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**THE ACCEPTANCE OF MOBILE APPLICATIONS IN
LANGUAGE CLASSROOM AMONG ENGLISH LANGUAGE
LEARNERS IN MALAYSIAN UNIVERSITY BASED ON A
UNIFIED THEORY OF ACCEPTABLE (UTAUT) MODEL**



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**DOCTOR OF PHILOSOPHY
UNIVERSITI UTARA MALAYSIA
2025**



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Abstrak

Teori dan model penerimaan teknologi telah dibangun, berkembang, dan diaplikasikan secara meluas untuk mengenal pasti faktor-faktor yang mempengaruhi penerimaan aplikasi mudah alih di negara, subjek, dan konteks tertentu. Walau bagaimanapun, masih terdapat sedikit kajian yang menumpukan pada penerimaan aplikasi mudah alih dalam pembelajaran bahasa Inggeris dalam konteks pendidikan tinggi di universiti Malaysia. Dalam kajian ini, Teori Penyatuan Penerimaan dan Penggunaan Teknologi (UTAUT) digunakan untuk menyelidik niat tingkah laku pelajar dalam menerima aplikasi mudah alih untuk pembelajaran bahasa Inggeris. Kajian ini mengkaji hubungan antara jangkaan prestasi, jangkaan usaha, pengaruh sosial, syarat yang memudahkan, motivasi hedonik, harga, dan tabiat, dengan mengambil kira konteks pendidikan, jantina, dan tahap pendidikan. Strategi penjelasan berturutan menggunakan penyelidikan kaedah campuran telah digunakan dalam kajian ini. Data kuantitatif (soal selidik) dikumpulkan terlebih dahulu, diikuti dengan data kualitatif (temubual). Data kuantitatif dikumpulkan daripada 300 peserta, manakala data kualitatif diperoleh daripada sepuluh peserta. Data kuantitatif dianalisis menggunakan statistik inferens dan deskriptif, manakala data kualitatif dianalisis menggunakan analisis tematik. Keputusan kajian menunjukkan bahawa model UTAUT adalah model yang berguna untuk meramalkan penggunaan aplikasi mudah alih sebagai alat pembelajaran bahasa Inggeris. Jantina ditemui sebagai moderator yang kuat, diikuti oleh konteks, yang juga merupakan moderator yang signifikan. Sebaliknya, tahap pendidikan bukan moderator yang signifikan dalam meramalkan niat tingkah laku untuk menggunakan aplikasi mudah alih sebagai alat pembelajaran bahasa Inggeris. Akhirnya, kedua-dua moderasi antara dan dalam konteks terbukti sebagai faktor yang signifikan. Kajian ini menyumbang kepada pengetahuan mengenai aplikasi mudah alih sebagai alat untuk penerimaan aplikasi mudah alih dalam bilik darjah bahasa dalam kalangan pelajar bahasa Inggeris di universiti Malaysia, berdasarkan model UTAUT. Keputusan kajian ini memberikan sumber tambahan yang penting dalam bidang pembelajaran bahasa Inggeris dalam konteks pendidikan tinggi di Malaysia. Kata kunci: Teknologi maklumat dan komunikasi mudah alih, jantina, UTAUT, aplikasi mudah alih, pelajar universiti.

Kata kunci: *Teknologi maklumat dan komunikasi mudah alih, jantina, UTAUT, aplikasi mudah alih, pelajar universiti.*

Abstract

Technology acceptance theories and models have been widely developed, evolved, and applied to identify the factors influencing the acceptance of mobile applications in specific countries, subjects, and contexts. However, there have been few studies focusing on the acceptance of mobile applications in English language learning within the context of higher education in Malaysian universities. In the present study, the Unified Theory of Acceptance and Use of Technology (UTAUT) was used to investigate students' behavioral intentions to accept mobile applications for English language learning. The study examined the relationship between performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price, and habit, considering the educational context, gender, and educational level. The explanatory sequential strategy using mixed-methods research was employed in this study, where quantitative (questionnaire) data was collected first, followed by qualitative (interview) data. The quantitative data was gathered from 300 participants, while the qualitative data was obtained from ten participants. The quantitative data was analyzed using inferential and descriptive statistics, while the qualitative data was analyzed using thematic analysis. The results indicate that the UTAUT model was an effective model for predicting the use of mobile applications as English language learning tools. Gender was found to be a strong moderator, followed by the context, which was also a significant moderator. In contrast, educational level was not a significant moderator in predicting behavioral intention to use mobile applications as English learning tools. Finally, both inter- and intra-context moderation were proven to be significant factors. The current study contributes to the body of knowledge on mobile applications as a tool for the acceptance of mobile applications in language classrooms among English language learners in Malaysian universities, based on the UTAUT model. The results provide a significant addition to the field of English language learning in the context of higher education in Malaysia.

Keywords: *Mobile information and communication technologies, gender, UTAUT, mobile applications, university students.*

Acknowledgements

First and foremost, all praises to ALMIGHTY ALLAH for his enlightenment and blessing during my PhD journey. Without his numerous blessing it would not be possible. I would like to extend my endless thanks and deepest gratitude to my supervisor Dr. Mohd Hilmi Bin Hamzah and Dr. Hariharan a/IN. Krishnasamy for believing in my ideas since our very first meeting and generously providing me with their wise guidance, support and encouragement. I thank the management and the staff of Universiti Utara Malaysia for their maximum support and contribution toward the success of my PhD. Last but not least, I would like to express my sincere gratitude to my mother for all her constant prayers, patience and motivation. And for each and every one who has been associated with the accomplishment of my PhD thesis.



Dedication

This thesis is wholeheartedly dedicated to the **ALMIGHTY ALLAH**, the most beneficent, and the most merciful for his benevolence. And to my Mother who has been my source of inspiration and strength whenever I thought of giving up.



