

CHAPTER II LITERATURE REVIEW

2.1 Introduction

This chapter describes the concept of electronic learning systems, and mobile learning in higher education institutes and necessities for m-learning acceptance. The discussion will be supplemented with an explanation of current m-learning implementations in Malaysia. In addition, theories and models related to the acceptance of mobile learning are highlighted.

2.2 Electronic Learning

Mentioned that Collis and Wende (2002), Gururajan (2002) and Wakahiu and Kangethe, (2014), electronic learning enables higher degree of feasibility of distance learning for universities to include as a component of their learning modes. As such, distance learning has been offered by many institutions either independently or as part of blended learning (Matheos et al., 2005; Azizan, 2010). In blended learning, the methods of conventional teaching and e-learning and e-teaching are combined, and owing to this, as reported by Mortera-Gutierrez (2006), blended learning can adapt to both traditional and non-traditional students regardless of whether they are in the university area or are able to go to their regular classes.

A number of definitions describing the notion of E-learning. As an example, Trifonova and Ronchetti (2003) term e-learning as an approach to learning that is

technology-delivered or technology-enhanced which supports two modes of application namely: 1) learners and instructors are physically distanced from one another while the technology mediates the entire teaching and studying process, and 2) execution of hybrid learning in the context of traditional learning via paired services such as course syllabus, online learning materials and examinations.

Mahanta and Ahmed (2012) define e-learning as a mode of learning that is basically a linked form of learning which depends on online technology. Further, Soliman, (2014) perceive e-learning as learning that is anchored by media and digital electronic instruments. Therefore, based on the definitions presented above, it can be deduced that the term e-learning primarily indicates learning that takes place online. Pertaining to blended learning, some scholars perceive it as a product which resulted from the infusion of traditional and online learning that is inclined towards enhanced learning experience (Collis & Moonen, 2002; Meylani et al., 2015).

E-learning utilizes video communications and online communications and therefore, it allows distribution of learning materials and also communications that are synchronous and asynchronous. White boards, instant messaging, chat rooms, e-forums, and streaming video are examples of synchronous delivery. The mechanisms of asynchronous delivery typically entails Black Board, Learning Space and learning management systems (LMS) through Web CT, which satisfy the needs of students who are both on and off-campus (Keegan, 2002; Soliman, 2014). Learning management systems is a component of asynchronous delivery that is familiar to majority of university instructors and they use this component for different functions at different degrees. For

instance, some instructors use LMS to upload lecture notes and assignments while others to facilitate project development and conduct exams.

As such, it is of critical importance to create technical support for such systems so that it remains relevant and operationally consistent in the current learning culture. As stated in (Abbad et al., 2009), proper training, user involvement, and commitment from IT bureaus as well as university administrators can put faulty systems at the minimum level and systems that are continuously functioning. However, Denk et al., (2007) found that e-learning occasionally delivers insufficient access to knowledge or information but this is due to the inability of wired technology to provide flawless, 24-hour timeless functionality. This is however not the case with mobile and wireless technologies.

2.3 Mobile Learning

M-learning a method of using wireless and mobile technologies in education to broaden access to learning materials and this is achieved via the use of handheld devices such as mobile phones or personal digital assistants (PDAs) to create a mobile community (Singh & Bakar, 2007; Baran, 2014). In essence, according to Bryan (2004), Nomadic (2004) and Conejar and Kim, (2014), m-learning can be regarded as a mode of knowledge transfer which occurs mediated by a mobile device, and a method of learning that has made the so-called nomadic learners relevant. Aside from that, m-learning can also be used to sustain a wireless online virtual community connected by a campus server.

Therefore, students could synchronously and asynchronously share their learning experiences and information in a collaborative environment by only using their personal handheld devices (Farooq et al., 2002 ; Yaslam & Iahad, 2012). M-learning is regarded as the next mode of e-learning using mobile technologies. However, evolution-wise, Lavoie (2007) and Fotouh et al., (2011) pointed that these two systems of learning (e-learning and m-learning) significantly differ when it comes to capabilities and limitations. The capabilities and limitations of e-learning have been a focus in a number of studies such as those from (McLean, 2003; Quinn 2004; Barker et al., 2005), and Rekkedal and Dye, (2007), and these aforesaid studies found substantial similarities between e-learning and m-learning where each may represent the other with new foundation and more sophisticated technologies. In fact, m-learning is becoming a portable solution where through it, learners could engage in collaborative and interactive learning activities making m-learning an appropriate mode in engaging learners in learning-related activities in various physical locations, improving classroom communication and collaborative learning and supporting projects' group work (Barker et al., 2005; El-Hussein & Cronje, 2010).

Nonetheless, it should be noted that m-learning has been frequently comprehended as mobile e-learning, especially with regard to the utilisation of wireless technology, specifically the mobile internet and mobile devices, in assisting learning materials and education services. As such, based on the discussed above, the services of m-learning can be grouped into two major categories: 1) the services of learning material services, and 2) the services of learning administration.

2.3.1 Definition and Concepts of Mobile Learning

The definitions of the concept of m-learning vary (Paliwal & Sharma, 2009). A number of these definitions and their respective authors are presented in Table 2.1.

Table 2.1: Definitions of M-Learning

Author	Definition
O'Malley (2003)	Mobile learning is all modes of learning that occurs when the learner is not at a specific location or learning that occurs when the learner grabs the learning opportunities offered by mobile technologies.
Quinn (2004)	M-learning functions as the intersection of mobile computing and e-learning in terms of accessible resources irrespective of your location; rich interaction; strong search capabilities; powerful support for effective learning; and performance-based assessment.
Brown (2004)	Mobile learning or (M-learning) is a natural extension of e-learning.
Geddes (2004)	Mobile Learning is the acquisition of any knowledge and skill via mobile technology, anywhere, anytime.
Trexler (2005)	Any mode of education using handheld or palmtop gadgets as the main technologies.
Sharples (2005)	A process of coming to know, in which learners construct transiently stable interpretations of their world in cooperation with their peers and teachers.
Horng & Horng (2009)	Mobile learning is a process and system that connects learners with circulated learning resources; while distance learning takes a wide array of forms.
Ally (2009)	Mobile Learning is the delivery of learning content to mobile devices.
El-Hussein & Cronje, (2010)	Mobile learning is any mode of learning that occurs in learning environments and spaces that considers the mobility of learner, technology and learning.
Liu and Han (2010)	M-learning is a new education channel that assists people in acquiring knowledge and skill universally, using mobile technologies.
Santosh & Sidho (2013)	Mobile learning is a natural extension of e-learning.

It is interesting to note that the various definitions of m-learning presented above have all inclined to revolve in three main structures: (i) the separation of place and time between student and instructor, among learners, and/or between learner and learning

resources; (ii) the interaction between the learner and the instructor, among learners and/or between learner and learning resources made possible by one or more media (whereby the utilisation of electronic media is unnecessary) and (iii) the learner comprises of individual or group pursuing learning experience as offered by the provider.

2.3.2 Mobile Learning vs Electronic Learning

Past studies on e-learning and m-learning has served researcher with a wide range of ideas with regard to the classification of m-learning. For instance, some scholars put emphasis on pedagogy over technology, while others put emphasis on technology in m-learning, whether using the constantly connected (i.e. wireless network) or intermittently connected devices. On the other hand, m-learning systems will be incorporated with social factors by social behaviorists, while Rheingold (2002) documented that some scholars perceive m-learning as a social revolution going in line with the mobile revolution. Thus, based on the views above, m-learning can be described as a system that incorporates pedagogy, technology and social influences.

As indicated by learning systems, there are many views with regard to how learning occurs in people as well as the question of what the best learning method is. With regard to distance learning there is always physical distance between learner or student and the university and thus, through distance education, student's learning is made possible via delivery modes such as television and compressed video. As for e-learning, the letter 'e' means 'electronic' however, it is most frequently referred as online learning (Rosenberg, 2001; Gaebel, 2014) owing to the fact that in the age of digital and knowledge, the

medium of learning have been dominated by the computers and the internet. E-learning distinguishes itself from distance learning in a sense that it comprises of a particular content and technology and this can be evidenced by the different learning delivery modes for on-campus and off-campus students.

As such, just like the implied name, distance learning is only restricted to off-campus students. On the other hand, m-learning can be used both on and off campus. In other words, it can be used regardless of distance and location. Not only that, using m-learning, students can have access to materials conveniently, ubiquitously, and easily. Figure 2.1 illustrates the relationship among distance learning, electronic learning and mobile learning, and as indicated, mobile learning is a subset of electronic learning while electronic learning is a subset of distance learning. In other words, every mobile learning event is an electronic learning event, and every electronic learning event is a distance learning event.

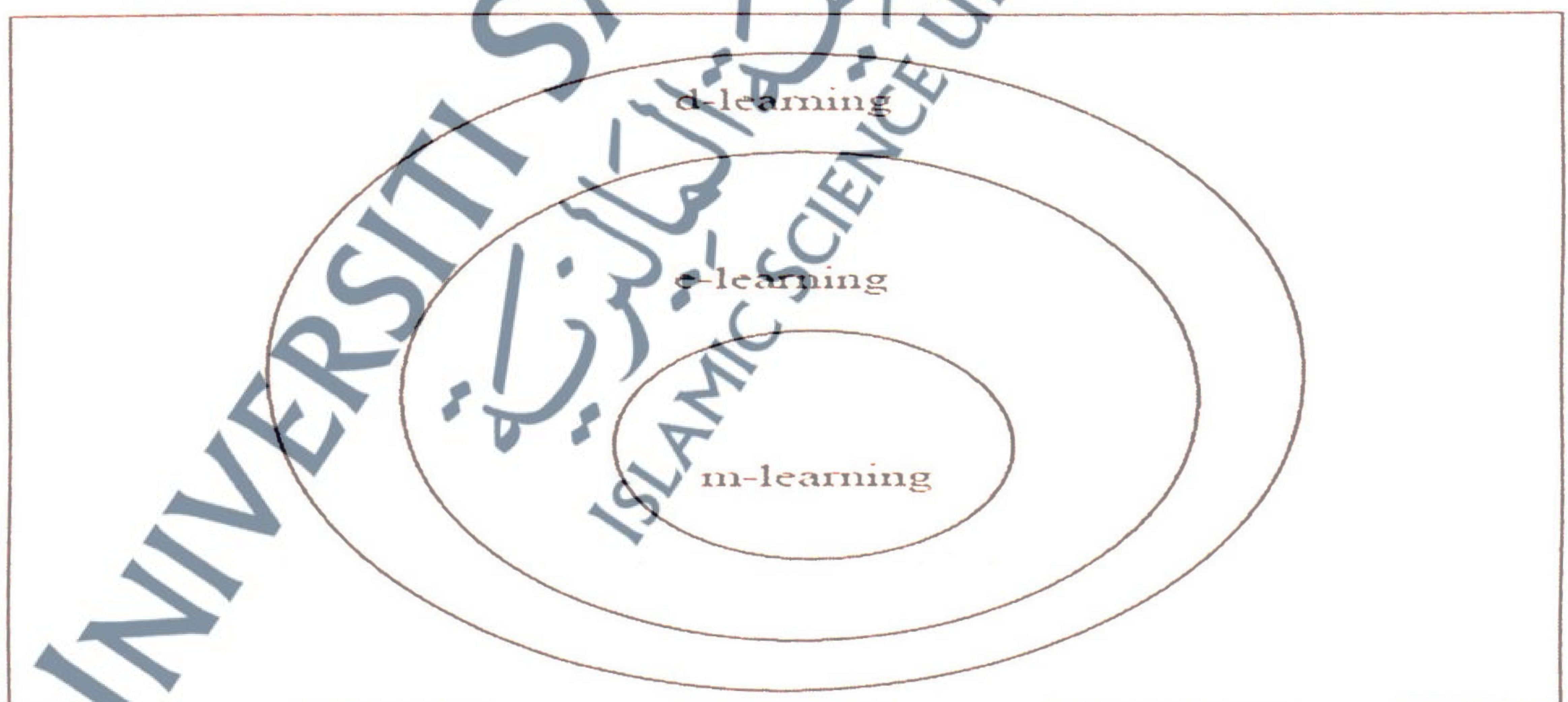


Figure 2.1: Set theory perspective of learning paradigms

Source: (Gergiev et al., 2004)

Comparatively, a different illustration on the relationship among the three learning paradigms was highlighted by (Tick 2006). As stated by Tick (2006), due to information and communications technology innovation, d-learning slowly transforms into e-learning however, stresses that e-learning and d-learning bears no resemblance. Further, by adopting the system of m-learning, learner has flexible timing and autonomy. Figure 2.2 below illustrates this relationship.

