and they may stay continually connected with the WeChat and m-learning apps to secure these advantages.

The fourth sociocultural factor is related to the highly centralised education system, which has forged a passive and surface learning approach among Chinese learners. In the old Chinese imperial examination (*Keju* 科举) system, learning the required subjects and passing the examinations became the major track for upward social mobility (Guo, 2015). After liberation from the imperial system, since the 1950s, formal education were more tightly controlled by central government in China, where the funds, curriculum, syllabus, textbooks, student admissions and graduation assessments were designed and monitored centrally by the National Education Committee (Liu, 2017; Mok & Ngok, 2008). From the 1980s, the initial reform for decentralisation in tertiary education started to move forward in stages; however, primary and secondary education still remain centralised. In such a highly centralised education system,

learners lacked opportunities for experiential learning and personalised learning, thus relying on receptive knowledge and memorisation, resulting in a passive and surface learning habit rather than active and deep learning habit (Carless, 2012; Yung, 2015). Previous research has evidenced that, compared with the learning characteristics among students in Western countries, Chinese learners in Confucian heritage cultures tend to be more passive learners, involving surface learning, group learning and with a pragmatic orientation to learning (Guo, 2015; Liu, 2017; Ryan, 2010; Yung, 2015).

It is difficult to expect that the Chinese mobile learners who have been influenced by a centralised educational system for many years, as passive and surface learners, will change their learning habits immediately. They thus may not exploit all the advantages that are provided to them in an open m-learning environment and suddenly turn into active and deep learners. Therefore, in the process of adopting m-learning, the passive and surface learning approach has been adopted by the Chinese mobile learners; which explains why respondents prefer high quality ("well-cooked") m-learning programs/courses, without self-selecting, self-determining, self-modifying and self-checking learning activities; relying instead on the teachers/trainers (Andrews, 2015). However, the highly centralised educational system may also give rise to the demand for freedom and autonomy in the learning experience, which can be considered as a re-balancing after a long history of centralised education in the Chinese formal education system. Since the "open policy" in the 1980s, and the increasing influence from the West, China has witnessed a quickly increased prevalence of the term *Ziyou* (自由 freedom) and individualism, freeing individuals from the highly socialist state and political coercion and reclaiming individual autonomy and choices that had been largely erased in the past (Lau, 1992; Zhang, 2008). As a result, the Chinese learners desire individualistic goals, autonomy, independence, self-respect, and accomplishment in their learning planning, selection and execution.

The investigation of sociocultural influence provides an in-depth understanding of the distinctive characteristics of m-learning that may inform m-learning adoption both within China and within other markets with similar sociocultural conditions, as well as increasing theoretical understanding of the relationship between m-learning adoption and cultural context.

6.6.3 Summary for research question 5

This study identified three similarities and two distinctions between the characteristics of Chinese m-learning and Western m-learning. In regard to similarities, firstly, the results both of this empirical research and previous researches conducted in the West suggest high usage of mobile devices and ubiquitous use of mobile devices for learning purposes, indicating the favourable conditions and huge potential for organisations to adopt m-learning for employee learning and development. Secondly, the mobile activity pattern carried out by Chinese users identified in this study are similar to the activity pattern reported by previous studies conducted in the West. Thirdly, there is a similarity in that Chinese mobile learners and Western mobile learners use and emphasise similar mobile affordances for their learning and teaching activities.

However, the characteristics of Chinese m-learning have two distinctive differences from the those reported for the West. Firstly, past studies have addressed and discussed the various affordances of mobile devices and mobile technology for learning purposes, nonetheless, such studies did not indicate the importance of each affordance and their order of the importance. The present study is one of the first known studies that examines the importance of the perceived affordances of m-learning and ranks the three central themes based on the importance. Secondly, this study has taken a solid step toward understanding the perceived benefits of m-learning for organisations, which have not been well discussed in previous research. The differences between personal benefits and organisational benefits confirm that the perceived affordances of mobile technology are influenced by the actors' cultural background, individual experience and the social setting (context) of the actors.

Therefore, sociocultural factors may influence these distinctions in the characteristics of m-learning in the Chinese business environment. There are four sociocultural factors that have been identified. Firstly, the traditional Chinese value of education has a strong impact on the utilitarian and pragmatic orientation in m-learning. Secondly, China's current economic environment as an emerging market may reinforce the orientation of utilitarian and pragmatism of m-learning. Thirdly, the collectivism and *Guanxi* orientation that is rooted in Confucianism provides a positive influence on the adoption and proliferation of m-learning. Fourthly, the centralised education system and its Confucian heritage culture learning context can forge a passive and surface learning approach among the Chinese mobile learners. The investigation of sociocultural influence provides an in-depth understanding of the distinctive characteristics of m-learning that may inform both m-learning adoption within China and within other markets,

as well as increasing theoretical understanding of the relationship between m-learning adoption and cultural context.

6.7 Implications of the research

This study achieved the goal of identifying the characteristics of m-learning in a Chinese business setting. To develop an in-depth understanding of these characteristics of m-learning, this study discussed the findings by virtue of comparing existing Western literature and investigating sociocultural factors that have influenced these distinctive characteristics. The outcomes of this research can contribute conceptually to knowledge of the m-learning field and, in practical application, can help to reshape the way mobile technologies are being used in organisational learning in China. This study presents four areas of theoretical and practical implications for researchers and stakeholders.

Firstly, this research provides implications to fill gaps in the current m-learning literature and to develop a conceptual foundation for future research on m-learning in a Chinese business environment. In particular:

- It explored the importance level of each of the m-learning affordances;
- It conceptualised the central themes of m-learning and revealed the order of the central themes by their importance;
- It investigated the perceived organisational benefits of m-learning, which have a different focus from the perceived personal benefits of m-learning;
- It addressed the sociocultural influences on adoption and implementation of m-learning in the Chinese business context.

Secondly, the findings of this research provide guidelines for instructional designers and HRD practitioners when designing and implementing m-learning activities and blending these activities with existing learning systems in their organisations. In general, the results of this study imply that the conditions for m-learning to flourish in Chinese business settings have appeared favourable, based on the high penetration and usage of mobile devices, the proliferation of using mobile devices for learning, and users' positive perceptions of m-learning. However, the results of this study also point out some issues that need attention when implementing m-learning in Chinese organisations:

- The demographic differences in the usage of mobile devices and m-learning need to be considered. Since female employees, employees with lower education level, and mobile or remote employees tend to spend more time on m-learning compared with other groups, this study implies that the adoption and implementation of m-learning also needs to be segmented in organisations.
- The preference for organisational learning method by different topics needs to be considered. Although m-learning is welcomed for most organisational learning topics in China, and the cost of organisational learning would be reduced by adopting m-learning, m-learning is not considered as the best learning method for every learning topic/content; for example, for managerial/leadership topics. This study implies that learning delivery methods need to be altered to suit different learning topics/contents.
- The perceived ideal content of m-learning should be highlighted. The implication of this study suggests that m-learning could achieve a better outcome if the content is simple, short, fragmented, and has edutainment.
- The perceived ideal user groups of m-learning could be targeted to increase the acceptance rate and participation rate. M-learning is best for a younger age group, junior- or first-level employees and mobile/remote employees.
- Employees' concerns about m-learning need to be considered to further promote m-learning in Chinese organisations. This study suggests that the issues of "passive and surface learning approach", the "privacy issue", and "insufficient interaction", should be considered before adopting m-learning as a major organisational learning method.

Thirdly, the results of this study may also provide implications for m-learning suppliers and m-learning app developers to re-design content and curriculum to enhance, enrich and extend learning and development in the Chinese business context. For example:

- The 21 frequent activities carried out through mobile devices and their level of frequency imply the mobile activity pattern of the Chinese mobile users;
- The 17 important aspects of m-learning and their importance ranking indicate the most important affordances of m-learning for Chinese users;
- The three central themes of m-learning suggest the key focuses of m-learning;
- The four improvement areas of m-learning addressed by respondents imply shortages and weaknesses of current m-learning products and m-learning implementation.

Fourthly, the implications of this study may also provide inputs for Chinese organisations adopting m-learning into their organisational learning systems. This research provides them with knowledge about the current situation of m-learning in the Chinese business context, thus better helping them to identify the needs of, effectively adopt the implementation of, and target the right groups and contents for, m-learning. Subsequently, by leveraging the full potential of m-learning, in this way, organisations can develop more highly competent employees, which is essential to enhance organisational competitiveness. Moreover, a good understanding of the characteristics of m-learning in a Chinese business context can work as a blueprint for m-learning project implementation and testing, not only for organisations in China but also for organisations in other Confucian cultures such as South Korea, Taiwan and Singapore.

6.8 Future Research Directions

The area of m-learning is still an immature field and needs further research to understand the characteristics of m-learning in different teaching and learning contexts. There are a number of contributions made by this study to the literature and implications for practice as detailed in the earlier sections; moreover, the study also has several recommendations for future research as discussed in the following paragraphs.

This study has focused on the business environment, in particular, organisations in China. M-learning characteristics might be very different in other teaching and learning environments in China, such as primary and secondary schools, professional training programs by government agents and philanthropic educational organisations. Furthermore, the research findings are based on data from four organisations from different industries in China. Therefore, the results of this study may lead to generalisability of the findings, and may be suitable for future exploring other organisational contexts. Such exploration will provide the opportunity to potentially develop the theoretical model of m-learning for Chinese context and other business environments.

The organisations included in this research are sizable companies located in the 1st tier or 2nd tier cities, which are the metropolitan large cities in China; while other small business organisations based in rural regions and under-developed areas have not been included as cases in this study. Although the national mobile phone penetration rate and mobile device usage is generally high, it is to be acknowledged that the feasibility of exploring formal m-learning activities organised by companies might reveal many more challenges as well as potential for

the populations living in those areas. Future studies could explore m-learning initiatives in remote/rural areas and test whether the findings from this study apply to larger geographic regions.

The main data collection timeframe including surveys and interviews for this study were conducted from middle 2017 to late 2017. Therefore, this study does not provide a longitudinal study of m-learning or explore sustainability over time. Future research could study the sustainability and benefits of m-learning over a longer period of time to provide a deeper understanding of the characteristics and benefits associated with organisational m-learning initiatives, as well as the benefits m-learning provides to organisation and employees over time. This study has found that m-learning has benefits to organisations and can increase the organisational capabilities as perceived by the respondents; however, the real value and outcome of implementing m-learning as organisational learning method for organisations needs to be investigated in future research.