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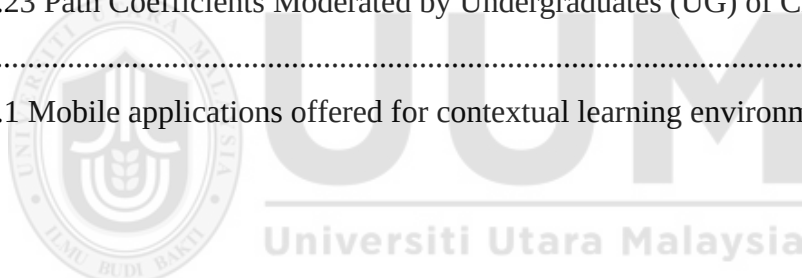
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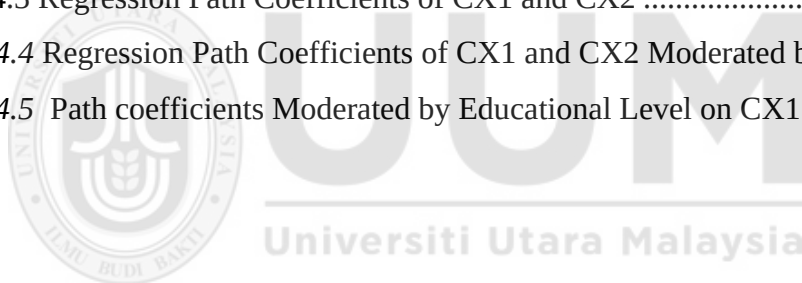
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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

Mobile data information and communication technologies (ICTs), with advanced capabilities, have created new possibilities and opportunities, for students who are learning English language learning, in higher education in Malaysia (Darmi & Economics 2014; Arif et al., 2024). The last several decades have seen a rapid evolution of ICT, which has resulted in significant changes to the learning environment. As more educational institutions integrate these new technologies into the conventional classroom setting, educators and scholars are being impacted using technology in education in general and ESL teaching and learning in particular. While prior studies have addressed many obstacles to the use of e-learning in ESL classrooms and higher education, they have also highlighted numerous benefits of this type of technology-based instruction (Zaini et al., 2024). Mobile learning, also known as M-learning is defined as any type of learning that occurs when a learner is not fixed, predetermined location or when a learner takes advantage of the learning opportunities provided by mobile technologies. (Shield & Kukulsca, 2008; Alghazi et al., 2021). M-learning is an interactive form of technology-based learning in which students actively participate in engaging in learning activities by collaborating and interacting through a mobile device.

One of the main causes of the growing popularity of mobile application in language classroom, which is a method of language learning that is enhanced or assisted by using a handheld mobile device (Shield & Kukulsca, 2008), is the recognition of mobile phones as practical pocket-sized computers that students can carry around and that are

always powered on (Prensky, 2005). The advent of fifth generation (5G) mobile communications has the potential to revolutionise any learning environment by becoming a widely utilised and effective learning tool. Hsu et al. (2006) have identified mobile learning as the next big thing in education. Hence, the plethora of research studies that have been conducted in the years on the use of mobile phones in L2 learning and teaching across various global contexts is indicative of the general excitement surrounding the potential of mobile devices for language learning environments (Stockwell, 2008; Alghazi et al., 2020).

Additionally, under the Smart School pilot project, which began in 1997, the introduction of new technology has dramatically changed the way that education is delivered in Malaysia. This was done in part to support ongoing efforts by the Malaysian Ministry of Education to improve students' English language ability. Millions of Malaysian Ringgit have been invested by the government of Malaysia on the training of highly qualified English language instructors and on the use of ICT to encourage more interest in and enhance English language instruction among Malaysian students. While using mobile devices for educational purposes is still considered novel, it is anticipated that smartphones would be included into Malaysian official education sometime between 2016 to 2020 (Siraj & Saleh, 2003; Qin & Yu, 2023; Sabri, 2021). This prediction appears to be supported by the data: according to the Malaysian Communication and Multimedia Commission (MCMC) 2008 survey, most mobile phone users are between the ages of 20 and 49 (Supyan et al. 2012), and this number is growing as information sharing and accessibility become more convenient.

Moreover, the utilization of English language as mode of communication turns out to be progressively significant. It is likewise, a significant element for students to further

their study and for employment purposes. Darren (2015) defines language learning as the language ability or ability in language use while Freeman (2012) defines language learning as an ability of several distinct but related constructs. An individual with inability or limited language learning will face difficulties in finding employment opportunities (Ghalib, Hassan, & Sahrir, (2014) and eventually will become a hindrance towards the growth of Malaysia because English language learning is now assumed to be one of the determinants for Malaysia growth (Gibbons, 2009; Songhori et al., 2024). Therefore, universities around the world have imposed a strict entrance procedure where students are required to present a certificate indicating their language learning such as IETLS and TOEFL.

In Malaysia, higher education institutions want to promote the learning process using technology in a way that encourages the shift in teaching from a teacher-centric model to a learner-centric model (Mahamad, 2013). In the late 1990's, higher education institutions in the developed world launched a new application of technology-enabled education that can accomplish this, i.e. blended learning. The use of these technologies in learning was pioneered in the national distance teaching institutions, like the UK Open University and UNED in Spain, but then became mainstream within most universities. Steele, (2016) reported that the American Society for Training and Development (ASTD) identified blended learning, in 2016, as one of the top ten trends becoming prominent in knowledge delivery. This claim was confirmed in a more recent paper for higher education by Campus Technology which pointed out that findings of studies show a growing prevalence toward the use of blended learning, as it is believed by many educators that this form of learning, blended learning, is more effective than a classroom-based approach alone. Nowadays, as the use of such technologies in the

classroom has become so common, many of those implementing blended learning are unaware that they are undertaking (Ali & Warraich, 2023).