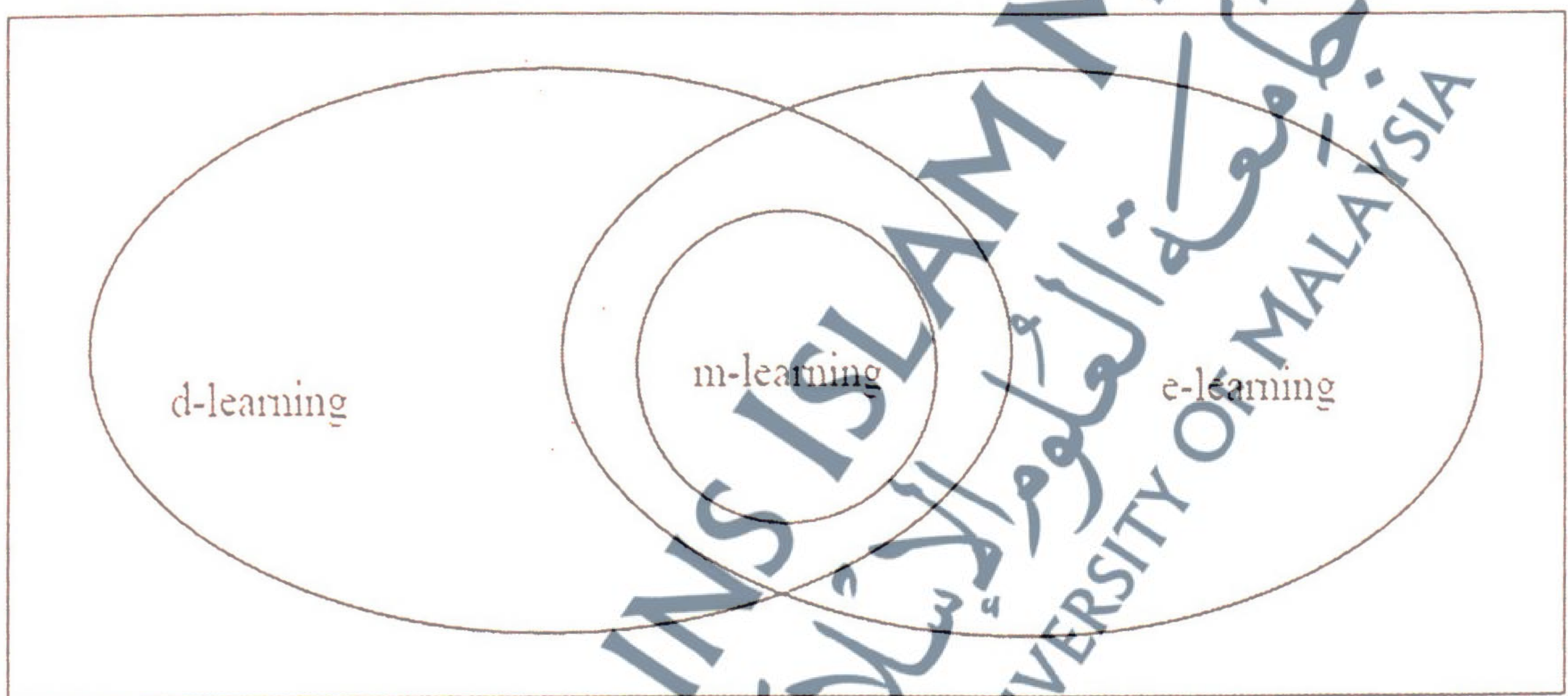


Figure 2.2: The Interrelationship of Distance Learning Electronic and Mobile Learning Distance

Source: (Tick 2006)

However, Low and O'Connell (2006) have a contradicting view. According to them, m-learning is a subset of e-learning as highlighted by (Georgiev et al., 2005). Aside from that, m-learning has also been associated with the model of flexible learning that is sufficient, just in time, personalized, of which, is illustrated in Figure 2.3.

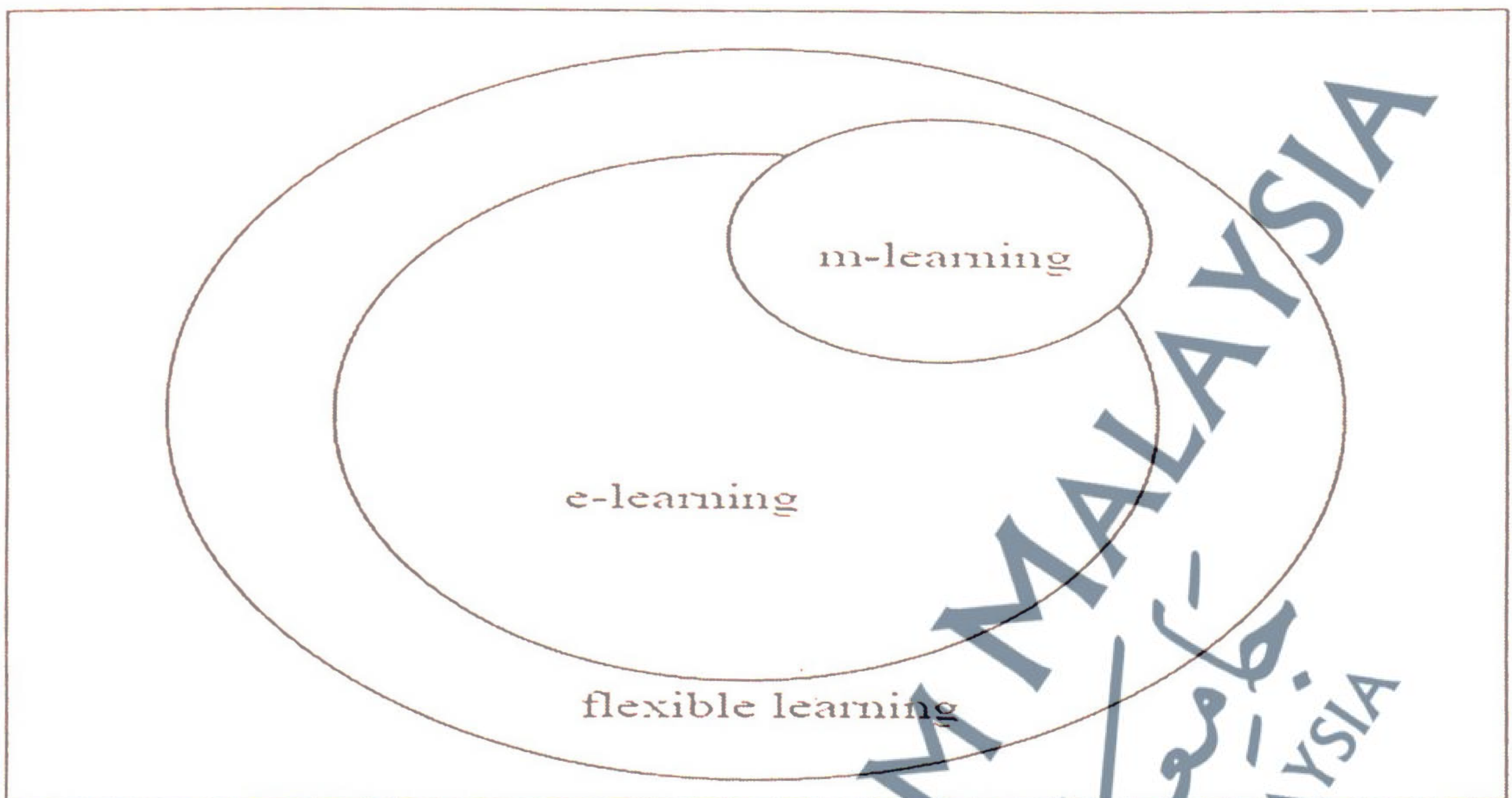


Figure 2.3: The Link of Mobile Learning to Flexible Learning

Source: (Low and O'Connell, 2006).

In this study, the distinctions between the paradigms of learning in terms of the probable continuum of the space of learning and flexibility presented to learner are investigated, and contrary to the conventional mode of learning, distance learning as well as e-learning and m-learning possesses the capability to offer learner with a wider range of learning spaces. Further, these modes of learning are ubiquitous and provide greater ease of access and thus these modes of learning can cater to wider range of students as well as facilitating a bigger space of learning. This view is illustrated in Figure 2.4 with regard to the range of learning space. As shown in the figure 2.4, the learning space for m-learning is particularly greater than that of e-learning, distance and traditional learning.

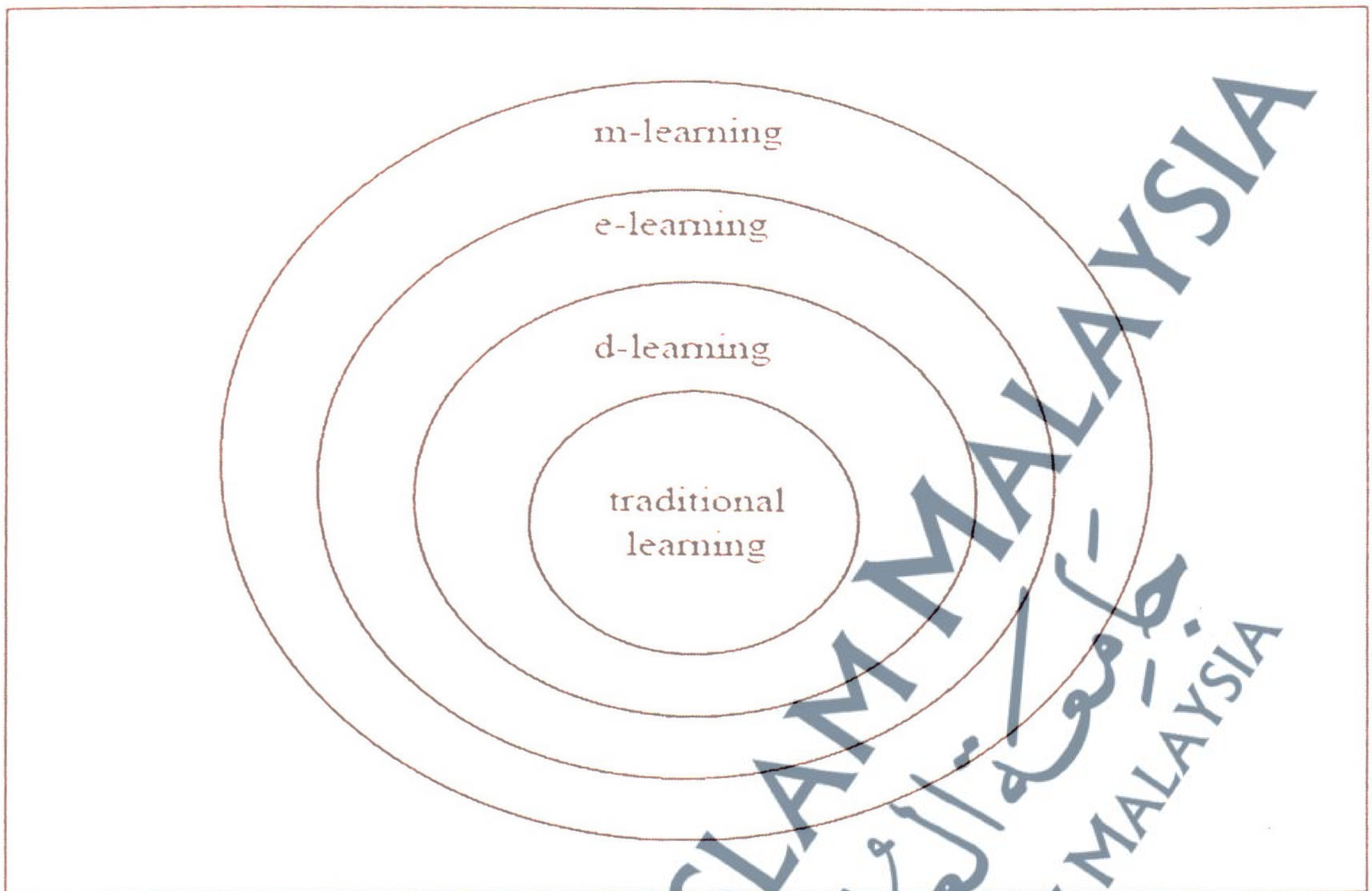


Figure 2.4: Range of Learning Space and Ease of Access for Learning Paradigms

Source: (Georgiev et al., 2005).