Finally, further studies could look at demographic differences in using mobile devices and adopting m-learning related to gender, job function, education level, age and job level. This study was meant to explore general characteristics across all demographic groups, but the results suggest some differences in gender, job function, educational level and age. For example, females, less educated employees, and mobile/remote employees, tend to engage more in m-learning compared with other groups. However, the demographic issues were not the focus of this study, and the findings didn't provide concrete answers to every demographic difference related to m-learning. For future research, it is recommended to further investigate the demographic issues with a larger sample size to generate more concrete findings on these issues.

6.9 Concluding Remarks

M-learning research is rapidly growing and expanding; however, there is limited research on m-learning usage in China and in the business context. The aim of this research was to gain a greater understanding of the characteristics of m-learning in a Chinese business setting. The exploratory nature of this study has provided many insights and contributions to m-learning literature and m-learning practice. While there are similarities between the characteristics of Chinese m-learning and the m-learning in the Western context, this study has found important differences; for example, the perceived importance levels of the affordances of m-learning, the

ranking of the central themes regarding m-learning, and the perceived organisational benefits of m-learning. HRD practitioners in China must be aware of the contextual influences imposed by sociocultural factors before and during the adoption and implementation of m-learning in their organisations.

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Appendix

Appendix A: Survey Questionnaire

G Survey Questionnaire 调查问卷[复制]

Mobile Learning in Chinese Business Settings
企业里的移动学习

Participant Information 至受访者:

You are invited to participate voluntarily in this online survey regarding a study of mobile learning. This study aimed at exploring the characteristics of mobile learning in the Chinese business context and develop a mobile learning framework for Chinese business settings. This survey takes approximate 6 minutes. Anonymity is guaranteed in this survey, personal identifying information like your (or your company) name and address will not be used and all information will be securely stored for five years before being destroyed. Within this research, mobile devices include any handheld device capable of multiple functions, for instance, accessing the Internet, reading articles. Examples comprise smartphone, Tablet, Laptop, Palmtop, PDA, or similar devices. Please respond questions by ticking the corresponding answers.

Thanks for your support and participation!

您被受邀参与一项关于在中国商业环境中移动终端学习的研究，研究旨在探索在中国企业内移动终端学习的特点并建立相应的理论框架。本次调研大约耗时6分钟左右。调研遵循保密原则，任何个人背景信息诸如单位、个人姓名及所在地均不会被公布；所有调研信息均会得到妥善保存直至销毁。

在此项研究中，移动设备包括任何可手持的、能接通互联网浏览网页的移动设备。常见的移动终端包括：智能手机、平板电脑、轻便型笔记本电脑、掌上电脑等。回答问题时请勾出相应的选项。

感谢您的支持和参与！

Part I: Personal Information
第一部分：受访者背景信息

1. Age 年龄:

- 19–25
- 26–35
- 36–45
- 46+

2. Gender 性别:

- Male 男
- Female 女

3. Highest education level 最高学历:

- High School 高中
- Associate Degree 大专
- Bachelor 本科
- Master 硕士
- PhD 博士

4. Job function 工作部门:

- Sales & Marketing 市场与销售
- Manufacture 生产制造
- HR/Fin/Admmin/Training 人事 / 财务 / 行政 / 培训
- Operation 营运
- Engineering 工程
- IT/Communication 信息技术 / 沟通
- R & D 研发
- Logistics/Purchasing 物流 / 采购
- Other (Please specify) 其它(请明示) _____ *

5. Job type 岗位性质:

- Non-managerial position 非管理岗位
- Managerial position 管理岗位

Part II: Mobile Device and Usage (Mobile devices include: Phone, Tablet, Laptop, Palmtop, PDA)
第二部分：移动设备及使用（移动设备包括智能手机、平板电脑、笔记本、掌上电脑等）

6. How many mobile devices do you currently have? 您目前有多少台移动设备?

- Nil (Go to Question 11) 没有(跳转至11题)
- 1
- 2
- 3
- 4
- More than 4 超过4台

7.What is your most used mobile device? 您最常用的移动设备是什么?

- Smart phone 智能手机
- Tablet 平板电脑
- Laptop 笔记本电脑
- Others 其它(请注明) _____ *

8. How many years have you used mobile devices? 您使用移动设备有多久了?

- less than one year, 不到一年
- 1-3 years, 1-3年
- 4-5 years, 4-5年
- 6-10 years, 6-10年
- More than 10 years, 10年以上

9. How many hours do you spend on mobile devices every day? 您每天有多少小时使用移动设备?

- ○ less than one hour, 不到1小时
- ○ 1 – 2 hours, 1 – 2小时
- ○ 2(+) – 3 hours, 2(+) – 3小时
- ○ 3(+) – 5 hours, 3(+) – 5小时
- ○ 5(+) –7 hours, 5(+) – 7小时
- ○ 7+, 7小时以上

10. Which activities and how often do you usually do via mobile device each week? 您经常用移动设备做以下哪些事，它们的频率有多高?

	Never 从不	Seldom 偶尔	Sometimes 有时	Often 经常	Very often 很常用
Reading News 看新闻	○	○	○	○	○
Reading Books/Magazine/Articles 阅读报刊 / 杂志 / 文章	○	○	○	○	○
Use of a search Engine (Baidu, Google etc.) 使用搜索引擎(百度、谷歌等)	○	○	○	○	○
Taking pictures or video and/or recording audio 拍照片、录音、摄像	○	○	○	○	○
Making phone calls 打电话	○	○	○	○	○
Checking and replying to Emails 收发电子邮件	○	○	○	○	○
Looking at or posting to Social Media: WeChat, QQ, WeiBo, LinkedIn, Facebook, WhatsApp, etc. 社交媒体：微信、QQ、微博、LinkedIn, Facebook, WhatsApp,等.	○	○	○	○	○
Engaging in Instant Messaging 短信	○	○	○	○	○
Accessing Professional Websites/Portals 浏览（行业）专业网站	○	○	○	○	○
	Never 从不	Seldom 偶尔	Sometimes 有时	Often 经常	Very often 很常用
Language translation 翻译	○	○	○	○	○
Accessing a Company based Learning program (incl video, app) 公司组织的在线学习（包括视频及应用软件课件）	○	○	○	○	○
Accessing a Learning					

program – not company based (incl video, app) 非公司组织的学习课件（包括视频及应用软件课件					
Online Shopping 网上购物					
Video Conference (Meeting) 电话 / 视频会议					
Checking Whether 查看天气					
Mobile Finance/Banking 移动 / 手机金融（手机银行，支付宝，股票交易等）					
Data Transfer (iDrop, Bluetooth transfer, etc.) 数据交换(iDrop, 蓝牙等)					
Checking Time 看时间					
Entertainment (Game/Movie/Music/Radio) 娱乐(游戏/电影/音乐/收音机)					
Health and sports tracking 运动及健康					
Map, Location and GPS 地图及GPS					

Other use (please specify):其它1(请指明):

Other use (please specify):其它2(请指明):

Part III: Learning Through Mobile Device 第三部分：通过移动终端的学习

11. How would you prefer to receive training in your organisation? 在公司学习中，您希望得到何种方式的培训?
Class: Classroom learning; Computer: Computer based (e-learning); Mobile: Mobile learning; Job: On-the-job learning; NA: Not received at all. You may choose more than one method for each training activity.
课堂: 课堂式授课教学; 电脑: 电脑教学(e-learning); 移动: 移动终端学习; 在岗: 在岗 / 在职实践学习; 均否: 什么学习方式都不想。 针对每一种学习内容，您可选择一种以上学习方式。 [多选题]

	Class课堂	Computer电脑	Mobile移动	Job在岗	NA均否
Leadership & Managerial 管理及领导力培训					
Job related knowledge and skills 工作相关的技能及知识					
Soft Skills (inter-personal skills, language etc.) 软技能(沟通技巧、外语、团队合作、演					

讲等)					
IT Skills IT技能培训	☐	☐	☐	☐	☐
Product/Industry information 产品 / 行业知识培训	☐	☐	☐	☐	☐
Compliance (Regulations) related 法务 / 法规培训	☐	☐	☐	☐	☐

Other (please specify) _____ 其它（请明示）_____

12.How important is each of these aspects of Mobile learning for you? (Please rate each aspect)
您认为以下关于移动终端学习的哪些方面比较重要? (请注明每一项)
1=Not important at all, 2=Not important, 3=Neutral, 4=Important, 5=Very important. 1=很不重要, 2=不重要, 3=可有可無，4=重要，5=非常重要

	1	2	3	4	5
Monitoring and keeping track of learning progress 能随时监测跟踪学习进程	○	○	○	○	○
Allows autonomy in choosing learning content and method (Personalized learning) 能给予您在学习内容及学习方法上足够的自主性（个性化学习）	○	○	○	○	○
Allows autonomy in choosing learning environments (Can learn anytime and anywhere) 能给予您在学习环境上的灵活性（随时随地学习）	○	○	○	○	○
Allows a person to learn in their own way 让您按自己的方式学习	○	○	○	○	○
Allows access to audio-visual support of learning 能够支持语音学习	○	○	○	○	○
Learning can be more realistic/relevant and practical 学习能够更相关 / 实用	○	○	○	○	○
Allows publishing and sharing of progress and insights among a group of people 允许将自己的观点和成果与人分享或出版	○	○	○	○	○
Allows interactive with trainers and other learners 可以与培训师或学员积极互动	○	○	○	○	○
Allows you to build and maintain organisational/social networking which is linked to your learning 可以建立并维系组织 / 社交人际网络	○	○	○	○	○
	1	2	3	4	5
Allows multi-task learning (or learning while doing something else) 可以实现多任务处理学习（边学习边做其它的事）	○	○	○	○	○
Helps overcome shyness in the face-to-face training or in a public class 帮助避免及克服面对面教学中当众表达的害羞	○	○	○	○	○
Learning can be timely (can look up information when needed) 实现随时学习（任何时候都能获取所需信息）	○	○	○	○	○
Information can be updated easily to reflect latest changes 信息得以实时更新	○	○	○	○	○
Allows ongoing sharing of good practices 可以随时实现最佳实践经验分享	○	○	○	○	○
Save training/learning cost for organisation 为组织节省时间和财力	○	○	○	○	○
Can use targeted and customized Learning Apps.能使用有针对性的定制学习应用软件	○	○	○	○	○
Location awareness and GPS 可使用GPS和定位功能	○	○	○	○	○