In universities which incorporate both physical and online learning, formal and informal learning can be effectively merged as blended learning. Researchers envisage that students have universal access to mobile technologies, thus both formal and informal learning can be accessed as required (Franklin, 2011; Liu, & Carlsson, 2010; Shudong, 2005; Almaiah et al., 2019; Oye et al., 2014). This sort of blended learning can be accomplished either by establishing a mobile phone computing plan in universities with every student being supplied a personal mobile device, or by implementing a 'Bring Your Own Device' (BYOD) model with students bringing along their own devices (Parnell & Bartlett, 2012). These mobile devices may include laptops, tablets, e-readers, smartphones, etc. (Lai, Khaddage, & Knezek, 2013). Blended learning offers significant benefits for educational institutions when they are conscientiously implemented (Vaughan, 2014).

The need to understand technology acceptance more comprehensively has compelled researchers to develop technology acceptance behaviour models (Jen, Lu, & Liu, 2009). Most of these models are based on the Theory of Reasoned Action (TRA) and the Theory of Planned behaviour (TPB). There are other popular models based on Innovation Diffusion Theory (IDT), Social Cognitive Theory (SCT), and Motivation Theory (MM). The assessment of the validity and efficiency of these models is regarded as one of the most important scopes of research on information management (Hu, Chau, Sheng, & Tam, 1999; Tian & Yang, 2023).

The technology acceptance theory adopted for this research is the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). Venkatesh et al. (2012) proposed

UTAUT2 after identifying three new key components resulting in a substantial improvement in the variance explained in behavioural intention. The redefinition of UTAUT1 involved incorporating three key constructs - hedonic motivation, price value and habit; as well as the alteration of the existing relationships with new connections. Before UTAUT1 was developed, research had shown that models such as Technology Acceptance Model (TAM) could predict 40% of the variance in acceptance of an innovation. Previous literature claimed that the proposed UTAUT2 model could explain 74% of the variance in behavioural intention to use a technology as compared to the UTUAT1 model which could explain only 56% of the variance in behaviour intention to use a technology (Taylor & Todd, 1995; Venkatesh & Davis, 2000; Venkatesh et al., 2012). Thus, the UTAUT2 acceptance model used in this research investigates a student's behaviour intention to accept mobile application for English language learning in relation with performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price and habit against the educational context, gender, and educational level (Almisad & Alsalam, 2020; Ting & Lai 2023).

1.2 Problem Statement

The development of the newest technologies has benefited both teachers and students by enabling them to develop and experience previously unimaginable methods of teaching and learning a second language. This is because, although the spread of new technology, especially mobile phones, has evolved rapidly in both developed and developing countries, the differences in practices are staggering. The emergence of multifunctional mobile devices, such as smartphones, tablet PCs, pocket computers, and e-readers, has made working and communicating facile and learning a second language simpler, quicker, easier, and more enjoyable. Like previous technological

advancements, industrialised nations tend to integrate mobile learning more successfully into their practices because to its cost and availability. This is because their social systems and technological states differ from those of underdeveloped countries Kaliisa et al., (2017) and Lamptey & Boateng (2017). Malaysia is lagging industrialised nations like Australia, America, and China by ten years when it comes to the use of mobile technology in second language instruction. Research shows that industrialised nations had been using mobile technology for language learning since 1994 (Burston, 2013). According to Nordin et al., (2017) Malaysia began using mobile-assisted language learning (MALL) in 2003. Despite Malaysia's somewhat belated adoption, the pervasiveness of mobile technology in modern culture and the widespread use of mobile devices within Malaysian society have had a substantial influence on the integration of mobile technology into the educational system, especially with regard to the teaching of English (Muller, 2019) from Statista, a 2019 poll found that by 2021, there would be over 33 million smartphone users in Malaysia. Additionally, it was found that 86.3% of respondents under the age of 20 own a smartphone, making the millennial generation more likely than the elder generation to own one (Muller, 2021). The millennial generation's extensive smartphone ownership in Malaysia has had a significant impact on the incorporation of mobile in English language classrooms around the country (Anthony, 2024; Vasuthevan et al., 2024).

The younger generation of today is accustomed to using mobile devices, especially interactive touchscreen ones; many of them may have used touchscreen gadgets for the first time before turning two years old (Papadakis et al., 2021). In a perfect world, mobile devices especially touchscreen devices would provide interactive experiences that leverage people's innate constructivist learning capacities, encouraging the acquisition of 21st-century skills that are considered essential for education and future

employment in the technological age Papadakis, (2021) and Crompton et al., (2017). According to Shahrol et al., (2020) it is inescapable that the utilisation of mobile technology, specifically touchscreen devices, as a productive instrument for education has turned into a worldwide occurrence, drawing substantial interest from scholars, professionals, and interested parties in various educational settings in an attempt to

Since the concept of mobile learning is not new, it has frequently had its meaning expanded upon. The terms "mobile learning" is explained from two main perspectives: the learner-centered viewpoint and the technology-centered perspective Chen et al., (2020). Mobile learning was first characterised as "any educational provision where the sole or dominant technologies are handheld or laptop devices" by (Traxler, 2005, p. 262), who put out the technology-centered approach that gave rise to the more popular definition. The usage of mobile devices such "phones, smartphones, personal digital assistants (PDAs) and their peripherals, perhaps tablet PCs and perhaps laptop PCs, but not desktops in carts and other similar solutions" was defined as the mobility of mobile learning by (Traxler, 2005, p. 263). Moreover, (Hulme, 2009, p. 159) provided an alternative definition of mobile learning that was drawn from the learner-centered viewpoint (Attuquayefio & Addo, 2014). It described it as the mobility of learners who "create ever-changing learning environments" that transcend time and location, as well as the portability of gadgets. Mobile learning is the process of acquiring knowledge via intra- and inter-personal interactions among users as well as their learning materials in a range of scenarios through the use of personal mobile devices capable of quickly gathering and delivering information to users. This definition, which was presented by (Lee et al., 2019) in recent years, best captures the essence of mobile learning (Badi & Noor, 2024).