Further, the study looks into the distinctions between the learning paradigms with regard to the probable continuum of learning space and flexibility that learner is offered with. Contrasting with the users of conventional learning as well as distance and e-learning, users of m-learning have larger continuum of learning spaces. As m-learning is ubiquitous and offers higher degree of ease of access, more students can be reached and larger learning space can be facilitated. This view is illustrated in Figure 2.4 with regard to range of learning space. Above all, the learning space offered by m-learning learning is larger when compared with that of e-learning, distance learning and traditional learning.

Table 2.2: Comparisons of Terminology between E-Learning and M-Learning

E-learning	M-learning
Computer	Mobile device
Broadband	GPRS, G3, Bluetooth
Multimedia	Objects
Interactive	Spontaneous
Hyperlinked	Connected
Collaborative	Networked
Distance learning	Situated learning

Source: (Behera, 2013)

Table 2.3 below highlights the comparisons in the methods of communication between the instructor and students in both e-learning and m-learning.

Table 2.3: Instructor- to-Student Communication

E-Learning	M-Learning
Asynchronous	Synchronous
Scheduled	Spontaneous
Time-delayed	Instant delivery
Passive	Instant

Source: (Behera, 2013)

Table 2.4 highlights the comparisons in the methods of communication between student and student in both e-learning and m-learning.

Table 2.4: Student-to-Student Communications

E-learning	M-learning
Face-to-face or e-mail-to-email	Flexible
Audio-teleconference common	Video and Audio teleconference
Bound by location and time	No geographic boundaries
Travel time to reach to internet site	No travel time since wireless connectivity

Source : (Behera, 2013)

Notwithstanding the comparisons above, both e-learning and m-learning play a crucial role in modern education and even though they pose a number of differences, there are also similarities between them. For instance, both e-learning and m-learning inspire both teachers and students to be personally responsible for their own learning which will consequently build self-knowledge and self-confidence in students.

Apart from that, both e-learning and m-learning trigger a significant change in the way knowledge is spread. Not only that, if these learning is correctly applied, the quality of education can be enhanced. In other words, both e-learning and m-learning can thus also improve teachers' delivery skills. The third similarity of e-learning and m-learning is that both comprise of the combination of digitally delivered content and learning support and service. With regard to this, it is imperative that teachers equip themselves with technological skills to successfully apply the e-learning or m-learning.

2.3.3 Benefit of M-Learning

The use of m-learning is factored by several reasons (Attewell, 2005a; Yousuf, 2007; Becking et al., 2008; Sarraf et al., 2012; Embi & Nordin, 2013). One of the reasons is that m-learning in particular, provides assistance to learners in improving their literacy and numeric skills, recognizing their existing abilities and identifying the area in which assistance and support are needed. Apart from that, through the use of m-learning, the problem of digital divide is overcome, and learners using this mode of learning find learning to be informal. As such, learners' self-esteem and self-confidence are increased. Moreover, m-learning is not constrained by place since it is a portable form of learning, and using this mode of learning, learner can have access to material in real time too. As such, m-learning is suitable for independent and collaborative learning experiences. As indicated by many relevant projects and trials conducted, both m-learning and mobile technologies and tools can provide the platform for a variety of learning activities in a variety of settings.

Not only that, this learning mode can be employed by learners of different ages. Further, as indicated by Naismith et al., (2004), by incorporating a blended approach, m-learning improves the quality of traditional lessons. As indicated by Vovoula (2005), compared to the traditional learning, m-learning encourages more interaction as this mode of learning entails more contact, more 'bustle' and users could communicate and collaborate more between them. Further, m-learning offers users with learning opportunities that are unique and personalized, and learning can occur regardless of time and place (Hwang & Tsai, 2011). Additionally, Norman (2011) stated that m-learning is

convenient while Lam et al., (2010) perceive m-learning to be personalized aside from having secure content. M-learning is also flexible and through personalized devices, it gives user easy access to learning resources (Caudill, 2007; Rueckert et al., 2013).

Owing to these advantages, m-learning becomes a feasible mode of learning in educational institutions such as universities, colleges and schools. Further, as mobile technology is portable, learning environment is not confined to the classroom anymore, and since mobile devices are personal in nature, it suits well with learning applications outside the realm of formal education.

2.3.4 The Acceptance of M-learning

'Technology acceptance' is a term that is used by researchers from various aspects and ways. With regard to the students' acceptance of technology, Dillon and Morries (1996) describe it as "the demonstrable willingness within a user group to employ IT for the tasks it is designed to support." With regard to this, the current study finds that Dillon and Morries's (1996) description to be well suited with m-learning acceptance and therefore, adopted it into this study. Further, there are numerous models developed in this field and instead of merely defining the concepts of acceptance, some models have been formulated to examine and predict the affecting factors of user acceptance towards IT in different circumstances. Therefore, this study aims to comprehend and ascertain the factors affecting the acceptance of m-learning among the students in Malaysia in the context of higher education institutions.

2.4 Trends of Mobile Learning in Higher Education

Universities are greatly influenced by both mobile technologies and wireless technologies, and the same can also be said in the characterizations of learning spaces (Wedge & Kearns, 2005; Long & Ehrmann, 2005; Johnson & Lomas, 2005; Chen et al., 2012). Not only that, the boundaries of higher education has been expanded by the boundaries of information and communications technology in higher education that now learning occurs anywhere and anytime. Together with smart personal mobile devices, mobile and wireless communication facilitates user's access to classroom information without being constrained by time or location. As such, these devices can potentially alter the concept of the classroom (Wentzel, 2005; El-Hussein, & Cronje, 2010; Goundar, 2011).

In order to provide better learning environments, educational institutions have attempted to equip students with the latest technology according to their understanding or beliefs on what the students need. This has encouraged the process known as integration of information and communication technologies over the last decade, where instructors would use various technology aids such as computers and internet in the classrooms (Hsu, 2010). Albeit the general positive perception and acceptance of m-learning, some researchers including McLean (2003), Quinn (2000), Barker et al., (2005), Rekkedal and Dye (2007), Arif et al., (2013), Embi and Nordin, (2013) and Hamat et al., (2013) have investigated the pros and cons of e-learning and they have indicated that in many ways e-learning resembles m-learning especially in terms of the integration of more policies and more refined technologies.

2.4.1 Mobile Learning Implementations in Higher Education

Albeit the potential of m-learning, its implementation in higher education institutions such as colleges and universities must be compatible with the current curriculum. For instance, some teaching purposes are not suited for m-learning environment where preference should be given to classes on theory and information, and short courses (Keegan, 2002). Nonetheless, as indicated by Elgort (2005) and Chong et al., (2011), the implementation of m-learning in the context of university is clearly influenced by organizational, socio-cultural, and intra and interpersonal factors. Apart from that, m-learning can usually be employed when learning of any form that is mediated through mobile devices occurs (winters, 2006; El-Hussein et al., 2010). Also, as indicated by Alexander (2004) and Hamdan and Schaper (2012), m-learning can usually be employed in learning that legitimizes nomadic learners. O'Malley et al., (2005) perceive m-learning as a developing archetype in a state of great expansion. However, even though the technologies of m-learning have widely spread, only few universities have implemented this mode of learning.

Even among the universities that have already implemented m-learning, it is uncertain if they have pedagogically used the system in a proper way. For example, SMS (Short Messaging Service) has been used by lecturers in UK's higher education as prompts for course requirements, polling classes, and pop quizzes, while some universities experiment with the application of phone exams where the test takers are identified by their voice print identification (NMC & Educause, 2006). In reviewing the way universities use personal digital assistants (PDAs) Kim et al., (2006) discovered that

storage and retrieval of information such as courseware, timetables and e-books are those that are generally used.

Similarly, in higher education environment, digital audio players such as Apple's iPod have mainly been used to 'deliver' recorded lectures and subsequently podcast as Rich Site Summary (RSS) feeds to students' computers so that they can be downloaded to iPods (Belanger, 2005) and the recorded materials allow students to have access to the learning materials anywhere at any time. Patten et al., (2006) laid down a framework for classifying educational uses of mobile technologies where it suggests that m-learning uses are primarily linked to the administrative functions (i.e. timetabling and calendaring), reference functions (i.e. dictionaries and e-books) and interactive functions (i.e. response and feedback activities). Further, Patten et al., (2006) contended that these activities are underpinned by theory that seems to be either principally behaviorist in nature or non-existent at all. All in all, with regard to m-learning, educational institutions should contemplate whether they are capable of providing the proper training and technical supports required for its implementation (Becta, 2004).

Not only that, as indicated by Wood (2003), the development of the adoption plans should be a matter of concern among all stakeholders. Additionally, Tables 2.5 and 2.6 provide the summary to numerous m-learning initiatives and projects that were previously undertaken as documented in the literatures. It should be noted however, that even though the list provided does not include all available, it does indeed represent various usages of m-learning with a large continuum research subjects, of which, entail school learners, K-12 students, university students and adult learners (Klopfer et al. 2002; Rogers et al., 2002;

Attewell & Savill-Smith, 2003; Colley & Stead, 2003; Trinova & Ronchetti, 2003; Traxler, 2003; Alexander, 2004; Chinnery, 2006; Wentzel et al., 2005 ; Belanger, 2005; Little, 2006; Cochrane, 2010; Farrow, 2011).

In the Tables 2.5 and 2.6 below, a brief description of each research or project, sponsor, research location and population, and major findings are presented.

Table 2.5: List of Past Studies of Research Projects in M-Learning.