13. Indicate how much you agree with the following statements?
请指出您对以下每个表述的认同度

1: Strongly Disagree, 2: Slightly Disagree, 3: Neutral, 4: Slightly Agree, 5: Strongly Agree. 1代表非常不同意，2代表比较不同意，3代表中立，4代表比较同意，5代表非常同意。

	1	2	3	4	5
Mobile device can enhance my learning efficiency 移动设备能提高我的学习效率	○	○	○	○	○
Mobile device can enhance my learning interest 移动设备能提高我学习的兴趣	○	○	○	○	○
I am satisfied with the results and effectiveness of mobile learning 我很满意移动学习带来的学习效益和学习成绩	○	○	○	○	○
Mobile learning can help my career development 移动学习可以帮助我的职业发展	○	○	○	○	○
I can use mobile device with great ease 我能够轻而易举地使用移动设备	○	○	○	○	○
M-learning is most likely to be a mainstream learning method in the future 在将来，移动学习很可能成为主流的学习途径	○	○	○	○	○
In general, I like using mobile devices to learn 总体来说，我喜欢使用移动设备来学习	○	○	○	○	○

This is the end of the survey. Thank you! 问卷调查结束，谢谢！

提交

问卷星 提供技术支持

Appendix B: Interview Guide

Step one: Explain the research background information

"You are invited to participate in a study on exploring the characteristics of mobile learning in Chinese business context and developing a mobile learning framework for Chinese business settings. The outcomes of this research will contribute conceptually to the knowledge of the mobile learning field within business environment. Additionally, the research will have practical implications that it will provide recommendation for organisational learning and development professional in designing organizational mobile learning activities and programs. My name is Ebin Zhang from MGSM Macquarie University and I am the research of this project"

Step two: Consent Letter (Explain and get signed)

"This is the consent letter of your participation in both English and Chinese, please read it and sign on the bottom. Let me know if you have any questions. Once again, this is interview is confidential and for research purpose only, you have the rights to withdraw at any time you want. You may also access the result of research if you like, leave you email address if you do so"

Step three: Acquire interviewees' personal information (age, function and job type)

"Do you mind tell me something about you, for example, your age range, job function and job type etc. These data will be only for statistic/demographic use and you will be anonymous in the research paper"

Step three: Ask questions and take notes

"Do you mind if I record our conversation and take notes during the interview?"

Interview Questions

1. In the past few months, have you ever used mobile devices for learning, either company based or for personal learning? (Please share these experiences). (If not used, go to 3.)
2. What are the personal benefits for you from using a mobile device for learning?
3. What is the potential and future benefits that m-learning could bring to you/your team/your organisation?
4. Do you see mobile devices as being useful for any specific learning activities you might have in the future?
5. Do you see mobile devices as being more useful for any specific group of people in the organisation?
6. What are your concerns when using a mobile device for learning?
7. What can be done to increase the effectiveness of mobile learning?

Appendix C and D of this thesis have been removed as they may contain sensitive/confidential content

Appendix E: SPSS Statistical report on Mobile Device Usage by Gender group

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
How many hours do you spend on mobile devices every day?	male	357	4.553	2.1968	.1163
	female	308	5.333	2.3018	.1312

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality ..
		F	Sig.	t
How many hours do you spend on mobile devices every day?	Equal variances assumed	5.669	.018	-4.463
	Equal variances not assumed			-4.448

Independent Samples Test

		t-test for Equality of Means		
		df	Sig. (2-tailed)	Mean Difference
How many hours do you spend on mobile devices every day?	Equal variances assumed	663	.000	-.7796
	Equal variances not assumed	638.857	.000	-.7796

Independent Samples Test

		t-test for Equality of Means	
		Std. Error Difference	95% Confidence ... Lower
How many hours do you spend on mobile devices every day?	Equal variances assumed	.1747	-1.1225
	Equal variances not assumed	.1753	-1.1238

Independent Samples Test

		t-test for Equality of ... 95% Confidence Interval of the...
		Upper
How many hours do you spend on mobile devices every day?	Equal variances assumed	-.4366
	Equal variances not assumed	-.4354

Appendix F: SPSS Statistical report on Mobile Device Usage by Age group

Descriptives

How many hours do you spend on mobile devices every day?

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
19-25 years	38	5.197	2.2914	.3717	4.444	5.951
26-35 years	278	4.799	2.3515	.1410	4.521	5.076
36-45	291	4.978	2.1949	.1287	4.724	5.231
46+	58	4.966	2.3468	.3082	4.348	5.583
Total	665	4.914	2.2778	.0883	4.741	5.088

Descriptives

How many hours do you spend on mobile devices every day?

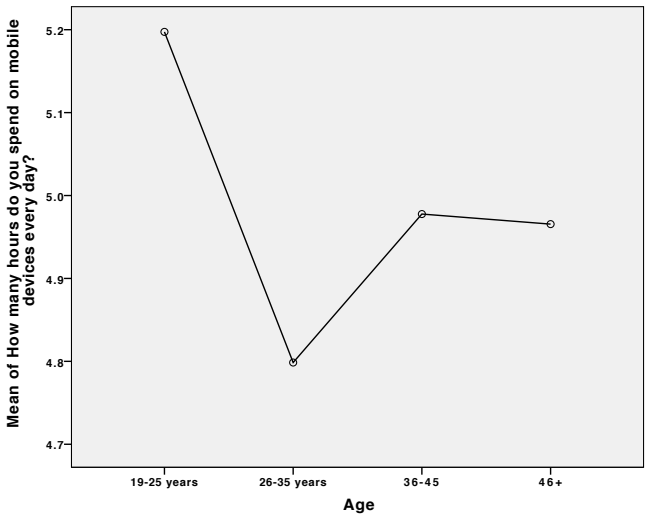
	Minimum	Maximum
19-25 years	1.5	8.0
26-35 years	-3.0	8.0
36-45	.5	8.0
46+	1.5	8.0
Total	-3.0	8.0

ANOVA

How many hours do you spend on mobile devices every day?

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.089	3	2.696	.519	.670
Within Groups	3437.025	661	5.200		
Total	3445.114	664			

Means Plots



Appendix G: SPSS Statistical report on Mobile Usage by Educational Level Group

Descriptives

How many hours do you spend on mobile devices every day?

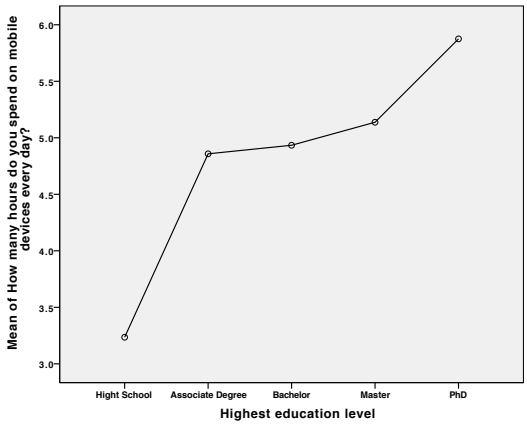
	N	Mean	Std. Deviation	Std. Error	95% Confidence… Lower Bound	95% Confidence Interval for… Upper Bound	Minimum	Maximum
Hight School	17	3.235	2.2989	.5576	2.053	4.417	.5	8.0
Associate Degree	134	4.858	2.2799	.1970	4.469	5.248	1.5	8.0
Bachelor	401	4.934	2.2291	.1113	4.715	5.153	-3.0	8.0
Master	109	5.138	2.3490	.2250	4.692	5.584	.5	8.0
PhD	4	5.875	3.0653	1.5326	.997	10.753	1.5	8.0
Total	665	4.914	2.2778	.0883	4.741	5.088	-3.0	8.0

ANOVA

How many hours do you spend on mobile devices every day?

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	57.627	4	14.407	2.807	.025
Within Groups	3387.487	660	5.133		
Total	3445.114	664			

Means Plots



Correlations

		How many hours do you spend on mobile devices every day?	Highest education level
Pearson Correlation	How many hours do you spend on mobile devices every day?	1.000	.092
	Highest education level	.092	1.000
Sig. (1-tailed)	How many hours do you spend on mobile devices every day?	.	.009
	Highest education level	.009	.
N	How many hours do you spend on mobile devices every day?	665	665
	Highest education level	665	665

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Highest education level[b]	.	Enter

a. Dependent Variable: How many hours do you spend on mobile devices every day?

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.092[a]	.008	.007	2.2699	1.936

a. Predictors: (Constant), Highest education level

b. Dependent Variable: How many hours do you spend on mobile devices every day?

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.899	1	28.899	5.609	.018[b]
	Residual	3416.215	663	5.153		
	Total	3445.114	664			

a. Dependent Variable: How many hours do you spend on mobile devices every day?

b. Predictors: (Constant), Highest education level

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t
1	(Constant)	4.040	.380		10.645
	Highest education level	.299	.126	.092	2.368

Coefficients[a]

Model		Sig.
1	(Constant)	.000
	Highest education level	.018

a. Dependent Variable: How many hours do you spend on mobile devices every day?

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.339	5.535	4.914	.2086	665
Residual	-7.9372	3.6609	.0000	2.2682	665
Std. Predicted Value	-2.757	2.977	.000	1.000	665
Std. Residual	-3.497	1.613	.000	.999	665

a. Dependent Variable: How many hours do you spend on mobile devices every day?

Post Hoc Tests

Multiple Comparisons

Dependent Variable: How many hours do you spend on mobile devices every day?