However, English language instruction at university level does not have the capacity to cope with the growing numbers of students who need English both to study, and to operate as global citizens, especially because northern Malaysia is a non-English environment. Moreover, the number of faculty members able to offer English instruction is not increasing fast enough, when compared to the growing number of students (Ayub, Hamid, & Nawawi, 2014). Thus, initiatives need to be implemented to improve the current situation, and mobile application learning, via a blended learning strategy, provides an opportunity better support English language learning (Hanewald, 2016; Voicu & Muntean, 2023).

Nevertheless, what makes the situation in Malaysia unique is that the use of mobile applications permits a growth in English learning; it could be an effective tool to promote learning and English communication. Additionally, if mobile Application is used effectively to reduce the time students spend on campus; due to their commitments toward their families and they would not have to spend extended time away from their families (Griva, 2011). Nonetheless, with the use of ICTs, despite the need to separate for the purposes of tuition, both groups can freely access a large range of high-quality learning experiences, and thereby fulfil their personal and intellectual potential. In this way, ICTs can improve equality of opportunity. However, culture has been always affecting the flow of adopting new technologies across the world (Ghalib, 2014). Consequently, mobile application could be an effective device to endorse English language learning (Bokolo, 2024; (Yang et al., 2024). If mobile applications are used effectively to reduce the time students spend on entertainment, which would be beneficial for students. With the use of mobile application, students can easily access a large range of high-quality English language learning experiences, and thereby fulfil their weaknesses in English skills. Another research was done by Segaran, (2014)

utilizing the classification of Gibbons, (2009), on social influence, indicates high social influence at university would help students to achieve high academic achievement. So, do the undergraduate and post graduate students in UUM produce the same result or social influence does not affect their academic achievement?

These studies indicate university students face problems in all the skills of English in general and in the amount of vocabulary and grammar they have in particular. Likewise, these studies attributed the weakness in English among undergraduate and post graduate students due to the imposed English language curriculum which focuses on the traditional methods of teaching rather than smart methods of learning. Hence, it is worthy to find the behavior of university students towards mobile application use for increasing English vocabulary diction (Chun & Yunus, 2023).

Many studies have been conducted to investigate the challenges, barriers, concerns, and effectiveness of Mobile application learning all around the world. Therefore, there is no doubt that mobile application learning, with its all-different approaches, can promote the learning process in a way that encourages a pedagogic shift from a teacher-centric model to a learner-centric model. Mobile application learning is highly promising in complementing conventional ways of learning (Denk et al., 2007, p. 135) via, for example, the creation of blended learning environments which have been proved to be a successful learning strategy (Banados, 2006; Lim, Morris & Kumpitz, 2006; Osguthrope & Graham, 2003; Thompson, 2003). Denk et al (2007) suggested that mobile application learning can support autonomous, flexible, context-aware, life-long, and life-wide learning. Similarly, Campanella (2012) argued that the foremost reasons that are invoked in support of mobile application learning are flexibility, collaboration, motivation, accessibility, and portability (Du & Liang, 2024; (Yasan & Yildirim, 2024).

Technology acceptance theories and models have been broadly developed, evolved, utilized and stretched out to determine the factors related to the acceptance of Mobile applications in specific nations, subjects, and contexts. However, there have been not many studies of the acceptance of mobile applications in English language learning in the higher education context of Malaysian university (Deni et al. 2021; Mutiaraningrum and Nugroho, 2021). To examine the acceptance of mobile application for English language learning among students at Universiti Utara Malaysia, which will consequently help to understand the concept of technology acceptance and integration of the mobile applications as an English language learning tool in a university setting (He & Li, 2023).

In addition to gender, two relatively new moderators (at least in terms of their use in the UTAUT2 model) were included in the study. Those are educational level (undergraduate and postgraduate) and educational context (IT students and Education students). The choice of educational level was based on a detailed literature review which revealed that education level was a better predictor than age in the assessment of mobile applications in an academic environment (Abu-Shanab, 2011; Agarwal & Prasad, 1999; Al-Gahtani, 2004). Similarly, this research also hypothesised that students from different educational context would accept mobile application in English language learning differently, possibly due to their differing background experiences; and, therefore, educational context replaced experience as a moderator in the UTAUT2 model in the current study. This study further recognizes the theory of connectivism proposed by (Siemens, 2005) as it posits that knowledge is distributed across the social and communication networks in the educational context that the student is situated in. The two contexts chosen (IT and education students) offer the opportunity to compare groups in terms of two different schools of UUM which is SEML and SOC, the intake

in SEML is more and the students are from education background in terms of gender more females are in SEML, whereas in SOC UUM if we compare from SEML more students are Males in terms of gender. These educational contexts also vary in terms of the proportion of females and males enrolled in the programmes, providing the opportunity to investigate interactions between moderators. Hence educational context was adopted as a third moderator along with gender and educational level. Indeed, the arguments posed within the rest of this study (based on the ideas briefly noted in the previous two sentences) suggest that educational context may be one of the most important moderators when it comes to considering the adoption of a technology such as mobile application. This argument will be discussed further throughout the study, but its importance in terms of developing one of the key factors investigated in the current work should be noted (Hoi, 2020; Yasin et al., 2024).

To the best of knowledge of the researcher, there is a gap in literature between the moderating role of with students' behaviour intention. Further research is required in higher education that should consider educational context as moderator. While analysing the moderating effect of education level on UTAUT2 model of Behavioural Intention, Menkhoff and Bengtsson (2012) highlighted the needs to assess contextual comparative study. Mobile Application may have a high demand on Social Influence and Facilitating Conditions, performance expectancy and effort expectancy probably mean unacceptable high service cost from learners. Also, although mobile application learning can be highly situated to the flexibility of mobile phones in terms of time and space, the physical or virtual learning environment are very promoting for English language learning (Sølvberg & Rismark, 2012). Tan et al., (2016) indicated contradictory finding about the performance expectancy, which is defined in this study as the degree to which using mobile applications will provide improvements in learning

the English language and behavioural intention (Huang et al., 2023). The present study offers conclusions drawn from the empirical data analysis, as well as to integrate and highlights underpin theory: Unified Theory of Acceptance and Use of Technology (Venkatesh, 2012), which influences the study's theoretical model.