Research Project Name	Description	Sponsor - Location	Population
MOTILL (Farrow, 2011)	The study proposes taxonomy of ethical issues based on dominant positions in meta-ethical moral theory. Categories from the Mobile Technologies in Lifelong Learning (MOTILL) project are used.	The Open University Milton Keynes, UK	General
Moblogging (Cochrane, 2010)	Mobile Web 2.0 project Focusing on mobile blogging (m-blogging), the projects were aimed to explore the potential of mobile Web 2.0 tools in enhancing both the formal and informal teaching and learning environments. Discovery of critical success factors such as: the critical value of the pedagogical integration of the technology into the course assessment, lecturer modeling of the pedagogical use of the tools, the need for regular formative feedback from lecturers to students, and the suitable selection of mobile devices and software in supporting the pedagogical model that becomes the base of the course.	Centre for Teaching and Learning Innovation, Unitec, Auckland, New Zealand	Student and teaching staff
Wireless Instruction Initiative (WII) (Little, 2006)	- Exploit existing UT wireless network relevant educational technologies. - Instructors integrate wireless technology into their courses. - Instructors participate in summer institute for pedagogical consultation. - Classroom and field based.	University of Tennessee	University Students and faculty
Stanford Learning Lab (Chinnery, 2006)	- Language study programs utilizing mobile phones. - Included vocabulary practice, quizzes and access to live talking tutors. - Fragmented short learning modules for use by the learner.	Stanford University	University Students
m-learning (Attewell, 2005)	A Pan-European project .Youngsters who are at risk of being excluded from the society are encouraged to involve themselves in learning opportunities: this project also delivers inexpensive and accessible information technologies such as mobile phones. Instead of specific learning gains, measure was only	European Commission Information Society UK, Italy, Sweden	Young Adults who are not studying or in training full time

on changes in attitude towards learning			
GIPSY / Manolo projects (Wentzel et al., 2005)	- Develop a more flexible and location-based way of learning - Main objective to explore the wireless supported learning environments - Student focus groups influenced the development of courses used in the project - Individual and collaborative learning were designed into the courses - Field trips were made to collect geo-referenced data - While GIPSY focused on m-learning Manolo was the next phase to integrate electronic, wireless, and m-learning	SURF (an ICT partnership organization for all Dutch universities) - Netherlands	University students in Geographic Information Systems (GIS) departments
Duke's Digital Initiative (Belanger, 2005)	- Investigate the Pedagogical uses of iPods, Audio based Podcasting and RSS (Really Simple Syndication) feeds - Encourage faculty to design curricula that incorporated the technology - Provide portable access to course material for reference and review - Support collaboration and field research	Duke University and Apple Inc.	University students and faculty
MOBIlearn (Naismith et al., 2004)	Worldwide project led by the Europe using mobile technologies in exploring the approaches to learning that are context-sensitive in nature. A recyclable m-learning construction is established. Field trials entail: learning anywhere (i.e. during museum visits), blended learning (i.e., part of a formal course syllabus), and information interpretation learning (i.e. daily medical information)	European Commission Information Society Europe, Switzerland, USA and Australia	General
MIT Games-to-Teach project -- Environmental Detectives (Klopfer et al., 2002)	- Augmented reality educational gaming to develop skills of environmental inquiry - Hand held gaming using a pocket PC to supplement real world interactions through context-sensitive data and social interactions - Goal to discover source of contamination and develop a suitable remediation plan - Can do simulated data collection and interviews with experts through 5 trials	MIT	Secondary and first year under-graduate students

Table 2.6: Key Outcomes of Research Projects in Mobile Learning

Research Project Name	Key Outcomes
MOTILL	Proposed a framework to adapt applications, which are as varied as policy review, lesson design, assessing institutional activities as well as illustrating the research project's ethical significance.
Moblogging	Ascertain mobile learning's critical success factors such as: the critical value of the pedagogical integration of the technology into the course assessment, the modeling of lecturer with regard to the pedagogical use of the tools, the requirement for standard formative feedback from lecturers to students, and the suitable selection of mobile devices and software in supporting the pedagogical model that underpins the course.
Wireless Instruction Initiative	Satisfaction expressed by faculty and learners Support from faculty and the technical department are crucial administrative had a total change at faculty level (100%), while the departmental level sustained 80% change, change at institutional level is underway Learning achieved is independent as well as self-directed.
Stanford Learning Lab	Mobile phones show effectiveness for quiz delivery providing that the distribution of the quiz items is in little portions A great potential platform for online quizzes and lessons of automated voice vocabulary. Live tutoring is proven to be effective comprehension could negatively be affected by poor audio quality, and albeit their effectiveness for review and practice purposes, the issue of screen sizes hinders learning new content.
M-learning	After trying m-learning, learners were mostly enthusiastic about this learning where 62% reported that they would take part in future learning. Of the above 80% reported preference for employing mobile devices. M-learning has the potential to attract young people to learn and maintain interest.
GIPSY / Manolo	Students express high satisfaction and preference in using the PDAs . Albeit issues with screen size students still preferred mobility, Battery life and bandwidth are among the technical problems. The crucial element of personalization is not yet implemented as it is difficult for many of courses to tailor material to personal preferences future implementations should take into account the impact of logistical, resource and cost of wireless and m-learning.
Duke's iPod	There has been a significant increase in the number of Pod users from 19 in spring 2005 to 47 in spring 2006. There is a rapid increase in demand for iPods from the Faculty success from students and faculty is documented .The inclusion of video and other multimedia as part of expansion initiative.
MOBILearn	Established the design of m-learning which entails: content and technology suppliers, end-users' requirement, specialists in pedagogy, mobile operators and mobile device manufacturers, and market analysts.
MIT Games-to-Teach project – Environmental Detectives	Students show high favorability towards the investigative and the technology interaction experience.

Many projects and trials related to m-learning have shown that m-learning and mobile technologies and devices that are capable of supporting various learning activities in various settings for learners of various ages. In fact, as indicated by Naismith et al., (2004), through its blended approach, the quality of traditional lessons can also be improved. The next section discusses the various mobile wireless devices currently being used in higher education setting.

2.4.2 Mobile Wireless Technology in Higher Education

Wireless Fidelity or Wi-Fi is a wireless Internet service and recently, several institutions have started to provide this service for their members. Through Wi-Fi, members of these institutions could interact with one another, access to teaching and learning materials as well as utilize the internet. Globally, the mobile technology has expanded where in 2005, there were 1.5 billion users of mobile devices (Prensky, 2005) and the rate jumped to 6.8 billion users by 2013 with the belief that 96% of mobile phones will be furnished with internet connectivity (Sanou, 2013).

Therefore, numerous higher education institutions such as colleges and universities have employed the mobile wireless technologies as the tools for learning and teaching. In fact, in the US, the majority of public universities (more than 90%) and private universities (80%) have had a certain degree of m-learning implementations and mobile wireless technologies (Swett, 2002). For instance, the Cisco CTE 1400, which is an application that allows the transformation of web page into a suitable mobile wireless devices format, was implemented in Louisiana State University (LSU) (Oliver & Wright,

2002). With the implementation of CTE 1400, the university (LSU) was able to dispense its web content and applications to mobile wireless.

The CTE 1400 implementation was appropriate owing to the growing number of mobile devices users whereas indicated, 76% used mobile phones, 14% used PDAs, and 9% had devices that were equipped for wireless connectivity (Cisco System, 2003). In relation to this, as indicated by Oliver and Wright (2002), there are even university students who are required to own mobile wireless devices for school assignment purposes such as those students of the University of South Dakota (USD) and the University of Minnesota (UM). As such, it is expected that, in the future, mobile devices and wireless network will be a requirement for all students and universities. Figure 2.5 provide a summary of colleges and universities that embark on projects using various mobile wireless technologies in activities of teaching and learning as indicated by Bartel and Meerts (2002).

Schools	Users	Tool	Key Uses
North Carolina State University College of Veterinary Medicine, Raleigh, NC	Students	PDA	▪ Accessing to many medical references ▪ Participating in wireless polling during class
University of Central Oklahoma College of Education, Edmond, OK	Faculties and Students	PDA	▪ Accessing to information ▪ Supporting innovative teaching practices ▪ Enhancing collaboration and builds relationships
UC Berkeley School of Education K-12 Schools, Berkeley, CA	Students	PDA	▪ Offering students mobile data-gathering tool ▪ Allowing for new types of curricular activities ▪ Helping students understand difficult science concepts
Stanford University, Stanford CA	Faculty, students and staff	PDA	▪ Accessing data ▪ Enabling on-going communication among faculty, students, and staff. ▪ Data exchange
Carnegie Mellon University,	Students	Wireless Computer	▪ Collaboration
University of California, San Diego, San Diego, CA	Faculty and students	Wireless LAN	▪ Providing better networking service for laptops and PDAs
Florida State University, Tallahassee, FL	Faculty and Law and MBA students	Wireless LAN	▪ Providing better teaching and learning environment
Wake Forest, Winston-Salem, NC	Faculty and students	Wireless LAN	▪ Providing innovative technology ▪ Others

Figure 2.5: The Uses of Mobile Wireless Technologies in Higher Education Setting

Source: (Bartel and Meerts, 2002)

Tablet computers, palmtop, Personal Digital Assistants (PDAs) and smart phones are some of the various mobile wireless devices that are being used in higher education setting. It has been contended many, that mobile wireless computers, PDAs and handheld

devices often use the most in learning environment (McKenzie, 2001; McGhee & Kozma, 2001; Boggs, 2002; Fryer, 2002; Kim et al., 2006; Lauricella & Kay, 2010). Thus, due to their widespread use in higher education setting, three mobile wireless devices which are, mobile wireless computer, Personal Digital Assistants (PDAs), and mobile wireless phones (with SMS and MMS) will be the focus of this study.

A. Mobile Wireless Computer

Mobile wireless computers or commonly known as wireless laptops, are the most widely used mobile wireless technologies in higher education setting (Kim et al., 2006). Wireless laptops contain integrated wireless card and this allows user to engage in short-range wireless voice and data communications. As indicated by Mc Kimmy (2003), with regard to network connection, mobile wireless laptops differ from wired laptops in a sense that mobile wireless laptops use a wireless network interface card (WNIC) while wired laptops use Ethernet card or Network Interface Card (NIC) or Network card. As stated by Kim, Holmes and Mims (2004), for network connection, instead of wired connection, only very low radio frequency is required by WNIC. Further, through the use of mobile wireless computers students would be able to engage themselves in peer-to-peer communication through instant messaging, chat rooms, bulletin boards and email (Demb et al., 2004).

Through utilization of mobile communication such as web access, email and voice or text messaging and multimedia messaging, students would be able to engage in short learning activities that are attractive to them and consequently, could foster collaboration

(Shih, 2007). Further, students who are engaged in group works recognize and use social communication to exchange information within a collaborative learning environment and with the application of wireless connections, students would be more capable to collaborate whenever and wherever they want (Gay et al., 2001).

B. Personal Digital Assistants (PDA)

Aside from the mobile wireless computer, the device category that has also been heavily investigated in the literature is the Personal Digital Assistants or PDAs. PDAs have been extensively investigated with regard to their screen size and the previously non-existent functions offered by them. Nonetheless currently, these devices are primarily incorporated into smart phones. Based on the operating system in which they run, PDAs are classified into two categories, which are Palm handhelds or PDAs and Pocket PC (Livingston, 2004). The operation of Palm handhelds (PDAs) is on the operating system of Palm (OS). On the other hand, the operation of Pocket PC is anchored by the Windows Mobile operating system (OS) and applications. Also, although not mentioned in the literature, other operating systems namely, the Nokia Internet Tablet OS and Microsoft Windows CE are also the commonly used OS.

Apart from those mentioned, Bluetooth, WI-Fi connections and GPS functions are all that can also be supported by PDAs. Among the students, the uses of PDAs include sending and receiving data, documents, spreadsheets and also applications to other group members without having to use wiring and downloading processes (Yuen & Yuen, 2003).

Aside from that, as reported by Winkelstein (2002) PDAs are popular tool in retrieving medical information.

C. Mobile wireless phone

Mobile wireless phones such as smartphones have all the functions of PDAs. In addition to that, mobile phones are also equipped with the attributes of extensible phones such as features of personal information management (PIM) (i.e. address book, notepad, calendars and to-do lists) all of which can be synchronized with a PC (Livingston, 2004). Mobile wireless phones generally operate using an operating system (OS), in addition to related applications such as Palm OS, Windows Mobile OS, Blackberry OS and Symbian OS. Blackberry supports a full miniature keyboard while iPhone that was launched by Apple in 2007 operates on the OS X that supports touch screens as well as handwriting recognition. Indeed, programs are made for the OS, compared to the constraints of BREW and J2ME platforms. Enterprises and educational institutions are among those that create these programs for their specific usage, and these programs can be downloaded or customized as needed by users. Mobile wireless phone frees students from the constraints of place and time (Kim et al., 2006).

Not only that, the device can also improve students' learning processes in a group discussion or teamwork as the device allows easier and more efficient in-group discussions collaborations. As an example, by tapping on certain keys on the wireless handset's numeric keypad, the device will send a signal to a receiver that is linked to a wireless computer that is equipped with Global Positioning System (GPS) software,

hence, allowing simultaneous communication with other software. In this way, a discussion setting is created in which all responses and opinions can be sent anonymously. As a result, students can address their opinion more freely without fear of committing offenses to other students.

2.4.3 Limitations of M-Learning

When discussing the implementation of m-learning, the issues of imitations should not be overlooked because unlike e-learning, the limitation issues in m-learning are more prevalent due to limited capacity of current technology. Still, it cannot be denied that the use of mobile technology in education is generally cheaper when compared to conventional technology (Goundar, 2011). The capability of mobile devices is restricted by factors including battery life, memory, small screen, small and limited keyboard, and high line cost (Rekkedal & Dye, 2007; Paul, et.al.2010; Suki & Suki, 2010; Kim & Kim, 2013) all these can impede the wide use of mobile technology in learning. Hence, the extension of the wireless network across the campus and the software and hardware redesign for the purpose of m-learning are recommended as a part of the solutions (Corlett et al., 2005) so that the university will have the sufficient environment to immediately implement the latest technology innovation (Seppala et al., 2002).