	(I) Highest education level	(J) Highest education level	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Tukey HSD	High School	Associate Degree	-1.6229*	.5833	.044	-3.218	-.027
		Bachelor	-1.6986*	.5610	.021	-3.233	-.164
		Master	-1.9023*	.5908	.012	-3.518	-.286
		PhD	-2.6397	1.2590	.223	-6.083	.804
	Associate Degree	High School	1.6229*	.5833	.044	.027	3.218
		Bachelor	-.0757	.2261	.997	-.694	.543
		Master	-.2794	.2922	.875	-1.079	.520
		PhD	-1.0168	1.1495	.903	-4.161	2.128
	Bachelor	High School	1.6986*	.5610	.021	.164	3.233

		Associate Degree	.0757	.2261	.997	-.543	.694
		Master	-.2037	.2447	.921	-.873	.466
		PhD	-.9411	1.1384	.922	-4.055	2.173
	Master	High School	1.9023*	.5908	.012	.286	3.518
		Associate Degree	.2794	.2922	.875	-.520	1.079
		Bachelor	.2037	.2447	.921	-.466	.873
		PhD	-.7374	1.1534	.969	-3.892	2.417
	PhD	High School	2.6397	1.2590	.223	-.804	6.083
		Associate Degree	1.0168	1.1495	.903	-2.128	4.161
		Bachelor	.9411	1.1384	.922	-2.173	4.055
		Master	.7374	1.1534	.969	-2.417	3.892
Bonferroni	High School	Associate Degree	-1.6229	.5833	.056	-3.266	.020
		Bachelor	-1.6986*	.5610	.026	-3.279	-.119
		Master	-1.9023*	.5908	.013	-3.566	-.238
		PhD	-2.6397	1.2590	.364	-6.186	.906
	Associate Degree	High School	1.6229	.5833	.056	-.020	3.266
		Bachelor	-.0757	.2261	1.000	-.712	.561
		Master	-.2794	.2922	1.000	-1.102	.544
		PhD	-1.0168	1.1495	1.000	-4.254	2.221
	Bachelor	High School	1.6986*	.5610	.026	.119	3.279
		Associate Degree	.0757	.2261	1.000	-.561	.712
		Master	-.2037	.2447	1.000	-.893	.486
		PhD	-.9411	1.1384	1.000	-4.147	2.265
	Master	High School	1.9023*	.5908	.013	.238	3.566
		Associate Degree	.2794	.2922	1.000	-.544	1.102
		Bachelor	.2037	.2447	1.000	-.486	.893
		PhD	-.7374	1.1534	1.000	-3.986	2.511
	PhD	High School	2.6397	1.2590	.364	-.906	6.186
		Associate Degree	1.0168	1.1495	1.000	-2.221	4.254
		Bachelor	.9411	1.1384	1.000	-2.265	4.147
		Master	.7374	1.1534	1.000	-2.511	3.986

*. The mean difference is significant at the 0.05 level.

Homogeneous Subsets

How many hours do you spend on mobile devices every day?

			Subset for alpha = 0.05	
	Highest education level	N	1	2
Tukey HSD[a,b]	High School	17	3.235	

	Associate Degree	134	4.858	4.858
	Bachelor	401	4.934	4.934
	Master	109	5.138	5.138
	PhD	4		5.875
	Sig.		.140	.728

Appendix H: SPSS statistical report on Mobile Usage by Job Function

Descriptives

How many hours do you spend on mobile devices every day?

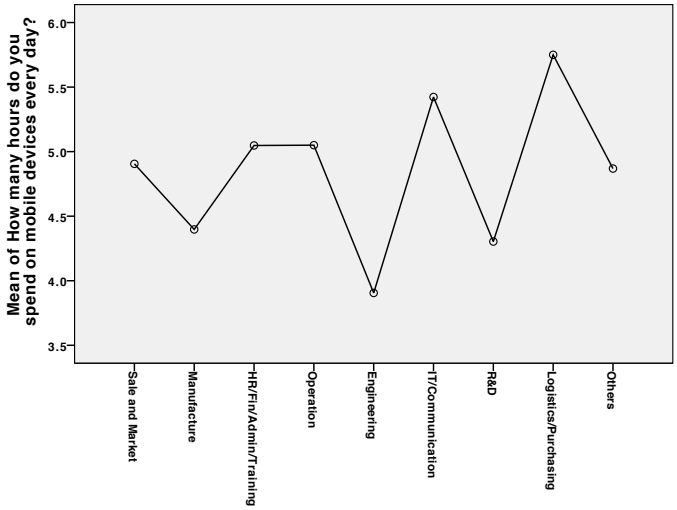
	N	Mean	Std. Deviation	Std. Error	95% Confidence… Lower Bound	95% Confidence Interval for… Upper Bound	Minimum	Maximum
Sale and Market	222	4.905	2.2782	.1529	4.604	5.207	-3.0	8.0
Manufacture	39	4.397	2.3175	.3711	3.646	5.149	1.5	8.0
HR/Fin/Admin/Training	84	5.048	2.4989	.2727	4.505	5.590	.5	8.0
Operation	110	5.050	2.1915	.2089	4.636	5.464	1.5	8.0
Engineering	37	3.905	2.1338	.3508	3.194	4.617	.5	8.0
IT/Communication	52	5.423	2.1199	.2940	4.833	6.013	1.5	8.0
R&D	28	4.304	2.2947	.4337	3.414	5.193	1.5	8.0
Logistics/Purchasing	32	5.750	2.2397	.3959	4.943	6.557	1.5	8.0
Others	61	4.869	2.0954	.2683	4.332	5.406	.5	8.0
Total	665	4.914	2.2778	.0883	4.741	5.088	-3.0	8.0

ANOVA

How many hours do you spend on mobile devices every day?

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	97.995	8	12.249	2.401	.015
Within Groups	3347.119	656	5.102		
Total	3445.114	664			

Means Plots



Post Hoc Tests

Multiple Comparisons

Dependent Variable: How many hours do you spend on mobile devices every day?

Tukey HSD

(I) Job function	(J) Job function	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Sale and Market	Manufacture	.5080	.3922	.933	-.713	1.729
	HR/Fin/Admin/Training	-.1422	.2894	1.000	-1.043	.758
	Operation	-.1446	.2634	1.000	-.964	.675
	Engineering	1.0000	.4011	.237	-.248	2.248
	IT/Communication	-.5177	.3480	.861	-1.601	.565
	R&D	.6018	.4530	.923	-.808	2.012
	Logistics/Purchasing	-.8446	.4271	.560	-2.174	.485
	Others	.0366	.3265	1.000	-.980	1.053
Manufacture	Sale and Market	-.5080	.3922	.933	-1.729	.713
	HR/Fin/Admin/Training	-.6502	.4377	.862	-2.012	.712
	Operation	-.6526	.4210	.831	-1.963	.658
	Engineering	.4920	.5184	.990	-1.121	2.105
	IT/Communication	-1.0256	.4785	.444	-2.515	.463
	R&D	.0939	.5595	1.000	-1.647	1.835
	Logistics/Purchasing	-1.3526	.5388	.229	-3.029	.324
	Others	-.4714	.4631	.984	-1.913	.970
HR/Fin/Admin/Training	Sale and Market	.1422	.2894	1.000	-.758	1.043
	Manufacture	.6502	.4377	.862	-.712	2.012
	Operation	-.0024	.3273	1.000	-1.021	1.016
	Engineering	1.1422	.4457	.205	-.245	2.529
	IT/Communication	-.3755	.3986	.990	-1.616	.865
	R&D	.7440	.4929	.851	-.790	2.278
	Logistics/Purchasing	-.7024	.4692	.857	-2.163	.758
	Others	.1788	.3800	1.000	-1.004	1.361
Operation	Sale and Market	.1446	.2634	1.000	-.675	.964
	Manufacture	.6526	.4210	.831	-.658	1.963

Appendix I: SPSS statistical report on Mobile Usage by Job Type

Group Statistics

	Job type	N	Mean	Std. Deviation	Std. Error Mean
How many hours do you spend on mobile devices every day?	Non-managerial position holders	343	4.933	2.2530	.1216
	Managerial position holders	322	4.894	2.3073	.1286

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality ..
		F	Sig.	t
How many hours do you spend on mobile devices every day?	Equal variances assumed	.055	.814	.218
	Equal variances not assumed			.218

Independent Samples Test

		t-test for Equality of Means		
		df	Sig. (2-tailed)	Mean Difference
How many hours do you spend on mobile devices every day?	Equal variances assumed	663	.828	.0385
	Equal variances not assumed	658.010	.828	.0385

Independent Samples Test

		t-test for Equality of Means	
		Std. Error Difference	95% Confidence … Lower
How many hours do you spend on mobile devices every day?	Equal variances assumed	.1769	-.3088
	Equal variances not assumed	.1770	-.3090

Independent Samples Test

		t-test for Equality of … 95% Confidence Interval of the …
		Upper
How many hours do you spend on mobile devices every day?	Equal variances assumed	.3858
	Equal variances not assumed	.3861

Appendix J: SPSS statistical report on Usage of Company Organised M-learning by Gender and Educational Level

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Accessing a Company based Learning program (incl video, app)	male	357	3.02	1.003	.053
	female	308	3.20	1.076	.061

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality ..
		F	Sig.	t
Accessing a Company based Learning program (incl video, app)	Equal variances assumed	6.763	.010	-2.287
	Equal variances not assumed			-2.275

Descriptives

Accessing a Company based Learning program (incl video, app)

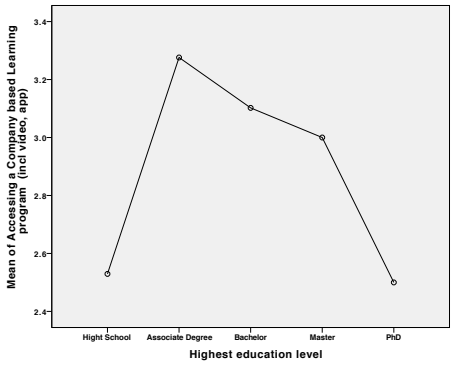
	N	Mean	Std. Deviation	Std. Error	95% Confidence . Lower Bound	95% Confidence Interval for ... Upper Bound	Minimum	Maximum
Hight School	17	2.53	1.068	.259	1.98	3.08	1	4
Associate Degree	134	3.28	1.014	.088	3.10	3.45	1	5
Bachelor	401	3.10	1.050	.052	3.00	3.21	1	5
Master	109	3.00	.991	.095	2.81	3.19	1	5
PhD	4	2.50	1.291	.645	.45	4.55	1	4
Total	665	3.10	1.041	.040	3.02	3.18	1	5