1.3 Research Objectives

1. To empirically assess the acceptance of mobile application in language classroom among English language learners in Malaysia.
2. To assess the significance of UTAUT2 model parameters which derive the acceptance of the mobile application in language classroom among English language learners as a learning tool.
3. To investigate the effect of acceptance of the mobile application in language classroom among English language learners.
4. To explore the perceptions of English language learners in Malaysia on the acceptance of the mobile application.

1.4 Research Questions

1. To what extent is mobile application accepted as an English language learning tool among English language learners in Malaysia?
2. What is the significance of UTAUT2 model parameters which derive the acceptance of the mobile application in language classroom among English language learners as a learning tool?
3. What is the effect of acceptance of the mobile application in language classroom among English language learners in Malaysia?
4. What are the perceptions of English language learners in Malaysia on the acceptance of the mobile application?

1.5 Significance of the Study

By adding new structures and moderators to an established model of technology adoption, this research substantially advances the body of information already in existence. The acceptability of mobile applications in language classrooms among Malaysian English language learners was examined using the recently adjusted model. These results were obtained from the work:

Universities and similar institutions will be better able to integrate mobile-English language learning programmes by identifying the key elements from this research on how students accept mobile applications for English language learning and how context, gender, and educational differences affect these choices. This study's primary goal is to investigate and comprehend the moderating effects of context, gender, and educational attainment on the relationships between hedonic motivation, price, habit, performance expectation, effort expectation, social influence, and facilitating conditions and the behavioural intentions of UUM undergraduate and graduate students regarding the use of mobile applications for English language learning. Numerous studies have been conducted to examine the impact of studying English at the elementary, secondary, and tertiary levels.

Nonetheless, some research pertaining to elementary and secondary education have been conducted in Malaysia. There aren't many studies that focus on higher education. As a result, the purpose of this study is to better understand the language barrier that UUM students face when studying English. Additionally, it is hoped that this study would serve as a roadmap for improving students' academic performance (Huang et al., 2024).

This research will support the advancement of English language instruction, enhancing students' ability to engage in the information society and propel their nation's economy towards globalisation (Bhardwaj, 2015). Since English is the language of academic discourse in a wide range of academic programmes (medicine, health sciences, nursing, engineering, applied sciences, computer sciences), the research will also help shape future implementations of mobile application learning across other disciplines by focusing on English language learners. Additionally, as the majority of academic material is written in English, undergraduate students must improve their English language proficiency in order to be eligible for postgraduate research programmes (Huang et al., 2024).

1.6 Scope of the Study

The extended UTAUT2 model was employed in this study to determine the variables influencing the behavioural intention to use mobile applications for English language acquisition. According to the study model, behavioural intentions to use mobile applications for English language learning will be predicted by factors such as performance expectation, effort expectation, social influence, facilitating conditions, hedonic incentive, pricing, and habit. The influence of the seven components that make up the UTAUT2 model was also predicted to be moderated by education level. At Universiti Utara Malaysia, data from undergraduate and graduate students will be gathered through a cross-sectional research to experimentally evaluate this concept. Afterwards, a thorough literature analysis will evaluate in depth in order to investigate the behavioural intention about the usage of mobile applications in English language learning. In light of this, the UTAUT2 acceptance model employed in this study examines how students' intentions to accept mobile applications relate to expectations

for performance and effort as well as social influence, facilitating factors, hedonic motivation, price, and habitual behaviour in relation to context groups, gender, and educational attainment. A quantitative study is conducted among the students, using a sample frame of UUM undergraduates, to determine the degree of connection between the research variables. Students at UUM are thought to be a representative sample of those studying English using mobile applications in an active setting.

In order to gather primary data from 400 undergraduate and graduate students in the IT and educational setting, a survey is created. The data is then analysed, and following that, a discussion and some suggestions for further research are presented.

1.7 Conceptual Framework

The purpose of this study is to ascertain if mobile applications have a role in higher education. In order to do this, the behavioural purpose of utilising technology will be evaluated using the UTAUT2 paradigm. As previously said, this study assumes that the seven UTAUT2 components and the moderators (context, gender, and educational level) would have a substantial impact on the behaviour intention to use mobile applications for education. An extensive summary of the study's methodology is given in this section. The following is a description of the seven UTAUT2 model constructs:

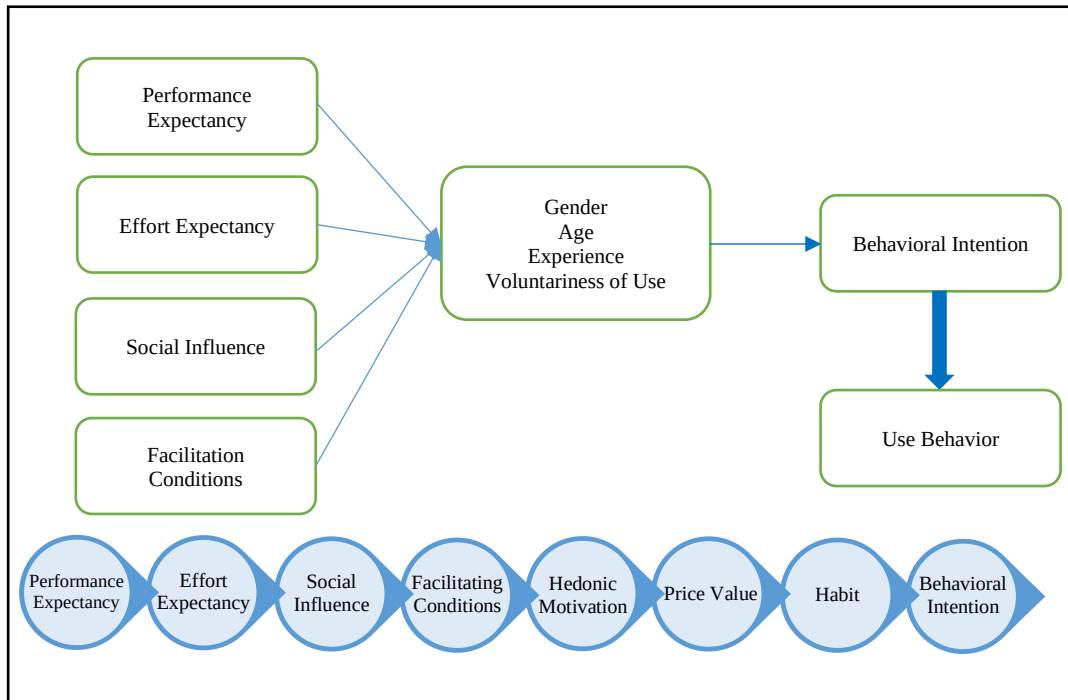


Figure 1.1 Conceptual framework of the study

1. **Performance Expectancy (PE):** the degree to which using a particular technology will improve performance.
2. **Effort Expectancy (EE):** the degree of ease associated with the use of that technology
3. **Social Influence (SI):** the extent to which the user perceives that he should use said technology
4. **Facilitating Conditions (FC):** the resources and support available to use the technology.
5. **Hedonic Motivation (HM):** the pleasure derived from using the technology.
6. **Price (PR):** the cognitive trade-off between perceived benefits of using technology and the costs of using it.
7. **Habit (HA):** the extent to which the user believes the use of said technology is instinctive or habitual.

1.8 Moderators

Although the three moderators have been discussed in detail in the Hypothesis Section of this study, a brief discussion is provided as follows.

Education Context: The population sample of this study

- a) The School of Computing (CX1)
- b) The School of Education and Modern Languages (CX2)

Level of Education: the two main stages of University Education

- a) **Undergraduate Level (UG):** The basic undergraduate enrolment
- b) **Postgraduate Level (PG):** This level comprises of students who enrol in either a Masters or a PhD degree programme at the University.

1.9 Definition of Terms

Behavioral Intention (BI): The Behavioural intention is defined as the degree to which a person aims or expects to carry out a certain action (Davis et al., 1989). In this study Behaviour intention defined as a measurement for evaluating the option that an individual may utilize a software system.

Performance Expectancy (PI): Performance Expectancy, defined in this study as the degree to which using mobile applications will provide improvements in learning the English language.

Effort Expectancy (EE): The Effort Expectancy, in this part of the study, defined as the degree of ease associated with using mobile applications in English language learning.

Social Influence (SI): Social Influence, in this part of the study, defined as the degree to which consumer perceive that important other (i.e. family, friends, and society) believe they should or should not use mobile applications in English language learning.

Facilitating Conditions (FC): Facilitating Conditions, in this part of the study, defined as the degree to which consumer believe that resources and support are available to help them to use mobile applications in English language learning.

Hedonic Motivation (HM): Hedonic Motivation, in this part of the study, defined the pleasure derived from using the technology.

Price Value (PV): Price value, in this part of the study, defined as the cognitive trade-off between perceived benefits of using technology and the costs of using them.

Habit (HA): Habit, in this part of the study, defined the extent to which the user believes technology use is instinctive or habitual.

1.10 Organisation of Thesis

The following is the structure of the chapters' outline. The research examines a student's behaviour intention to accept mobile applications by focusing on performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price, and habit against the educational context, gender, and educational level. Chapter two offers a review of relevant literature for the UTAUT2 acceptance model used in this study. The study's methodology and the procedure for gathering data are described in the third chapter. In contrast, the data analysis conducted in Chapter 4 with the use of software was reviewed in Chapter 5 along with a conclusion and suggestions.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In order to advance knowledge, the literature review's objective is to examine earlier research that, in terms of the theoretical framework, data collecting methods, and data analysis, may lead and guide the present study. The literature review offers a summary of the major subjects covered in the study's primary aim in order to accomplish this goal.

Given that the primary goal of the current study is to determine how English language learners at Malaysian universities want to use and accept mobile applications in the classroom, based on a unified theory of acceptable usage (UTAUT) model among students at UUM, Malaysia, In light of this, this chapter offers a summary of earlier studies on the topic, along with a definition and prospective use for mobile applications used by English language learners. Additionally, it offers an overview of mobile application learning globally and in Malaysia especially. Therefore, learning English is the main focus of the current study, albeit all mobile applications are evaluated. As a result, a section reviewing the usage of mobile applications for English language learners was supplied. Lastly, a part reviewed students' behavioural intentions about the usage of mobile applications for learning English. As an introduction to mobile application learning, a brief overview of ICT in education is given first.

2.2 Information and Communication Technologies (ICTs) in English language learning

In the previous ten years, education was limited to the classroom, with the instructor serving as the final source of information. However, in the current ICT era, things are quite different. According to study findings, instructors and students can learn English more successfully by utilising ICTs in the field of English language learning (Alnujaidi, 2008; Bañados, 2006). Although language pedagogy still emphasises conventional face-to-face teaching and learning, Rahimi, Azhan, Normeza, and Baharudin (2015) contended that it has grown more prevalent and influential when utilising ICTs. According to their statement, "the introduction of ICT, particularly interactive TV, the internet, and the newest social media networks, has undergone many transformations with language pedagogy in particular over the years" (p. 170).