In the context life-long learning, three major problems related to use of mobile education have been identified: student acceptance, mobile technologies' attributes and mobile devices' display limitation, and the privacy and confidentiality of user data (Yordanova, 2007). Additionally, based on the present limitations of mobile technology,

(Seppala et al., 2002; McLean 2003; Corlettt et al., 2005; Kukulska & Shield 2008; Wang, et al., 2009; Hashemi et al., 2011; Park, 2011; Chanchary & Islam, 2011) have identified a number of significant challenges faced by community in implementing m-learning. The challenges are as below:

- High start-up costs.
- Intermittent connectivity as a major obstacle.
- Access to the main third-party networks is costly.
- Negotiated access requires authorization from multiple parties.
- Device has restricted memory and storage capacity; these are main obstacles.
- Insufficient screens size (too small) to support sophisticated applications.
- Unavailability of cross-platform solutions.
- The industry is plagued by patented solutions.
- Current applications cannot be easily incorporated to the mobile technology environment.
- Security is a significant issue.
- Continuous technology development causes instability and impedes sustainability in terms of mounting viable m-learning applications.

Albeit the shortcomings mentioned above, m-learning can still be regarded as a life-long activity in changing communities and as people consistently improve their knowledge and skill, the system can be incorporated their daily life circumstances (Kalz,2014). A survey conducted by the Learning and Skills Development Agency (2003) in the UK on the use of mobile phones among students aged 16–24 years revealed that

nearly half of the respondents indicated that they are interested to use mobile phone in their learning specifically, in improving their spelling, reading, language and math dexterities. Additionally, although only half (50%) of the respondents currently use palmtops, more than half of them (55%) stated that they might use the device (palmtops) if it is sold at lower prices.

The advancements of telecommunication technology provide students and university staff with new facilities and interfaces. However, each new technology existing in the market has to be scrutinized with regard to its benefit for daily use so that the organizational infrastructure for students and university staff could be improved. WAP, the consortium of mobile services for campus and student needs - Campus Mobile – was established as a body that investigates innovative services (Barker et al., 2005). In a larger context, the implementation of m-learning at educational institutions with proper guidelines and policies can benefit all involved (Mazilu and Ion, 2010).

2.5 Summary Mobile Learning in Higher Education

Based on the researcher's review on the m-learning services in the higher education environment, the informative m-learning services are found to be the most successful and interesting for students. It is important to note that the classification of services reviewed is within the limitations and capabilities of the mobile devices such as PDAs, mobile phones and smart phones. However, researcher is more convinced that there is a definite need to ascertain the key factors influencing the acceptance of students in m-learning in the context of Malaysian universities. In addition, the suitable theoretical basis for this

study also needs to be ascertained. Hence, the next sections will delve into the relevant theories and models of acceptance.

2.6 Technology Acceptance Theories

As an important area in the field of academic research technology diffusion is a factor that determines the success of implementation (Grantham & Tsekouras, 2005; Williams, 2009; Ghobakhloo et al., 2012). Also, acknowledging factors that determine acceptance of student towards m-learning will generate crucial theoretical contributions in the context of online learning. This will consequently provide the higher education environment with m-services that are more effective and meaningful.

Nevertheless, several theories have been developed over the last two decades in an attempt to study and explain the intention and acceptance of user on the use of new technology that has been recognized since the mid-1980s. The most popular and influential theories are such as Technology Acceptance Model (TAM) by Davis (1989), Theory of Reasoned Action (TRA) by Ajzen and Fishbein (1980), Theory of Planned Behavior (TPB) by Ajzen (1985, 1991), Innovation Diffusion Theory (IDT) by Rogers (1995), extended TAM or TAM2 by Venkatesh and Davis (2000) and the most recent theory which is the Unified Theory of Acceptance and Use of Technology model (UTAUT) by Venkatesh, Morris, Davis, and Davis (2003).

All of the theories mentioned above share some common factors and similarities. For instance, as highlighted by Jairak et al., (2009) social factors are similar to subjective

norms in TRA and TPB. TPB suggests that behavioral intentions are the elements that individual behavior and behavioral intentions are a function of the attitude of an individual attitude toward the behaviour, the subjective norms that surround behavior performance, and the perception of individual of the ease with which the behavior can be performed (behavioral control). TPB is based on the level of behavior change and cognitive processing, and unlike the affective processing models, TPB does not consider emotional variables such as mood, fear, risk, and positive or negative feeling instead, these emotional variables are assessed in a limited manner (Snichotta, 2009). This poses as a drawback particularly in the students' behavior situation since most individuals' acceptance behaviours are affected by their personal emotion and are naturally affect-laden. The eight most popular models in examining the factors of user acceptance of the new technology were summarized and reviewed by Venkatesh et al., (2003) and they discovered that the conceptual framework foundation which underpins the models' category which explains individual acceptance of information technology entails three components namely, 1) individual's response towards the use information technology, 2) Information technology's usage intention, and 3) information technology's use behaviour alongside certain relation: these are shown in Figure 2.6.

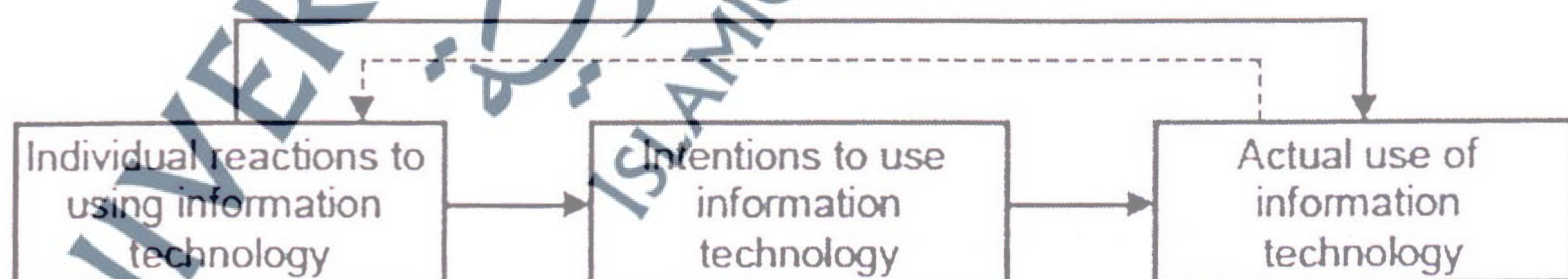


Figure 2.6: Basic Concept Underpinning User Acceptance Models.

Source: (Venkatesh et al., 2003)

Table 2.7 illustrates some of the past studies on the adoption of m-learning service and technology-mediated learning summarized by Liu and Han (2010).

Table 2.7: Summary of the Adoption Research on M-learning Services

Author	IS applications	Samples	Results
Wang et al., (2009)	M-learning	330 useful responses from five organizations	Performance expectancy, effort expectancy, social influence, perceived playfulness, and self-management greatly impact behavioral intention.
Kargin et al., (2009)	Mobile services	A qualitative research with 12 interviewees	Ease of use and usefulness are the major factors in mobile service adoption. From the perspective of service content and mobility are significant factors while social influence is also vital.
Liu (2008)	M-learning	A conceptual model	Proposed a model based on the basic structures of UTAUT, with an integration of self-efficacy, mobility, attainment value, perceived enjoyment, and self-management of learning, to explain learners' behavior intention.
Liao and Lu (2008)	E-learning websites	137 university students	Perceptions of relative advantage and compatibility are strongly linked to users' intention to use e-learning; prior experience influences learners' adoption of technology.
Liaw (2008)	Blackboard e-learning system	424 university students	Perceived self-efficacy is an important factor influencing learners' satisfaction while perceived usefulness and perceived satisfaction affects learners' behavioral intention to use the e-learning system.
Shih (2008)	Web-based learning	350 part-time students	Learners' efficacy control and efficacy expectations can become a guide to their adaptation learning behaviours on the web.
Chiu and Wang (2008)	Web-based learning	286 part-time students	Performance expectancy, effort expectancy, computer self- efficacy, attainment value, utility value, and intrinsic value were significant predictors of individuals' intentions to continue using web-based learning while anxiety had a negative effect.
Lopez-Nicolas et al., (2008)	Advanced mobile services	542 valid questionnaires by households	Social factor significantly influences people's decision to adopt advanced mobile services.

Koivumaki et al., (2008)	Mobile services	243 service users	Duration of the use has no effect on consumers' perceptions of mobile services however, the familiarity of the device and user skills have affect the perceptions of the services.
Lu et al., (2008)	Wireless mobile data services	1,432 respondents residing in five cities in China	Results indicate importance of perceived usefulness, ease of use, personal innovativeness in IT and mobile trust belief in influencing individuals' intention of using wireless mobile data service
Ju et al., (2007)	M-learning	245 university students	Perceived self-efficacy significantly affects perceived ease of use, which positively impacts perceived usefulness. Perceived usefulness significantly influences users' attitude which further impacts the intention to use m-learning.
Huang et al., (2007)	M-learning	313 university students	Individual differences greatly influences user acceptance in which the perceived enjoyment. PMV can predict users' intention to use m-learning.
Saade et al., (2007)	Multimedia learning	362 students	Found TAM as a solid theoretical model and its validity can be extended to multimedia and e-learning contexts.
Chiu et al., (2007)	Web-based learning	221 students of a web-based learning program	Attainment value, utility value, intrinsic value, distributive fairness, and interactional fairness are predictors for learners' satisfaction, while utility value and satisfaction showed significant positive effects in moulding learners' intention to continue the use of web-based learning.
Shin (2007)	Mobile internet	986 Koreans adults	Perceived quality and perceived availability have significant influence on users' intrinsic and extrinsic motivation to use mobile internet in Korea.
Chiu et al., (2005)	E-learning	189 students using e-learning services	Perceived usability, perceived quality, perceived value, and usability disconfirmation affect perceived satisfaction, while perceived satisfaction determines users' continuing intention to use e-learning.
Lu et al., (2005)	Wireless internet services	357 MBA students	There are strong relationships between personal innovativeness and social influences and the perceptual beliefs – usefulness and ease of use - which further affect intentions to adopt innovation.
Phuangthong and Malisawan (2005)	M-learning	Preliminary research with 385 responses	Perceived enjoyment is added to the basic constructs of TAM to explain users' behaviour.

The aim of this research is to provide a basic theoretical model that has the ability to support a vast continuum of technical, administrative, and student issues on m-learning by expanding the Technology Acceptance Model (TAM) and the Innovation Diffusion Theory (IDT). Further, to fulfil the objective, this study revisits some of the most prominent adoption theories. Then, the study will establish a theoretical model illustrating the acceptance of student towards m-learning; this is achieved through the adaptation and expansion of the existing adoption theories. The next section will discuss the relevant theories and the form of the base model.

2.7 Theoretical Framework and Hypotheses

This study lays down two relevant theoretical constructs namely, consumer (student) acceptance, adoption and behaviour prediction. In order to assist in the development of a solid theoretical base for this study, two well-established models of adoption and intention namely, the Technology Acceptance Model (TAM) and Innovation Diffusion Theory (IDT) are utilised; both TAM and IDT will be reviewed in the next subsections. As deduced by Williams (2009) there is not much insight that can be gained from the models of Unified Theory of Acceptance and Use of Technology (UTAUT) in the context of m-learning, and this is not the case with regard to other contexts of technology.

2.7.1 Technology Acceptance Model (TAM)

Technology acceptance model or TAM was formulated to explain the determining factors of user acceptance in a wide array of end-user computing technologies (F. D. Davis,

1986). As stated by Tung et al., (2014), this model was based on Ajzen and Fishbein's (1980) theory of reasoned action or TRA. Additionally, since TRA is a model that is well-established, many scholars various fields employ it in explaining and predicting human behaviour.