ANOVA

Accessing a Company based Learning program (incl video, app)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.220	4	3.055	2.853	.023
Within Groups	706.827	660	1.071		
Total	719.047	664			

Means Plots



Appendix K: SPSS statistical report on Usage of Personal Organised M-learning by Gender and Educational Level

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Accessing a Learning program – not company based (incl video, app)	male	357	2.83	1.034	.055
	female	308	3.06	1.043	.059

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality ..
		F	Sig.	t
Accessing a Learning program – not company based (incl video, app)	Equal variances assumed	.358	.550	-2.881
	Equal variances not assumed			-2.879

		t-test for Equality of Means		
		df	Sig. (2-tailed)	Mean Difference
Accessing a Learning program – not company based (incl video, app)	Equal variances assumed	663	.004	-.233
	Equal variances not assumed	647.154	.004	-.233

		t-test for Equality of Means		
		Std. Error Difference	95% Confidence … Lower	95% Confidence Interval of the… Upper
Accessing a Learning program – not company based (incl video, app)	Equal variances assumed	.081	-.391	-.074
	Equal variances not assumed	.081	-.391	-.074

Descriptives

Accessing a Learning program – not company based (incl video, app)

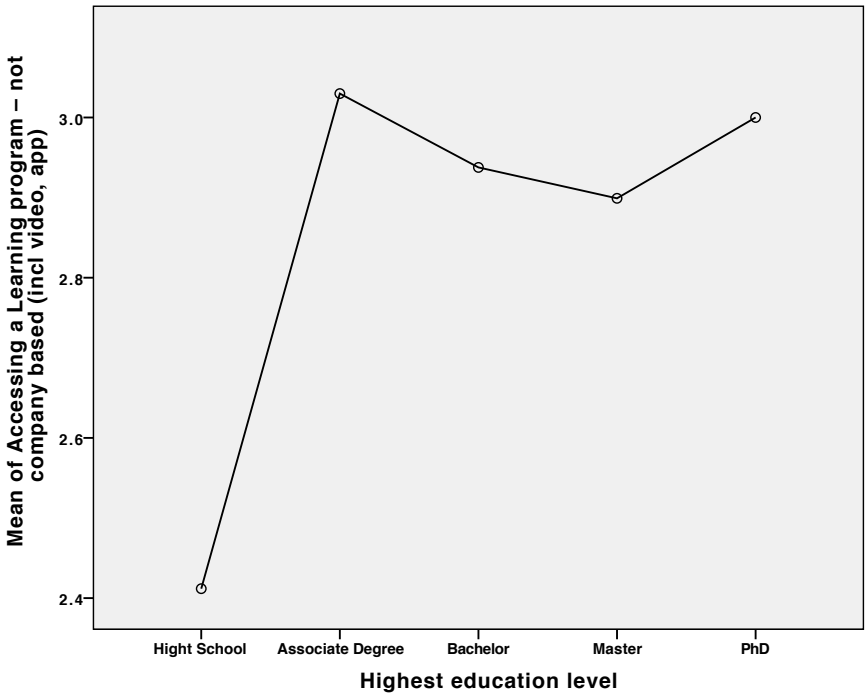
	N	Mean	Std. Deviation	Std. Error	95% Confidence … Lower Bound	95% Confidence Interval for … Upper Bound	Minimum	Maximum
Hight School	17	2.41	.939	.228	1.93	2.89	1	4
Associate Degree	134	3.03	1.069	.092	2.85	3.21	1	5
Bachelor	401	2.94	1.048	.052	2.83	3.04	1	5
Master	109	2.90	1.009	.097	2.71	3.09	1	5
PhD	4	3.00	.816	.408	1.70	4.30	2	4
Total	665	2.94	1.044	.040	2.86	3.02	1	5

ANOVA

Accessing a Learning program – not company based (incl video, app)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.018	4	1.504	1.384	.238
Within Groups	717.330	660	1.087		
Total	723.347	664			

Means Plots



Appendix L: SPSS statistical report on Usage of Company Organised M-learning by Job Function

Descriptives

Accessing a Company based Learning program (incl video, app)

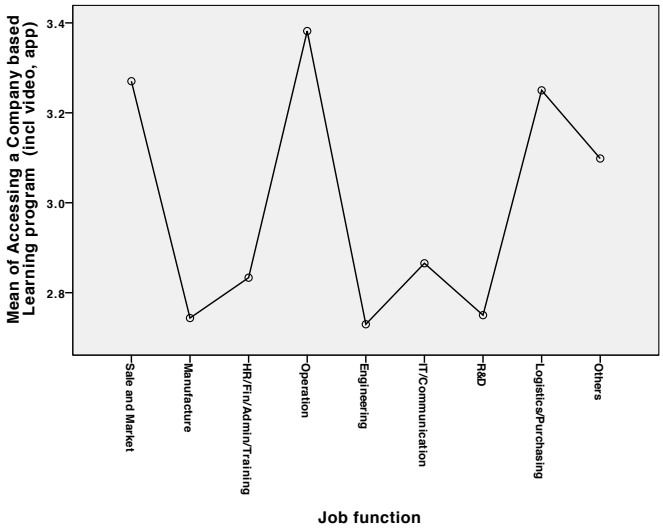
	N	Mean	Std. Deviation	Std. Error	95% Confidence .. Lower Bound	95% Confidence Interval for ... Upper Bound	Minimum	Maximum
Sale and Market	222	3.27	1.067	.072	3.13	3.41	1	5
Manufacture	39	2.74	1.093	.175	2.39	3.10	1	5
HR/Fin/Admin/Training	84	2.83	.955	.104	2.63	3.04	1	5
Operation	110	3.38	1.084	.103	3.18	3.59	1	5
Engineering	37	2.73	.962	.158	2.41	3.05	1	5
IT/Communication	52	2.87	1.010	.140	2.58	3.15	1	5
R&D	28	2.75	.799	.151	2.44	3.06	1	5
Logistics/Purchasing	32	3.25	.916	.162	2.92	3.58	1	5
Others	61	3.10	.926	.119	2.86	3.34	1	5
Total	665	3.10	1.041	.040	3.02	3.18	1	5

ANOVA

Accessing a Company based Learning program (incl video, app)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	38.182	8	4.773	4.598	.000
Within Groups	680.865	656	1.038		
Total	719.047	664			

Means Plots



Post Hoc Tests

Multiple Comparisons

Dependent Variable: Accessing a Company based Learning program (incl video, app)

	(I) Job function	(J) Job function	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Tukey HSD	Sale and Market	Manufacture	.527	.182	.092	-.04	1.09
		HR/Fin/Admin/Training	.437*	.134	.033	.02	.85
		Operation	-.057	.122	1.000	-.44	.32
		Engineering	.541	.186	.090	-.04	1.12
		IT/Communication	.405	.162	.231	-.10	.91
		R&D	.520	.210	.246	-.13	1.17
		Logistics/Purchasing	.020	.198	1.000	-.60	.64
		Others	.172	.152	.969	-.30	.64
	Manufacture	Sale and Market	-.527	.182	.092	-1.09	.04
		HR/Fin/Admin/Training	-.090	.203	1.000	-.72	.54
		Operation	-.584	.195	.071	-1.19	.02
		Engineering	.014	.241	1.000	-.73	.76
		IT/Communication	-.122	.222	1.000	-.81	.57
		R&D	-.006	.260	1.000	-.81	.80
		Logistics/Purchasing	-.506	.250	.526	-1.28	.27
		Others	-.355	.215	.776	-1.02	.31
	HR/Fin/Admin/Training	Sale and Market	-.437*	.134	.033	-.85	-.02
		Manufacture	.090	.203	1.000	-.54	.72
		Operation	-.494*	.152	.033	-.97	-.02
		Engineering	.104	.207	1.000	-.54	.75
		IT/Communication	-.032	.185	1.000	-.61	.54
		R&D	.083	.229	1.000	-.63	.80
		Logistics/Purchasing	-.417	.218	.605	-1.09	.26
		Others	-.265	.176	.854	-.81	.28
	Operation	Sale and Market	.057	.122	1.000	-.32	.44
		Manufacture	.584	.195	.071	-.02	1.19
		HR/Fin/Admin/Training	.494*	.152	.033	.02	.97
		Engineering	.598	.199	.069	-.02	1.22

	IT/Communication	.462	.176	.181	-.09	1.01
	R&D	.577	.222	.188	-.11	1.27
	Logistics/Purchasing	.077	.211	1.000	-.58	.73
	Others	.229	.167	.910	-.29	.75
Engineering	Sale and Market	-.541	.186	.090	-1.12	.04
	Manufacture	-.014	.241	1.000	-.76	.73
	HR/Fin/Admin/Training	-.104	.207	1.000	-.75	.54
	Operation	-.598	.199	.069	-1.22	.02
	IT/Communication	-.136	.225	1.000	-.84	.57
	R&D	-.020	.263	1.000	-.84	.80
	Logistics/Purchasing	-.520	.253	.505	-1.31	.27
	Others	-.369	.218	.754	-1.05	.31
IT/Communication	Sale and Market	-.405	.162	.231	-.91	.10
	Manufacture	.122	.222	1.000	-.57	.81
	HR/Fin/Admin/Training	.032	.185	1.000	-.54	.61
	Operation	-.462	.176	.181	-1.01	.09
	Engineering	.136	.225	1.000	-.57	.84
	R&D	.115	.246	1.000	-.65	.88
	Logistics/Purchasing	-.385	.236	.787	-1.12	.35
	Others	-.233	.198	.961	-.85	.38
R&D	Sale and Market	-.520	.210	.246	-1.17	.13
	Manufacture	.006	.260	1.000	-.80	.81
	HR/Fin/Admin/Training	-.083	.229	1.000	-.80	.63
	Operation	-.577	.222	.188	-1.27	.11
	Engineering	.020	.263	1.000	-.80	.84
	IT/Communication	-.115	.246	1.000	-.88	.65
	Logistics/Purchasing	-.500	.271	.653	-1.34	.34
	Others	-.348	.239	.875	-1.09	.40
Logistics/Purchasing	Sale and Market	-.020	.198	1.000	-.64	.60
	Manufacture	.506	.250	.526	-.27	1.28
	HR/Fin/Admin/Training	.417	.218	.605	-.26	1.09
	Operation	-.077	.211	1.000	-.73	.58
	Engineering	.520	.253	.505	-.27	1.31