Many English language learning instructors and higher education institutions are not fully using the latest developments in ICTs, despite the fact that access to ICTs is becoming more and more common, as is their functionality and the opportunities they present (Rahimi, 2015). However, given how quickly ICTs are developing, ongoing research into the ways in which these tools might be used to enhance foreign language acquisition is necessary. Moreover, Stockwell (2012) pointed out a number of other concerns about the interaction between technology and language acquisition that may influence how we perceive, utilise, and assess ICTs in language learning. These issues go beyond just the sheer number of ICTs. Stockwell (2012) posits that a multitude of factors might contribute to the distinctiveness of any ICT application, including the variety of settings in which they are utilised, the variety of pedagogies utilised, the variety of ICT users, and the variety of research methodologies. Any alteration in one area, though, may have an impact on the others and produce new information.

Consequently, more research is always required to inform any potential generalisations (Hunde et al., 2023).

With the increasing global dependence on portable devices, mobile applications are among the fastest-growing categories of ICTs. The social and economic landscape has been drastically altered by this revolution. A new educational concept known as mobile application learning (m-learning) has emerged as a result of the widespread adoption of mobile applications by educational institutions and projects to improve teaching and learning and streamline administrative tasks. Higher education is using it more and more, and teachers have spoken about it and given papers on it at conferences like the IEEE-sponsored International Workshop on Mobile and Wireless Technologies in Education (WMTE) and the annual MLEARN Conference. Definitions of mobile application learning make clear that it is a new educational trend.

2.3 Mobile applications

In the wake of the mobile revolution, scholars and educators have offered a variety of definitions of mobile application learning, focusing on distinct facets and dimensions. Quinn (2000), for instance, describes it as learning supported by mobile devices. Traxler (2005) describes it as "any educational provision where the sole or dominant technologies are handheld or palmtop devices" (p. 262), approaching it from a similar angle. Nevertheless, he challenges this definition a few lines later, writing, "Such definitions merely put mobile application learning somewhere on learning's spectrum of portability and also perhaps draw attention to its technical limitations rather than promoting its unique pedagogic advantages and characteristics" (p. 263). Sharma & Kitchens (2004) provide a more detailed definition of mobile application learning as

follows: "mobile devices, ubiquitous communications technology, and intelligent user interfaces" (p. 205).

"Mobile application learning is not about 'mobile' or about 'learning' as previously understood, but part of a new mobile conception of society," writes Traxler (2007) in a subsequent work (p. 5). However, as stated by Pachler, Bachmair, and Cook (2010), "mobile application learning is about the process of coming to know and being able to operate successfully in, and across, new and ever-changing contexts and learning spaces" (p. 6), rather than about delivering content to devices. Mobile application learning is defined as "the use of mobile technology, either alone or in combination with other information and communication technology (ICT) to enable learning anytime and anywhere," according to the UNESCO document on Policy Guidelines for Mobile Application Learning, edited by Kraut (2013). This definition sheds light on various practices and methods of mobile application learning. There are several ways that learning may occur: both inside and outside of classrooms, users can utilise mobile devices to access educational materials, connect with others, or create content (p. 6).

However, Laurillard (2007, 156) describes mobile application learning as "digitally facilitated site-specific learning" to highlight the unique characteristics of the physical location in which the learner is positioned and to set it apart from other learning technologies. Mobile application learning is defined by the eLearning Guild (Wexler et al., 2008) as "any activity that allows individuals to be more productive when consuming, interacting with, or creating information, mediated through a compact digital portable device that the individual carries on a regular basis, has reliable connectivity, and fits in a pocket or purse" (p.7). This definition places a greater emphasis on productivity and activity theory.

Definitions of mobile application learning enhance and represent the importance of this phenomenon, regardless of their focus on technology, physical environments, or learning theories. Essentially, this idea is easily comprehended from the two words that make it up: Students may study anything, anywhere, at any time, with the help of mobile applications. Therefore, mobile application learning is defined for the purposes of this research as follows: using portable mobile applications to support teaching and learning anytime, anywhere; creating a blended learning environment that supports learning in individualised or collaborative settings; and emphasising the learner as the centre of the learning process (Jaboob et al., 2024).

2.4 The Potential of Mobile application learning

Globally, individuals have started using mobile applications into their everyday lives since the 1990s. As per the 2014 Radicati Group Report on Mobile Applications, there are 5.6 billion mobile users globally, out of whom 7.7 billion mobile devices—including phones and tablets—are in use. By 2018, it is anticipated that there will be 6.2 billion users and 12.1 billion mobile devices worldwide. According to the survey, 84% of people on Earth would be utilising mobile applications by 2018. But according to a 2007 report by the Organisation de Coopération et de Développement Économique (ODEC), mobile apps would probably be accessible and inexpensive for everyone globally by 2020.

Therefore, it is evident that online banking is evolving into m-banking, e-commerce is becoming m-commerce, and e-learning is becoming m-learning. As a result, mobile apps are no longer limited to telephonic services alone. The proliferation of mobile apps, services, and goods, along with the growing accessibility of wireless and portable

devices, have opened up new corporate and government prospects as well as urgent evaluation of their uses for educational institutions.

Higher education institutions are facing a number of issues as a result of this trend towards increased usage of mobile apps, including the evolving nature of information, the evolving character of students, and the evolving nature of global market demands. Therefore, colleges must address global concerns in order to compete worldwide and address the scarcity of competent graduates. Mason (2006) argues that pressure to integrate modern technology into teaching and learning has become a global issue for higher education institutions. Such a shift would be even more attractive in the poor world, where new technology may address pressing problems like education access.

Lastly, the University of Birmingham created a mobile application learning organiser as an example of teaching and learning support activities (Holme & Sharples, 2002). Corlett et al. (2005) tested these mobile organisers for 10 months in the 2002–2003 school year. A set of seventeen pupils received wireless PDAs together with a mobile application learning organiser on loan. The focus group and follow-up survey findings showed that institutional support for mobile application learning was required. Ziden et al. (2017) recently unveiled a contextual mobile application learning system framework that was created for a Malaysian public university's learning environment.

Following the provision of a framework for important figures at Malaysian institutions, recommendations are made to divide function modules into two groups: administrative support service modules and learning modules for mobile applications. This study highlights the critical guideline for support services in Malaysian mobile application learning settings.