Originally, TAM consisted of five components namely, perceived ease of use (PEOU), perceived usefulness (PU), attitude toward using (ATU), behavioral intention to use (BI), and behaviour system use. Specifically, as indicated by Fred D. Davis (1989) PEOU represents the degree to which a user believes that using a particular service would be effortless, while PU means the degree to which an individual perceives that using a particular system would improve the performance of his or her job. PEOU and PU are the two most important factors for system use and in fact, according to Liu and Han (2010) these two elements (PEoU and PU) are the key beliefs which lead to user acceptance of information technology. Meanwhile, ATU directly predicts BI of the users, which determines AU. Later, an extension of TAM or known as TAM2 was proposed by Venkatesh and Davis (2000). As an extension of TAM, TAM2 added a new components namely, output quality, image, job relevance, voluntarism, result demonstrability and subjective norm) and omitted ATU because it is perceived as weak predictors of either BI or AU. The formation of TAM2 is in line with the studies of Taylor and Todd (1995a; 1995b) which concluded that the external variables in TAM2 strongly affect to user acceptance and that AU is indirectly influenced by PU and PEoU (through BI).

In addition, TAM3 was proposed by Venkatesh and Bala (2008) and the purpose of this model is to find a complete set of adoption's determining factors and tackle the role

of interventions in supporting adoption and innovations' utilisation by organizations' employees (Donaldson, 2011). However, this research decides to disregard the use of this theory due to the reasons below:

TAM3 is a very new theory and as at the time this research is being written, there has yet any published study that validates this theoretical model. On the other hand, for this study's research design, the researcher has decided to employ a theoretical model that has been validated, not ones that had only been investigated in one study. Apart from that, the participants of the TAM3 study were employees of organization that is non-academic in nature namely, the accounting service firm, financial services firm, manufacturing firm and an international investments' banking firm. In other words, there were no participants obtained from higher education. Additionally, the systems of information that were investigated were non-academic and were not designated as ones appropriate for a mobile environment. In particular, the systems examined comprised of a proprietary operating system, a customer account management system, a Windows based environment and a system for generating and analysing stock portfolios.

2.7.2 Innovation Diffusion Theory (IDT)

Innovation diffusion theory or IDT was proposed by Rogers (1962, 1983, 1995, 2003), and like the TAM, IDT is also a well-established theory for user adoption. Among many things, IDT describes the process of innovation decision, the factors of adoption rate, and numerous categories of adopters, while, innovation diffusion is attained through users' acceptance and use of new ideas or things (Zaltman & Stiff, 1973). Aside from that, IDT

can assist in the prediction of the likelihood and the rate of an innovation being adopted. In fact, 49 to 87 percent of the variance in the rate of its adoption is explained by an innovation's relative advantage, compatibility, complexity, triability and observability (Rogers, 1995).

Specifically, relative advantage is the degree to which an innovation is perceived as being better than the idea it replaces, while compatibility means the degree to which an innovation is perceived as coherent with the existing values, past experiences, and needs of potential adopters. On the other hand, complexity refers to the degree to which an innovation is perceived as relatively difficult to understand and use, and basically, innovations that are not well understood or have more complexity are more challenging to implement. Additionally, triability is the extent to which certain innovation may be investigated on a small scale; if certain innovation can be tested on a small scale, the full and complete version of adoption becomes much easier, and finally, observability entails the degree to which the results of an innovation are visible to others, and the higher the visibility, the higher the rate of the adoption will be.

The above explained five characteristics become the reference point in explaining user's decision making and adoption process (Wu & Wang, 2005; Tung et al., 2014). Apart from that, these characteristics are also useful in predicting the application of new technological innovations and explaining the ways these variables interact with one another. Further, Rogers (1995, 2003) termed the central concept of innovation diffusion as, "the process in which an innovation is communicated through certain channels, over time, among the members of a social system." Nonetheless, among these five discussed

characteristics, only relative advantage, compatibility and complexity have been suggested to show consistent link with the frequency of innovation adoption (Agarwal & Prasa, 1998; Tornatzky & Klein, 1982; Solomon et al., 2013).

2.7.3 Combination of TAM2 and IDT Models

Both TAM and IDT are two the most prominent theories in describing and predicting use of system and adoption of innovation. Additionally, these two theories have been proven to be highly successful in empirical studies such as indicated in studies by Igarria et al (1995), Taylor and P. Todd (1995), Moore and Benbasat (1996) Igarria, et al., (1997) and Karahanna et al., (1999). And as such, this study has chosen these theories as the base theories.

TAM in particular, has frequently been used to study the acceptance of Internet applications such as the studies by David et al., (1997), and Gefen and Straub (2000). Thus, TAM and IDT have the full capacity to study the Electronic Commerce (EC) and Internet application adoption, and at the same time, these two theories provide strong theoretical foundation for this study.

Additionally, even though TAM and IDT originated from different fields, they share some noticeable resemblances. For instance, as highlighted by Wu and Wang (2005) and Tung et al., (2014), the construct of relative advantage in IDT is often perceived as the equal to the PU construct in TAM, while the construct of complexity in IDT is very similar to PEOU concept in TAM.

Further, some studies even combined TAM and IDT. For instance, in their study to evaluate and explain consumer behaviour in the context of virtual store, Lee and Suh (2013) combined the TAM with the compatibility construct, while Tung et al., (2014) in their study has combined TAM2 with IDT. In Figure 2.7, the basic model for investigating acceptance of students towards m-learning services is drawn.

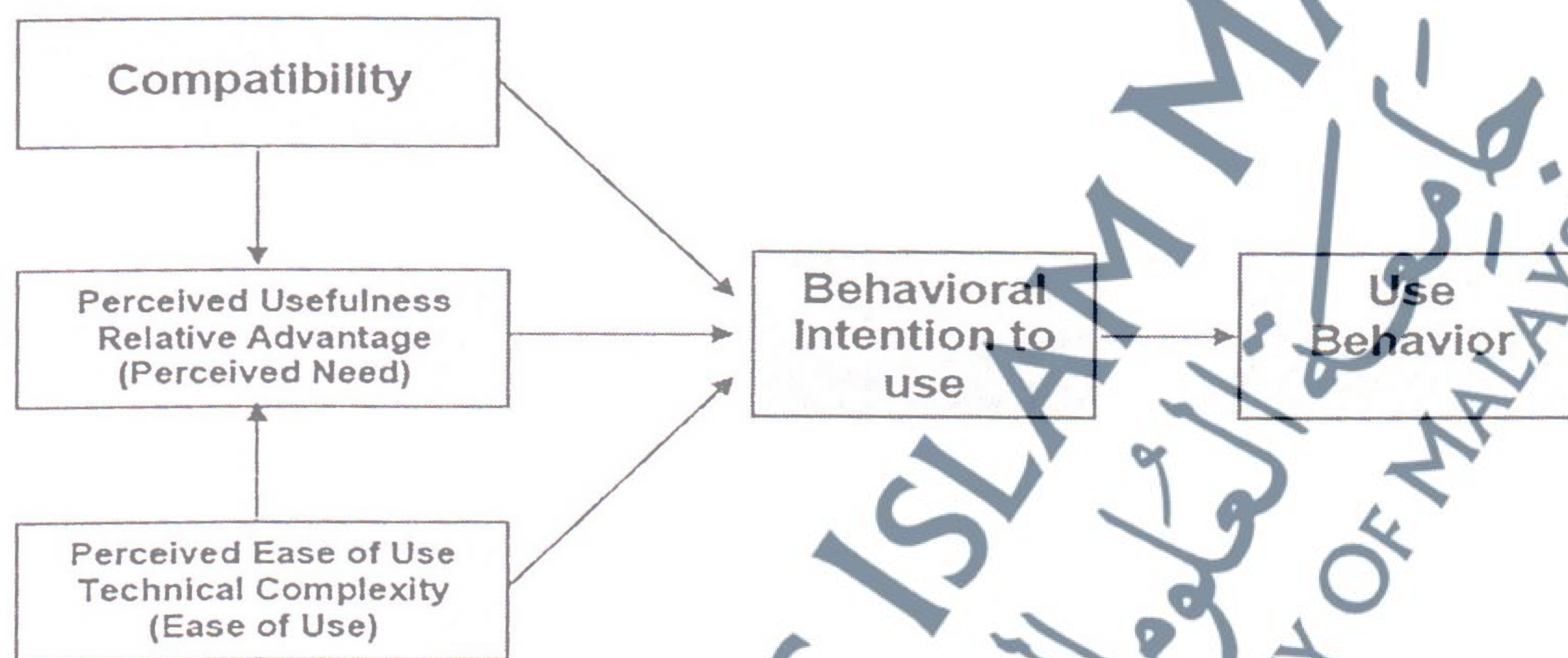


Figure 2.7: Base Model for Student Acceptance of m-learning.

Source: (Tung et al., 2014)

As an attempt to improve the model's predictive and explanatory abilities, the empirical studies of Hu et al., (1999), Wu and Wang (2005), Lee and Suh (2013), Wu, Weng and Kao (2014) and Tung et al., (2014) proposed that TAM be integrated with other theories of acceptance and diffusion. Also, through the inclusion of IDT's compatibility (C) construct, the model is endowed with the ability to attend to the social setting that becomes the platform of m-learning. Further, according to Rogers (2003), compatibility is determined by assessing the compatibility of innovation with existing

values and beliefs, previously introduced ideas, and the needs of potential adopters. Similar to PEOU, C is supposed to have a major impact on PU.

This assumption is based on the rationale that student will perceive m-learning services as useful if the adoption of m-learning service does not contradict with the student's requirements and way of life. However, it is important to note that the initial acceptance of m-learning service as well as continual use shows an equal degree of importance. Also, as extension to the research on TAM, several researches in the past few years have scrutinized on the vital subject of Information System (IS) continuance.

As an example, a research by Parthasarathy and Bhattacharjee (1998) has outlined potential discontinuity of a technology and proposed that based on the sources of the influence for users initial adoption (interpersonal), perceived usefulness, perceived compatibility, service utilization, and the usage of complementary product, the potential factors of discontinuity could be identified. Further, utilising the Expectation-Confirmation theory, Bhattacharjee (2001) has empirically proven that users' decision of IS continuance was affected by their satisfaction with the IS, where the IS directly results from confirmation or disconfirmation of users' expectation. Similarly, in the context of student, it is possible to predict their continuance in using m-service. This can be done by looking into their level of confirmation /satisfaction and usage of the m-learning service when they first adopted the system. Since TAM and IDT have received strong theoretical and empirical support, it gives assurance on the validity of the base model as far as electronic commerce is concerned.

Nonetheless, as the base model is formulated based on TAM, it also inherits TAM's weakness. For instance, although TAM has proven to be successful in predicting the potential user acceptance, it offers little help in the design and development of systems with a high acceptance level. To counter this weakness, V. Venkatesh and Davis (1996) proposed that the determinants of PU, PEOU, and BI be identified so that system designers can be provided with meaningful solutions. Besides that, through the utilisation of these determinants, student's confirmation, as well as their degree of satisfaction towards the service of m-learning could be identified. It should be noted that student's confirmation and their degree of satisfaction towards the service of m-learning shows substantial implications in the prediction of their usage continuance. Thus, the next step for the researcher of this study is to determine the factors of students' acceptance of which should become the focus of m-learning.

2.8 Research Model Factors

In this section will outline a number of factors which will be incorporated in the final research model.

2.8.1 Service Quality (SQ)

Service quality is generally derived from the perspective of customer attitudes, where quality refers to satisfying the requirements of the customer (Kruger, 2001; O'Neill et al., 2001; Geetika & Nandan, 2010). In terms of successfully fulfilling requirements of customers, Al-Mushasha and Hassan (2009) and El Saghier and Nathan (2013) stated that

it depends on the ability of the organization to identify and meet these requirements. From viewpoint of the organization, customers must be perceived as persons with individual requirements and in instances where a standard level of service quality is established to satisfy these requirements, organizations that claim to be providing their customers with high-quality services are obliged to satisfy the requirements of their customers. If this can be achieved, the said organization will have positive image in the marketplace, which will give them an edge over their rivals. Also, as documented by Lee and Yoo (2000), Al-Mushasha and Hassan (2009) and El Saghier and Nathan (2013) not only high-quality service leads to decrease in negative quality (poor service and inconsistency) but it also leads to increase positive qualities like luxury and fun, and this leads to the creation of value.