		IT/Communication	.385	.236	.787	-.35	1.12
		R&D	.500	.271	.653	-.34	1.34
		Others	.152	.229	.999	-.56	.86
	Others	Sale and Market	-.172	.152	.969	-.64	.30
		Manufacture	.355	.215	.776	-.31	1.02
		HR/Fin/Admin/Training	.265	.176	.854	-.28	.81
		Operation	-.229	.167	.910	-.75	.29
		Engineering	.369	.218	.754	-.31	1.05
		IT/Communication	.233	.198	.961	-.38	.85
		R&D	.348	.239	.875	-.40	1.09
		Logistics/Purchasing	-.152	.229	.999	-.86	.56
Bonferroni	Sale and Market	Manufacture	.527	.182	.142	-.06	1.11
		HR/Fin/Admin/Training	.437*	.134	.043	.01	.87
		Operation	-.057	.122	1.000	-.45	.34
		Engineering	.541	.186	.137	-.06	1.14
		IT/Communication	.405	.162	.448	-.11	.92
		R&D	.520	.210	.490	-.15	1.20
		Logistics/Purchasing	.020	.198	1.000	-.62	.66
		Others	.172	.152	1.000	-.31	.66
	Manufacture	Sale and Market	-.527	.182	.142	-1.11	.06
		HR/Fin/Admin/Training	-.090	.203	1.000	-.74	.56
		Operation	-.584	.195	.105	-1.21	.04
		Engineering	.014	.241	1.000	-.76	.79
		IT/Communication	-.122	.222	1.000	-.83	.59
		R&D	-.006	.260	1.000	-.84	.83
		Logistics/Purchasing	-.506	.250	1.000	-1.31	.30
		Others	-.355	.215	1.000	-1.04	.34
	HR/Fin/Admin/Training	Sale and Market	-.437*	.134	.043	-.87	-.01
		Manufacture	.090	.203	1.000	-.56	.74
		Operation	-.494*	.152	.043	-.98	-.01
		Engineering	.104	.207	1.000	-.56	.77
		IT/Communication	-.032	.185	1.000	-.63	.56
		R&D	.083	.229	1.000	-.65	.82
		Logistics/Purchasing	-.417	.218	1.000	-1.12	.28

	Others	-.265	.176	1.000	-.83	.30
Operation	Sale and Market	.057	.122	1.000	-.34	.45
	Manufacture	.584	.195	.105	-.04	1.21
	HR/Fin/Admin/Training	.494*	.152	.043	.01	.98
	Engineering	.598	.199	.101	-.04	1.24
	IT/Communication	.462	.176	.326	-.10	1.03
	R&D	.577	.222	.342	-.14	1.29
	Logistics/Purchasing	.077	.211	1.000	-.60	.75
	Others	.229	.167	1.000	-.31	.77
Engineering	Sale and Market	-.541	.186	.137	-1.14	.06
	Manufacture	-.014	.241	1.000	-.79	.76
	HR/Fin/Admin/Training	-.104	.207	1.000	-.77	.56
	Operation	-.598	.199	.101	-1.24	.04
	IT/Communication	-.136	.225	1.000	-.86	.59
	R&D	-.020	.263	1.000	-.86	.82
	Logistics/Purchasing	-.520	.253	1.000	-1.33	.29
	Others	-.369	.218	1.000	-1.07	.33
IT/Communication	Sale and Market	-.405	.162	.448	-.92	.11
	Manufacture	.122	.222	1.000	-.59	.83
	HR/Fin/Admin/Training	.032	.185	1.000	-.56	.63
	Operation	-.462	.176	.326	-1.03	.10
	Engineering	.136	.225	1.000	-.59	.86
	R&D	.115	.246	1.000	-.67	.90
	Logistics/Purchasing	-.385	.236	1.000	-1.14	.37
	Others	-.233	.198	1.000	-.87	.40
R&D	Sale and Market	-.520	.210	.490	-1.20	.15
	Manufacture	.006	.260	1.000	-.83	.84
	HR/Fin/Admin/Training	-.083	.229	1.000	-.82	.65
	Operation	-.577	.222	.342	-1.29	.14
	Engineering	.020	.263	1.000	-.82	.86
	IT/Communication	-.115	.246	1.000	-.90	.67
	Logistics/Purchasing	-.500	.271	1.000	-1.37	.37
	Others	-.348	.239	1.000	-1.12	.42

Logistics/Purchasing	Sale and Market	-.020	.198	1.000	-.66	.62
	Manufacture	.506	.250	1.000	-.30	1.31
	HR/Fin/Admin/Training	.417	.218	1.000	-.28	1.12
	Operation	-.077	.211	1.000	-.75	.60
	Engineering	.520	.253	1.000	-.29	1.33
	IT/Communication	.385	.236	1.000	-.37	1.14
	R&D	.500	.271	1.000	-.37	1.37
	Others	.152	.229	1.000	-.58	.89
Others	Sale and Market	-.172	.152	1.000	-.66	.31
	Manufacture	.355	.215	1.000	-.34	1.04
	HR/Fin/Admin/Training	.265	.176	1.000	-.30	.83
	Operation	-.229	.167	1.000	-.77	.31
	Engineering	.369	.218	1.000	-.33	1.07
	IT/Communication	.233	.198	1.000	-.40	.87
	R&D	.348	.239	1.000	-.42	1.12
	Logistics/Purchasing	-.152	.229	1.000	-.89	.58

*. The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Accessing a Company based Learning program (incl video, app)

	Job function	N	Subset for alpha = 0.05
			1
Tukey HSD[a,b]	Engineering	37	2.73
	Manufacture	39	2.74
	R&D	28	2.75
	HR/Fin/Admin/Training	84	2.83
	IT/Communication	52	2.87
	Others	61	3.10
	Logistics/Purchasing	32	3.25
	Sale and Market	222	3.27
	Operation	110	3.33
	Sig.		.105

Appendix M: SPSS statistical report on Usage of Personal Organised M-learning by Job Function

Descriptives

Accessing a Learning program – not company based (incl video, app)

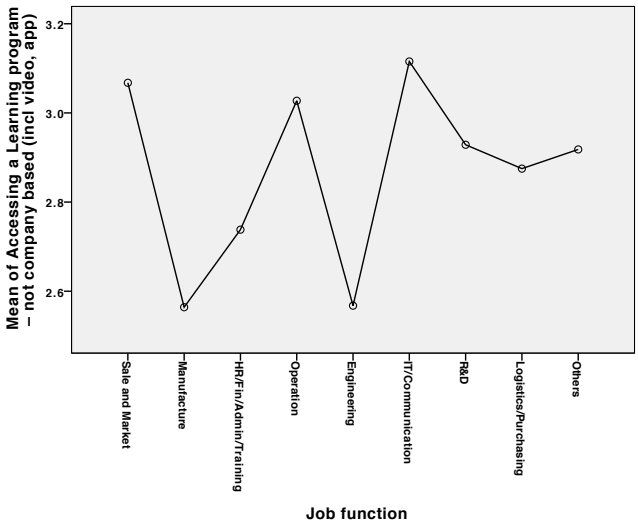
	N	Mean	Std. Deviation	Std. Error	95% Confidence … Lower Bound	95% Confidence Interval for … Upper Bound	Minimum	Maximum
Sale and Market	222	3.07	1.093	.073	2.92	3.21	1	5
Manufacture	39	2.56	1.046	.168	2.22	2.90	1	5
HR/Fin/Admin/Training	84	2.74	.995	.109	2.52	2.95	1	5
Operation	110	3.03	1.036	.099	2.83	3.22	1	5
Engineering	37	2.57	.929	.153	2.26	2.88	1	4
IT/Communication	52	3.12	1.022	.142	2.83	3.40	1	5
R&D	28	2.93	.858	.162	2.60	3.26	1	5
Logistics/Purchasing	32	2.88	1.070	.189	2.49	3.26	1	5
Others	61	2.92	.988	.127	2.66	3.17	1	5
Total	665	2.94	1.044	.040	2.86	3.02	1	5

ANOVA

Accessing a Learning program – not company based (incl video, app)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20.279	8	2.535	2.365	.016
Within Groups	703.069	656	1.072		
Total	723.347	664			

Means Plots



Post Hoc Tests

Multiple Comparisons

Dependent Variable: Accessing a Learning program – not company based (incl video, app)

	(I) Job function	(J) Job function	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Tukey HSD	Sale and Market	Manufacture	.503	.193	.183	-.10	1.10
		HR/Fin/Admin/Training	.401	.142	.112	-.04	.84
		Operation	.095	.129	.998	-.31	.50
		Engineering	.500	.197	.216	-.11	1.11
		IT/Communication	.068	.171	1.000	-.46	.60
		R&D	.139	.223	.999	-.55	.83
		Logistics/Purchasing	.193	.210	.992	-.46	.85
		Others	.150	.160	.991	-.35	.65
	Manufacture	Sale and Market	-.503	.193	.183	-1.10	.10
		HR/Fin/Admin/Training	-.103	.215	1.000	-.77	.57
		Operation	-.409	.207	.561	-1.05	.24
		Engineering	-.003	.255	1.000	-.80	.79
		IT/Communication	-.436	.235	.646	-1.17	.30
		R&D	-.364	.275	.924	-1.22	.49
		Logistics/Purchasing	-.311	.265	.962	-1.13	.51
		Others	-.354	.228	.828	-1.06	.35
	HR/Fin/Admin/Training	Sale and Market	-.401	.142	.112	-.84	.04
		Manufacture	.103	.215	1.000	-.57	.77
		Operation	-.306	.161	.612	-.81	.19
		Engineering	.099	.219	1.000	-.58	.78
		IT/Communication	-.333	.196	.745	-.94	.28
		R&D	-.262	.242	.977	-1.02	.49
		Logistics/Purchasing	-.208	.231	.993	-.93	.51
		Others	-.251	.187	.917	-.83	.33
	Operation	Sale and Market	-.095	.129	.998	-.50	.31
		Manufacture	.409	.207	.561	-.24	1.05
		HR/Fin/Admin/Training	.306	.161	.612	-.19	.81
		Engineering	.405	.211	.600	-.25	1.06

	IT/Communication	-.027	.187	1.000	-.61	.55
	R&D	.044	.235	1.000	-.69	.78
	Logistics/Purchasing	.098	.223	1.000	-.60	.79
	Others	.055	.177	1.000	-.50	.61
Engineering	Sale and Market	-.500	.197	.216	-1.11	.11
	Manufacture	.003	.255	1.000	-.79	.80
	HR/Fin/Admin/Training	-.099	.219	1.000	-.78	.58
	Operation	-.405	.211	.600	-1.06	.25
	IT/Communication	-.432	.239	.675	-1.18	.31
	R&D	-.361	.278	.932	-1.23	.50
	Logistics/Purchasing	-.307	.268	.967	-1.14	.53
	Others	-.350	.231	.848	-1.07	.37
IT/Communication	Sale and Market	-.068	.171	1.000	-.60	.46
	Manufacture	.436	.235	.646	-.30	1.17
	HR/Fin/Admin/Training	.333	.196	.745	-.28	.94
	Operation	.027	.187	1.000	-.55	.61
	Engineering	.432	.239	.675	-.31	1.18
	R&D	.071	.260	1.000	-.74	.88
	Logistics/Purchasing	.125	.249	1.000	-.65	.90
	Others	.082	.209	1.000	-.57	.73
R&D	Sale and Market	-.139	.223	.999	-.83	.55
	Manufacture	.364	.275	.924	-.49	1.22
	HR/Fin/Admin/Training	.262	.242	.977	-.49	1.02
	Operation	-.044	.235	1.000	-.78	.69
	Engineering	.361	.278	.932	-.50	1.23
	IT/Communication	-.071	.260	1.000	-.88	.74
	Logistics/Purchasing	.054	.287	1.000	-.84	.95
	Others	.011	.253	1.000	-.78	.80
Logistics/Purchasing	Sale and Market	-.193	.210	.992	-.85	.46
	Manufacture	.311	.265	.962	-.51	1.13
	HR/Fin/Admin/Training	.208	.231	.993	-.51	.93
	Operation	-.098	.223	1.000	-.79	.60
	Engineering	.307	.268	.967	-.53	1.14

		IT/Communication	-.125	.249	1.000	-.90	.65
		R&D	-.054	.287	1.000	-.95	.84
		Others	-.043	.242	1.000	-.80	.71
	Others	Sale and Market	-.150	.160	.991	-.65	.35
		Manufacture	.354	.228	.828	-.35	1.06
		HR/Fin/Admin/Training	.251	.187	.917	-.33	.83
		Operation	-.055	.177	1.000	-.61	.50
		Engineering	.350	.231	.848	-.37	1.07
		IT/Communication	-.082	.209	1.000	-.73	.57
		R&D	-.011	.253	1.000	-.80	.78
		Logistics/Purchasing	.043	.242	1.000	-.71	.80
Bonferroni	Sale and Market	Manufacture	.503	.193	.331	-.12	1.12
		HR/Fin/Admin/Training	.401	.142	.178	-.06	.86
		Operation	.095	.129	1.000	-.32	.51
		Engineering	.500	.197	.411	-.13	1.13
		IT/Communication	.068	.171	1.000	-.48	.62
		R&D	.139	.223	1.000	-.58	.85
		Logistics/Purchasing	.193	.210	1.000	-.48	.87
		Others	.150	.160	1.000	-.37	.66
	Manufacture	Sale and Market	-.503	.193	.331	-1.12	.12
		HR/Fin/Admin/Training	-.103	.215	1.000	-.79	.59
		Operation	-.409	.207	1.000	-1.07	.26
		Engineering	-.003	.255	1.000	-.82	.81
		IT/Communication	-.436	.235	1.000	-1.19	.32
		R&D	-.364	.275	1.000	-1.25	.52
		Logistics/Purchasing	-.311	.265	1.000	-1.16	.54
		Others	-.354	.228	1.000	-1.08	.38
	HR/Fin/Admin/Training	Sale and Market	-.401	.142	.178	-.86	.06
		Manufacture	.103	.215	1.000	-.59	.79
		Operation	-.306	.161	1.000	-.82	.21
		Engineering	.099	.219	1.000	-.60	.80
		IT/Communication	-.333	.196	1.000	-.96	.30
		R&D	-.262	.242	1.000	-1.04	.52
		Logistics/Purchasing	-.208	.231	1.000	-.95	.53

	Others	-.251	.187	1.000	-.85	.35
Operation	Sale and Market	-.095	.129	1.000	-.51	.32
	Manufacture	.409	.207	1.000	-.26	1.07
	HR/Fin/Admin/Training	.306	.161	1.000	-.21	.82
	Engineering	.405	.211	1.000	-.27	1.08
	IT/Communication	-.027	.187	1.000	-.63	.57
	R&D	.044	.235	1.000	-.71	.80
	Logistics/Purchasing	.098	.223	1.000	-.62	.81
	Others	.055	.177	1.000	-.51	.62
Engineering	Sale and Market	-.500	.197	.411	-1.13	.13
	Manufacture	.003	.255	1.000	-.81	.82
	HR/Fin/Admin/Training	-.099	.219	1.000	-.80	.60
	Operation	-.405	.211	1.000	-1.08	.27
	IT/Communication	-.432	.239	1.000	-1.20	.33
	R&D	-.361	.278	1.000	-1.25	.53
	Logistics/Purchasing	-.307	.268	1.000	-1.17	.55
	Others	-.350	.231	1.000	-1.09	.39
IT/Communication	Sale and Market	-.068	.171	1.000	-.62	.48
	Manufacture	.436	.235	1.000	-.32	1.19
	HR/Fin/Admin/Training	.333	.196	1.000	-.30	.96
	Operation	.027	.187	1.000	-.57	.63
	Engineering	.432	.239	1.000	-.33	1.20
	R&D	.071	.260	1.000	-.76	.91
	Logistics/Purchasing	.125	.249	1.000	-.68	.93
	Others	.082	.209	1.000	-.59	.75
R&D	Sale and Market	-.139	.223	1.000	-.85	.58
	Manufacture	.364	.275	1.000	-.52	1.25
	HR/Fin/Admin/Training	.262	.242	1.000	-.52	1.04
	Operation	-.044	.235	1.000	-.80	.71
	Engineering	.361	.278	1.000	-.53	1.25
	IT/Communication	-.071	.260	1.000	-.91	.76
	Logistics/Purchasing	.054	.287	1.000	-.87	.98
	Others	.011	.253	1.000	-.80	.82

	Logistics/Purchasing	Sale and Market	-.193	.210	1.000	-.87	.48
		Manufacture	.311	.265	1.000	-.54	1.16
		HR/Fin/Admin/Training	.208	.231	1.000	-.53	.95
		Operation	-.098	.223	1.000	-.81	.62
		Engineering	.307	.268	1.000	-.55	1.17
		IT/Communication	-.125	.249	1.000	-.93	.68
		R&D	-.054	.287	1.000	-.98	.87
		Others	-.043	.242	1.000	-.82	.73
	Others	Sale and Market	-.150	.160	1.000	-.66	.37
		Manufacture	.354	.228	1.000	-.38	1.08
		HR/Fin/Admin/Training	.251	.187	1.000	-.35	.85
		Operation	-.055	.177	1.000	-.62	.51
		Engineering	.350	.231	1.000	-.39	1.09
		IT/Communication	-.082	.209	1.000	-.75	.59
		R&D	-.011	.253	1.000	-.82	.80
		Logistics/Purchasing	.043	.242	1.000	-.73	.82

Homogeneous Subsets

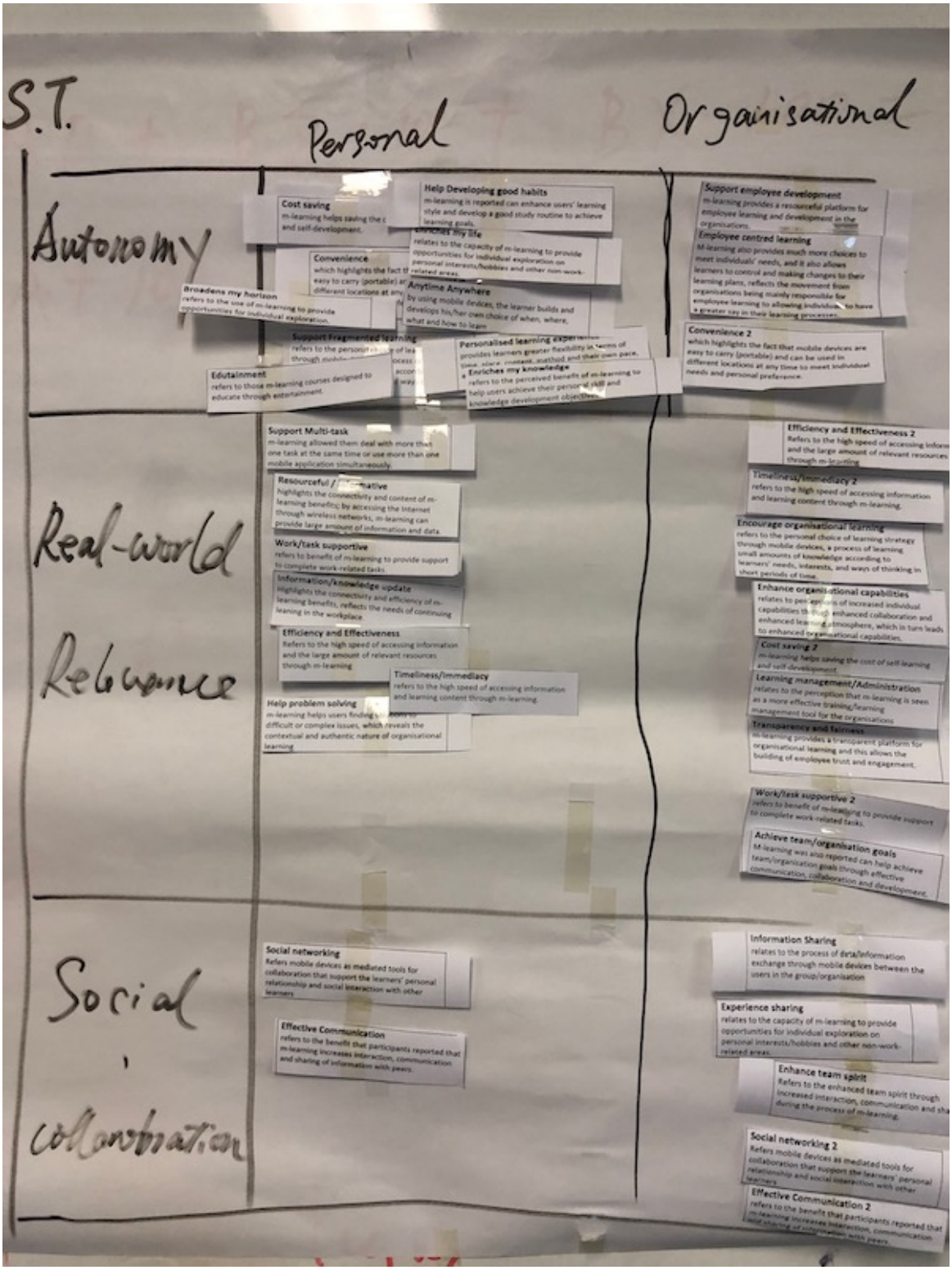
Accessing a Learning program – not company based (incl video, app)