As mobile wireless technology increases in terms of capability, the number of institutions like universities that has begun adopting m-learning in their teaching and learning increases. Not only that, as reported by Parsons and Ryu (2006), Al-Mushasha and Hassan (2009) and El Saghier and Nathan (2013), as mobile service quality is regarded as a primary factor linked to user behaviour, measurement of mobile service quality has become important. Thus, it cannot be doubted that knowledge in the factors leading to m-learning service quality can be of value in creating software and hardware design enhancement; this consequently increases the perceived value of the service as well as user satisfaction (Yi et al., 2010).

By measuring the quality gaps, institutions can gain strategic advantage on certain product and service in the market. In fact, the measurement provides the push so that an

institution could improve its position in the marketplace. However, as indicated by Bebeko (2000), previous research on this topic revealed that to objectively measure quality in the service sector is quite a challenge because services are intangible, heterogeneous and inseparable in nature. Conversely, in the evaluation of the comparative importance of quality dimensions in certain service industries Sachdev and Verma (2004) have reported two perspectives with regard to quality measurement namely, the internal and external perspectives. Specifically, the internal perspective refers to zero defect or conformance to requirements, while the external perspective explains quality measurement of customer perceptions, satisfaction, attitude, and delight. It has been proven that service quality significantly affects the success of technology implementation (Liu & Ma, 2006).

In particular, was extended by Tan and Chou (2008) when they conducted a study on the impact of mobile service quality and compatibility in the context of mobile technology on use of services. The results of the study indicate that mobile service quality and perceived technology compatibility influences user's satisfaction, in other words, service characteristics have to be coherent with the functionalities of mobile phone so that the satisfaction of user can be improved.

In another study by Li and Yeh (2009), the status of user's perception of service quality in the context of 3G mobile devices was examined and results indicated that both satisfaction and trust influence user intention to use 3G service. In agreement to the findings mentioned above, Akour (2009) and Yadav and Dabhade (2013) concluded that service quality technology is one of the crucial factors influencing m-learning adoption

success. Service quality refers to the acceptability, interface design, reliability/response, content quality, personalization, and privacy/security provided by the technology.

In an attempt to contribute to the literature of quality perception literature, a number of previous studies have employed numerous measurement instruments and in particular, Llusar and Zornoza (2000) indicated that these tools contributed to the technology quality measurement as well as the quality studies. In the environment of universities, service delivery and communication are mainly via personal interaction among students and staff/lecturers, and a number of studies have tried to identify the primary service quality dimensions in the aforesaid environment. However, only a handful of these studies investigated the attributes of service quality with regard to m-learning, in which the main service delivery and communication channel does not involve human (mobile wireless technology).

2.8.1.1 Dimension of Service Quality

(i) Personalization (P)

Personalized services is defined as the ability to customize the user interface, the information channels, and the services provided according to the individual user's needs, personal interests, and preferences (Reamy, 2001; Hyldegaard & Seiden, 2004) and available literature indicates that there have been a substantial number of studies on personalization on the web (Ho & Kwok, 2002). Personalization enables user to build up a personal information space with relevant information sources and services as well as

interact with the user interface in a personal manner. On the other hand, personalization is also regarded as the process of a system using the information of the user to convey a targeted solution using the personal preferences of the particular user. In the context of e-commerce, personalized web services, which are commonly available nowadays, are an important component. In the context of future mobile communication systems, Kellerer et al., (2003) indicated that personalization is one of the most compelling features. Thus, this study includes personalization as one of the dimensions of technology service quality factor and imparts positive significant impact on the acceptance of m-learning application among the students of the Malaysian higher learning institutions.

(ii) **Accessibility (A)**

refers to the time required to actively perform the service (Dabholkar, 1996) while in the context of m-learning, accessibility as defined by Al-Mushasha and Hassan (2009), is the availability of the system where and when the learners need to search or download any data. It is important to note that reliable speed on line access is crucial in the success in achieving the potential benefit of using m-learning system because learners have the expectation that m-learning services are always available on demand. Based on this notion, it is undeniable that the applications and services of m-learning heavily depend on the underlying network support. Further, Lim (2001) and Katerina and Stephanos (2006) documented two of the most critical variables influencing the development and the quality of m-learning service which are, the available bandwidth offered by the wireless networks and the network coverage. Thus, based on the clarifications above, this study

includes accessibility as one of the important features of technology service quality factor that could impart positive significant effect on the acceptance of students towards the service of m-learning higher education institution setting in Malaysia.

(iii) Interface Design (ID)

Interface design is defined as the appearance of mobile portal and it is consistent with the dimension of tangibility in the SERVQUAL model, where tangible dimension as defined by Parasuraman et al., (1988), is the physical appearance, such as facilities, equipment, and personal. However, numerous researchers have substituted this definition with the use interface required for the e-service context (Lofaono et al., 2002; Wolfinbarger & Gilly, 2003; Lee & Lin, 2005). In their previous research, Ghose and Dou (1998) have argued that an interface with higher level of attractiveness increases the level of user satisfaction and consequently, technology acceptance. In agreement to this notion, Al-Mushasha and Hassan (2009) stressed interface design as very crucial in the m-learning environment since interface replaces the role of personal contact in the real classroom setting. Based on the aforementioned, this study includes interface design as one of the critical dimensions of technology service quality factor that could impart positive significant impact on the acceptance of m-learning service among the students in the context of Malaysian higher education institutions.

(iv) **Content Quality (CQ)**

Content quality can be determined from consumers' evaluation, for instance, Rieh (2002) regarded content quality as the degree to which users think that the information is useful, good, current and accurate. On the other hand, Loiacono et al., (2002) termed content quality as the concern that information provided is appropriate, accurate and updated. However, the mobile's content quality still considered to be at an infant stage and thus making the skill in creating good quality mobile content one of the most crucial variables in determining the acceptance of mobile technology (Landor, 2003). Not only that, other scholars such as Kim and Ong (2005) also found content quality as one of the three key factors that promote and hinder the acceptance of m-learning. Thus, based on the points mentioned above, this study includes content quality as one of the dimensions of technology service quality factor that could leave positive significant impact on the acceptance of m-learning service among the students in the context of Malaysian higher learning institutions.

(v) **Reliability and Response (RS)**

In the SERVQUAL model, reliability and response entail consistency, dependability, accuracy, and ability to support customer with the appropriate information when there is a problem (Parasuraman et al., 1988). Dabholkar (1996) and Cox and Dale (2001) investigated the new service-delivery option available with computer technology and they documented consistency and dependability of performance as an important dimension in

service quality measurement due to user's consideration of performance risks based on new technology service quality.

This notion proves relevancy in the acceptance of m-learning services since learners are usually mobile and are often running out of time. Further, universities are proposed to focus on the dimension of reliability/response they could attain high acceptance of m-learning among students (Zeithaml et al., 2000; Parasuraman, 2004; Lee & Lin, 2005; Akour, 2009; Al-Mushasha & Hassan, 2009). Thus, based on the evidences discussed above, this study includes reliability/response as one of dimensions of technology service quality factor that could impart positive significant influence on the acceptance of m-learning service among students in the context of Malaysian higher education institutions.

(vi) Security and Privacy (PS)

Security and privacy is a complex social phenomenon and it signifies interactions among human and non-human agents from the aspects of behaviour, social, psychology, technology and organization (Lu et al., 2003). Security issues include concerns such as unauthorized access, editing, intrusion protection, and modification and omission of files or documents.

In today's context, the issue of security and privacy in the online or web domain has been under scrutiny by many researchers such as Lin and Wu (2002) and Pikkarainen et al., (2004). For instance, the security and privacy as quality items has been chosen as a variable in a research on the topic of assurance in examining the quality of service in e-

commerce (Swaid & Wigand, 2007). In addition to that, Viega et al., (2001), Howcroft et al., (2002) and Lu et al., (2003), concluded in their studies that users of online banking as well as online commerce perceive security and privacy as very important, and these factors even pose as a challenge in adopting online banking. As such, in the context of higher learning institutions, where there is greater emphasis on building long-term relationships with students, security has been regarded as a central role (Swaminathan et al., 1999; Kim & Tadisina, 2005).

Not only that, the importance of security has also been recognized by many scholars in the context of e-learning (Sparta, 2009). As mentioned earlier, security issues encompass concerns such as unauthorized access, editing, intrusion protection, and modification or omission of files or documents. In actuality, and these comparable notions can also be converted into the m-learning context especially for the WAP-enabled or smart phones.

Information disclosure is regarded as loss of privacy, something that is undesirable. However, as long as information disclosure yields a positive net outcome, people will accept (Alatalo and Siponen, 2002). This is evidenced in people's willingness in giving their private information online and sacrificing their privacy in the now popular social networking websites such as Myspace, YouTube and Facebook; in the context of students, they are far less concerned about giving out information if they see benefit in doing so.

Therefore, it can be reasonably expected students will not resist sharing personal information if they believe that their information is fairly collected and treated for

specific purposes such as m-learning. Thus, based on the abovementioned, this study includes privacy/security as one of the crucial dimensions of technology service quality factor and that could generate positive significant impact on the acceptance of m-learning service among the students in the context of the Malaysian higher learning institutions. Further, a study conducted on consumer acceptance of wireless finance by Kleijnen et al., (2004) concluded that the attributes of system quality such as time required for downloading as well connection speed are of great concern among users. Also, it is important to note that albeit the fact that the speeds and reliability of mobile network have shown great improvement in the last ten years, limitations still exists, that is, when compared to other wired networks. These limitations include greater delay time and relatively low speeds of network.

Apart from that, as highlighted by Lu et al., (2003), Chae and Kim (2004) as well as Kleijnen et al., (2004), there are also a number of issues with mobile devices such as low bandwidths, small screens, and bothersome methods of input, all of which can impact the satisfaction and acceptance of user. The limitations highlighted above could pose influence on the ease of navigation and the ability of content understanding. As part of the solution, reviews from literature have highlighted some potential solutions to interface issues such as the use of built-in projectors or simply, just use mobile devices that have bigger screens. In fact, these said features (bigger screens) are already available among mobile phones in the market today (Anderson & Blackwood, 2004; The Horizon Report, 2007).

2.8.2 Social Influence (SI)

Social influence is referred as the level to which an individual feels that important others are convinced that he/she should employ a technology (Al-Gahtani et al., 2007). In other words, in the context of technology, social influence explains the degree to which users perceive that their significant others believe that the users are obliged to use a new information system.

Specifically in mobile learning, this concept proposes that social influences (e.g. peers, parents, etc.) will impart strong impact on the intention of younger students in accepting and using mobile devices for learning purposes. Not only that, social influence on behavior intent also appears to be more prevalent during the initial and early stages of mobile learning but will become less significant over time as the experience gained by user (through consistent mobile device use) increases. Thus, as indicated by Davis et al., (1989), the effect of social influences in the acceptance and usage of information technology denotes a crucial need for a better understanding of TAM's real life application.

2.8.2.1 Dimensions of Social Influence

a) Image (IM)

Status/image gain is one motivation for a person to take on an innovation (Rogers, 1995). In the context of windows application, the post-adoption attitude was found to be linked to the instrumentality of the beliefs of usefulness and the perceptions of image

improvement (Karahanna et al., 1999). In addition to that, a substantial number of managers have chosen to adopt the use of email to relay messages to their subordinates with regard to media style and individual identity (David et al., 2000). Thus, based on the literature review presented in the previous sections, this study has included the social factors into the proposed model. This is due to the notion that social aspects function as determinants in describing the source of most of the variance in net benefits of m-learning application. Further, this study also highlights the social impacts on mobile channel and social influence in the context of higher education institution and this also contributes in characterizing the acceptance of m-learning. Then, social aspects will also be examined in a comprehensive manner to ascertain if they impart immediate influence on the behavior intention and the acceptance of m-learning.

b) Subjective Norm (SN)

Fishbein and Ajzen (1975) defined subjective norms as, "a person's perception that most people who are important to him think he should or should not perform the behavior in question" (p. 302). According to Davis et al., 1989 and Mathieson 1991, the concept of subjective norms are underpinned by normative beliefs about referent others, and the motivation to conform to them. It is worth noting that, as stressed by Davis et al., (1989), the subjective norms contain theoretical and psychometric issues and hence, it may be difficult to determine whether usage behavior is affected by subjective norms or individual attitudes. However, they also maintained that social influences significantly impact the acceptance and use of information technology and therefore, understanding

social influences will impart better understanding on the acceptance and use of information technology.