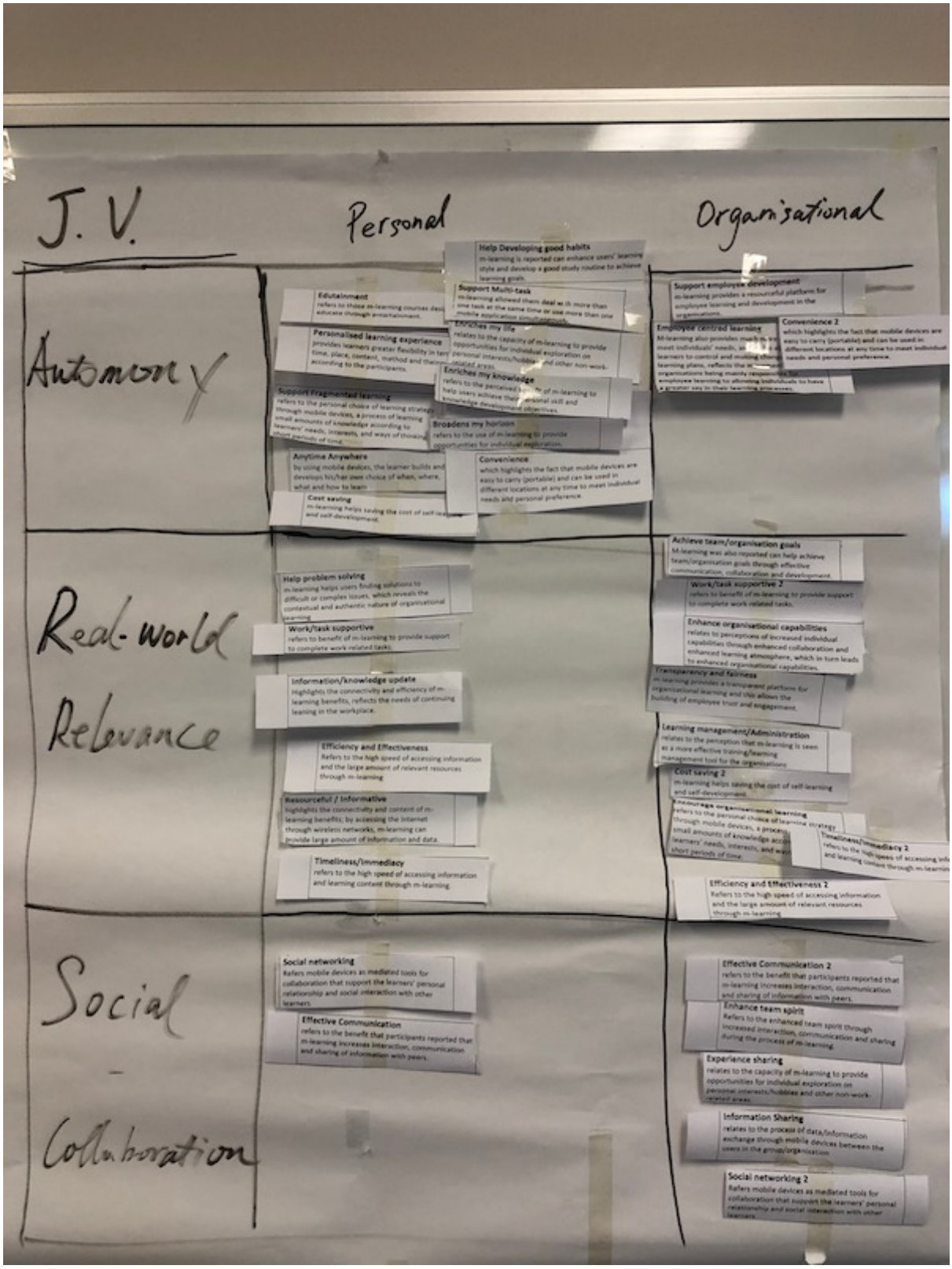
	Job function	N	Subset for alpha = 0.05 1
Tukey HSD[a,b]	Manufacture	39	2.56
	Engineering	37	2.57
	HR/Fin/Admin/Training	84	2.67
	Logistics/Purchasing	32	2.88
	Others	61	2.92
	R&D	28	2.93
	Operation	110	2.97
	IT/Communication	52	3.00
	Sale and Market	222	3.07
	Sig.		.366

Appendix N: Popular M-learning WPAs and Applications.

Name of WPA/App.	Icon	Description
Dedao (得到)		Launched in November 2015, the app provides paying users with a library of popular books summarized into 30 minutes, quality podcasts with transcripts. On a mission to help users conquer "a book a day, 365 books a year", Dedao is quickly capturing the money and attention of millions of people. This app is particularly revolutionary because of its timing. For the hundreds of millions of new smartphone / internet users from smaller cities, towns and rural villages in China, the first wave of apps to be adopted were fun, social apps like Douyu (live streaming) and Weibo (microblogging). However, there is an increasing trend for this gigantic group of users to move to apps with more intellectual substance.
Himalaya FM (or Ximalaya) （喜马拉雅）		Ximalaya FM is the largest online audio service platform in China. The Ximalaya FM platform enables users to share their knowledge and personal experience in specific fields through audio and personal podcast stations. Ximalaya FM has 40 million registered users, and 6 million daily active users who are attracted by the 10,000 daily uploaded audios of professional generated content (PGC). Ximalaya FM features 20 categories with 328 subcategories of content, and more than 5 million hosts and various forms of radio shows. The platform features podcast stations from retail brands such as Durex, China's biggest news agency Sina and one of China's most influential KOLs Luo Zhenyu. Ximalaya FM has also signed strategic partnerships with 60 big automotive brands, like BMW, Ford, Cadillac, etc. to provide in-car entertainment systems, for car drivers and passengers.
Mint Reading (薄荷阅读)		Mint Reading, an English-learning app developed by Chengdu Chaoyouai Education Technology, is looking at different ways to motivate students at a time when many people seek validation through "likes" and "shares". This social aspect is also seen in the company's Baicizhan app, which enables its 50 million users to challenge each other to vocabulary tests.
Fandeng Book Club (樊登)		Fandeng Book Club, also called Spiritual Wealth Club, is established in 2013, with the main purpose of influencing 300 million people to engage in more reading activities worldwide. This app provides users with the essence of high-quality books in video, audio, graphic and other forms. The product gets 50 high-quality books interpretation, including marriage, parent-child, spiritual growth, workplace, business management, cultural history and many other categories. By the end of October 2017, more than 2.8 million people have joined the Spiritual Wealth Club and developed the habit of reading over 50 books per year. Spiritual Wealth Club has established over 600 self-organized reading clubs worldwide and donated over 60 Libraries in poverty areas.
Zhihu (知乎)		Zhihu is a Chinese question-and-answer website where questions are created, answered, edited and organized by the community of its users. Launched on January 26, 2011, Zhihu differs from traditional online question and answer forums by enabling users to obtain information through questions that provoke the opinions and views from answerers as individuals. The number of registered users of Zhihu had exceeded 10 million by the end of 2013, and reached 17 million as of May 2015 with 250 million monthly page views (Resource: Wikipedia). Zhihu provides a home for the discussions that were never allowed in China's state education system. Relatively open discussions on hotlines and some sensitive or forbidden topics explain why Zhihu's following has grown rapidly in recently years.
Baicizhan （百词斩）		Baicizhan is an app which helps people remember English words, is the most popular free app in the Apple store, receiving 15,800 comments from users. The most prominent feature of Baicizhan is that it uses imge to help learners better understand work meanings and establish links between words and the real world. In addition to images, Baicizhan also provides TV and radio to engage users and assist their learning. Another advantage of this app is that it enables users to add friends and share their learning progresses with each other.

Appendix O: Peer checking of the qualitative analysis (matching/ grouping themes with central themes)




J. V.
Personal
Organisational
Autonomy
Real-world Relevance
Social Collaboration
Help Developing good habits
Support Multi-task
Enriches my life
Enriches my knowledge
Broadens my horizon
Convenience
Support employee development
Employee centred learning
Convenience 2
Anytime Anywhere
Cost saving
Achieve team/organisation goals
Work/task supportive 2
Enhance organisational capabilities
Transparency and fairness
Learning management/Administration
Cost saving 2
Help problem solving
Work/task supportive
Information/knowledge update
Efficiency and Effectiveness
Resourceful / Informative
Timeliness/Immediacy
Efficiency and Effectiveness 2
Social networking
Effective Communication
Effective Communication 2
Enhance team spirit
Experience sharing
Information Sharing
Social networking 2