As such, three mechanisms of social influence in which subjective norms affect behavioral intention to use have been identified and investigated by Venkatesh and Davis (2000) and they are, 1) direct compliance, 2) internalization, and 3) identification. Specifically, direct compliance entails individual performing a behavior with the anticipation of reward gain or punishment avoidance even though the doer does not have any belief regarding the behavior (Kelman 1958). On the other hand, internalization, based on expert power, entails a process (by individual) of incorporating the referent's belief into the individual's own belief structure (Kelman 1958; Warshaw 1980). Finally, identification, based on referent power, entails the process (by individual) of acting on group norms and gaining membership and social support (Kelman 1958; Pfeffer 1982; Venkatesh and Davis 2000). As indicated by Venkatesh and Davis (2000), the increased power and influence via this status advancing process provides a general foundation for enhanced productivity.

2.8.3 Culture Factor (CF)

Culture refers to, "the collective programming of the mind which distinguishes the members of one group or category of people from another" (Hofstede, 1991) or simply put, culture is any shared values of a particular group of people (Erez & Earley, 1993). Further, according to Shore and Venkatachalam (1996) culture indicates the individual's core values and beliefs which were formed during childhood and reinforced throughout

life, while Hasan and Ditsa (1999) define culture as, “the beliefs, philosophy, shared values, attitudes, customs, norms, rituals, common practices, and traditions which govern the ways of living of a group of people.”

Culture can also be expressed in terms of values and norms, where values, according to Laurent (1993), are what is worth doing or having, and are shaped by experience with parents, school, religion, and the media, while norms as highlighted by Straub et al., (1997); Hill et al., (1998), Straub et al., (2001) and Straub et al., (2002), encompass any shared beliefs with regard to behaviour. On the other hand, Goodman and Green (1992) observe culture as discrepancies that occur between the beliefs, values, and motivations of groups that are dissimilar from one another, while other scholars such as Samovar et al., (2009) perceive culture as the sum of values, beliefs, attitude, experience, knowledge, religion, meanings, hierarchies, meanings, roles, spatial relationships, concepts of the universe, notions of time and material objects and possessions attained by a group of people along the timeline of generations by individuals and the group.

2.8.3.1 Hofstede's Dimensions of Culture

Hofstede's (1980) termed culture as “the collective programming of the mind which distinguishes the members in one human group from another.” Based from a cross national research, people from different cultural and ethnic backgrounds are believed to have “different mindsets” where the term “mindsets” entails all those concepts that relate to cultural similarities and differences (Hofstede, 1991). It is important to note that according to Hofstede, culture “is learned,” and not only “inherited.” This notion is in

agreement with the theory of beliefs also proposed by Hofstede (1991), which postulates that individuals can both learn and unlearn cultural traits, depending on the influences of the environment, i.e., the adoption of new IT. Hofstede's dimensions of culture has been popular among both groups of academics and management that even after three decades, these dimensions are still relevant in comprehending the differences between national cultures and also in measuring the acceptance of new technology including m-learning (Nan et al., 2009; Kofod-Petersen et al., 2009; Srikes & Collins, 2009). The dimensions proposed by Hofstede's (1991) entail, (a) Uncertainty Avoidance (b) Power Distance (c) Masculinity versus Femininity (d) Individualism versus Collectivism and the lastly, which was later added by Hofstede (1991), (e) Long-term versus Short-term Orientation. Each of the dimensions listed is described in detailed as follows:

A. Uncertainty Avoidance (UA)

Uncertainty avoidance (UA) is "the extent to which the members of a culture feel threatened by uncertain or unknown situations" (Hofstede 1991). In other words, Kovačić (2005) stated that the dimension of UA describes the degree to which members of a society feel uncomfortable with uncertainty and ambiguity, preferring situations that are structured compared to unstructured. Then, a study was conducted by Kovačić (2005) to investigate the effects of national culture on the readiness of web E-government and the researcher found that countries that have high degree of uncertainty avoidance tend to have lower degree of acceptance and readiness pertaining to the adoption of new ICTs. Apart from that, countries with strong UA would also express a negative attitude towards

the application of new ICT tools. In comparison, those with weak UA will adopt the new ICTs willingly because they are able to bear the risk of unsuccessful implementation. Also, countries with weak UA would express positive attitude towards the application of new ICT tools. Further, TAM across three different cultures namely the US, Switzerland and Japanese was examined by Straub et al., (1997) and results indicated that TAM could not explain users' acceptance of new technology in different settings and different cultures. In detail, the acceptance of e-mail varies in these three countries: in the USA, email is highly accepted, in Switzerland, email is reasonably accepted while in Japan, email is not accepted. Thus, the researchers have deduced that UA appears to be a crucial factor making the new technology acceptable. However, no cultural data were collected from the aforesaid countries and thus, no assumptions with regard to differences in cultural values could be formed as there is no empirical evidence available for that purpose. In essence, the dimension of UA could impart an influence on students' acceptance of m-learning due to uncertainty, ambiguity and feeling of discomfort on the situation. Thus, this study will test this dimension and it is hoped that its relevant outcomes could provide important information on the overall results.

B. Power Distance (PD)

Power Distance (PD) is defined as, "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally" (Hofstede, 2001). In their study, Srite et al., (2000) found that a culture that has higher degree of power distance tends to have lower level innovativeness and trust in

their perception of the use of information system. In addition to that, the researchers also discovered that a highly collectivist culture tends to be affected by its subjective norm values. Apart from that, a study by Myers and Tan (2002) concluded that PD tends to significantly affect web design and users' interface acceptance. Moreover, an Information Technology transfer model was formulated by Srite et al., (2000). Further, Srite et al., (2000) conducted a survey in five Arab countries and results yield from data analysis confirmed that PD appears to be an important factor in encouraging acceptance of users or in hindering them from using the proposed system. In another study, Al-Khaldi and Wallace (1999) explored the use of computer in two non-identical cultures namely, the Saudi Arabian and the Canadian culture. The aim of the study was to identify the affecting factors that may influence the usage of computer in both cultures. Results indicated that the use of a certain system is perceived differently by different cultures and also, different cultures have different attitudes. Quintessentially, PD has become a crucial aspect in the model of Hofstede. In the context of this study, the impact of the power distance (PD) in the context of different Malaysian culture will be examined.

C. Masculinity/Femininity (MF)

As defined by Hofstede (1991), masculinity refers to, "a society in which social gender roles are clearly distinct: men are supposed to be assertive, tough, and focused on material success; women are supposed to be more modest, tender, and concerned with the quality of life." Femininity stands for a society in which social gender roles overlap: both men and women are supposed to be modest, tender, and concerned with the quality of life."

Cultural dimension can in fact be influenced by gender role, while gender role and its impact on technology acceptance have been widely cited in the literature (Gefen & Straub, 1997; Jackson, 2001; Speier & Venkatesh, 2002; Tolhurst & Debus, 2002; Yuen & Ma, 2002; Ong & Lai, 2006). In the context of society, it can be called masculine when it shows preference for assertiveness, achievement and material success in their tasks. Comparatively, if a society is into ideal relationships with its superiors or colleagues, shows concerns for the weak, and values life, it can be considered as feminine.

The study of Sundqvist et al., (2005) examined the influence of cultural similarity on the wireless communication tools' implementation based on the postulation that highly masculine countries diffuse wireless communications faster. However, the findings did not support their hypothesis and thus, this postulation is not yet proven.

Nonetheless, Sundqvist et al., (2005) concluded that a high level of UA has negative influence on the adoption of the new technology and that user's acceptance is dependent on the experience and past achievements of a the country. Additionally, information technology is found to encourage two-way relationships and a better life quality which signifies masculinity of high level (Bagchi et al., 2003). In contrast, the use of m-learning can indicate masculinity but the use can also for promoting success in stages of learning as well as increasing the students' performance; all these are classified as feminine. As such, this study attempts to examine the impact of the (MF) on m-learning acceptance in the context of different Malaysian culture and its related values.

D. Individualism/Collectivism (IC)

According to Hofstede (1991), individualism/Collectivism (IC) refers to, “societies in which the interests of the individual prevail over the interests of the group” versus “societies in which the interests of the group prevail over the interests of the individual.” In other words, the dimension of individualism as well as collectivism can offer an explanation on the connection between individuals and the group in a certain society, based on their customs, norms as well as values. As reported by Calantone et al., (2006), Srite (2006) and Al-Gahtani et al., (2007), there have been numerous studies conducted to investigate national culture, and its impact toward technology acceptance have been widely concluded. Thus, the current study will attempt to determine whether the culture of Malaysia signifies individualism or collectivism, as indicated by the future analysis, and at the same time, the impact on m-learning acceptance will be evaluated.

E. Long-term Versus Short-Term Orientation (LST)

Hofstede (1991) defines long-term orientation as, “the fostering of virtues oriented toward future rewards, in particular perseverance and thrift,” while short-term orientation refers to, “the fostering of virtues related to the past and present, in particular respect for tradition, preservation of 'face' and fulfilling social obligations.” As indicated by Hofstede (1991), the values of this dimension exist in the learning environment, both positively and negatively rated. As for the collectivist Southeast Asian countries the long-term orientation does not require correlation with collectivism; Brazil is an example of a collectivist country.

In comparison, Finland and Netherlands, two of European countries, are fairly long-term oriented, while Sweden and Germany are more short-term oriented (Hofstede et al., 2008). Thus, based on the future analysis, this study will ascertain if the culture of Malaysia reflects Long-term orientation, or Short-term orientation, and then, the impact of the culture towards acceptance of m-learning will be assessed. Also, since this dimension was identified in an additional research from a non-Western input, it is assured to be more suitable for cross-national research in the non-Western societies.

2.9 Summary

This chapter discussed m-learning in the context of higher education institutions in Malaysia as the background of this research. Based on the literature's outcomes, it can be said that in the context of higher education, there have been implementations of e-learning services and the system functions as the other mode to the traditional learning media. Nonetheless, the application of e-learning is limited in terms of connectivity and mobility. Specifically, even though the existence of wireless technology has provided support and maximized the e-learning's accessibility, devices like pc or laptop is still mandatory so that internet connection could be completed, of which, signifying that e-learning is still constrained location-wise as well as equipment-wise. As the issue of mobility still limits the current usage of e-learning, scholars are compelled to investigate this subject after which, will attempt to formulate a viable solution, i.e. to maximize accessibility without being restrained by time and also place. Consequently, the post-literature reviews on the mobile technology and its elements have enlightened the

researcher that such technology is feasible in the context of higher education as there exists a need for the universities to provide their students a service of learning for students that is free from the constraints of time and place.

Moreover, in the context of higher education, both the environment and the infrastructure are suitable for the diffusion and implementation in-learning. Undoubtedly the m-learning services which are informative in nature showed the most success and are the most preferred mode of learning among students in the context of higher education. Nevertheless, there are limitations on the capabilities of the mobile devices being used for m-learning applications but a number of potential solutions have been proposed. Aside from that, there are also obstacles impeding students' motivation in adopting this particular technology and due to this, the researcher acknowledges that the factors that should be deliberated when adopting the particular technology in the setting of higher education should be ascertained.

The factors, which are the building blocks of the proposed research model as well as the foundation of the theory, are also included in the discussion. Thus, following both theories, the TAM and the IDT, the basic Model for Student Acceptance with regard to m-learning was set up, and finally, the study formulates the research model and proposes the hypotheses.