Marc Prensky is a fervent advocate of mobile application learning, and no consideration of the possibilities of this approach would be complete without examining his work. In his 2005 work "What is the potential for learning from a cell phone?" "There are many different kinds of learning and many processes that we use to learn, but among the most common, tried-and-true, and successful of these are practicing, 'what-if'ing, observing, listening, questioning, reflecting, trying, estimating, and predicting," he said (p. 261). Prensky (2005) asserts that a number of mobile phone characteristics can enhance students' educational opportunities.

Conversely, Clark (2001) contends that media cannot affect accomplishment when it is utilised to offer learning information. The best available evidence, according to him, is that the media are merely means of delivering teaching; they have no bearing on student accomplishment, any more than the delivery truck that brings our groceries affects our dietary habits (p. 2). On the other hand, Laurillard (2007) asserts that learners who use mobile application learning find the process enjoyable, and that motivation has turned into a focus for what makes mobile application learning unique. Furthermore, she says, "Because they alter the nature of the learners and the objects of learning have, the mobility of digital technologies creates intriguing opportunities for new forms of learning" (p. 153).

The accelerating pace of mobile application learning's global deployment is demonstrated by earlier research, but studies of this phenomena as a whole have not addressed this issue. In order to address this, the following sections discuss mobile application learning in various situations.

2.5 Mobile application learning around the World

The trend towards mobile application learning has been sparked by the pervasive usage of mobile applications worldwide. Hwang & Tsai (2011) divided the era into two time slots: the first five years and the second five years. They then examined the top contributing nations of mobile application learning papers from 2001 to 2010. Over the first five years, the United States provided the most papers, followed by Taiwan and the United Kingdom. Taiwan did better than the US and the UK in the next five years.

Furthermore, compared to the first five-year period, more nations donated during the second one. Malaysia was not one of those nations, though. Wagner (2005) reviews the state of mobile apps in the US and gives instances of how useful they are for improving people's lives. One such example is the tracking of survivors following the 2004 Java tsunami. Additionally, he anticipates that the current state of mobile apps will change. In his opinion, learning about mobile applications will be made easier by the dynamic and evolving nature of mobile applications as well as wireless networks, hardware, and service costs.

The following global examples of mobile application learning efforts clearly imply that mobile application learning is starting to become more practical. Feedback from these initiatives helped make mobile application learning and teaching more popular in educational settings. It also inspired several educational institutions to take mobile application learning and teaching into consideration, change their e-learning to m-learning strategies, and formalise the informal practices.

In a UNESCO publication, Fritschi and Wolf (2012) use quantitative and qualitative data from a survey, in-depth literature analysis, and one-on-one interviews to examine mobile application learning in North America, the United States, and Canada. The study

was supported by corporations marketing mobile apps in kindergarten through postsecondary instruction, as well as state, provincial, and municipal representatives. The results of the interviews indicated the necessity of creating a professional development programme that is integrated into the workplace and concentrates on pedagogical techniques for enhancing education through the use of mobile applications, in addition to teaching students how to use them. They come to the conclusion that mobile application learning is getting greater attention and has the potential to raise student success.

Furthermore, there are more options for mobile application learning since there are more and better mobile applications available. Equity is a crucial element of any mobile application learning strategy in North America. Regardless of financial situation, all students have to have access to comparable gadgets and online services. In addition, district, state, and federal policies and efforts, as well as local and municipal leadership, can have a significant impact on the adoption of mobile application learning. The paper proposed policy changes and reforms to specifically address the use of mobile application learning because, despite the fact that mobile applications are widely owned and used in the USA and Canada, mobile application learning is only mentioned in the broader context of education technology and access. Known for its research, design, implementation, and assessment of breakthroughs and technology, Stanford is a preeminent American institution. One of the most significant innovations is the use of mobile applications, which are being developed through a number of projects, including the PocketSchool (Kim et al., 2011), the Remotely Operated Science Experiment (ROSE), the Stanford Mobile Inquiry-based Learning Environment (SMILE) (Seol et al., 2011), and Design-Based Learning (DBL). Students who took part in these programmes' pilot studies were engaged, goal-oriented, and gave encouraging

comments. Stanford offers websites and mobile applications to assist teachers and students in accessing valuable materials in addition to doing research on mobile applications.

Comparably, Harvard introduced the Harvard Mobile application in September 2010 as part of a university-wide effort to enhance the mobile interactions of visitors, staff, instructors, students, and neighbours with the Harvard campus and community. Through the application, prospective students may explore Harvard's 375-year history and learn about living on campus now through the Harvard Yard Tour, which is compatible with any web-enabled smartphone. Harvard Schools has its own mobile applications. Other American universities have also recently created their own apps.

"The European Commission has for many years played an outsized role in funding early mobile application learning projects and where the United Kingdom (through projects like MoLeNET) has been a real leader, with a few notable activities also occurring in Denmark and the Netherlands," write Trucano, Iglesias, and Liu (2012) in the World Bank Blog (para. 9).

Researchers in Europe have worked on large-scale mobile application learning initiatives during the past 20 years. MoLeNET is a unique collaborative effort that aims to promote mobile application learning in the further education sector. It is the largest and most diversified deployment of mobile application learning in the UK (Petley, Attewell, Savill-Smith, 2011). Another project is the handler from the University of Birmingham (Sharples, 2000). The HandLeR initiative introduced the concept of learning from any location outside of the classroom and throughout life, despite technological restrictions at the time.

The E-learning Lab of Shanghai Jiao Tong University (SJTU) has offered undergraduate courses on mobile applications (as exemplified by cell phones and PDAs) through the mobile application developed by the E-learning Lab (Wang, Shen, Tong, Yang, & Han, 2005). In China, where the budget is too limited to supply all higher education institutions with modern hardware and software (Cui & Wang, 2008). Therefore, in the industrialised world, mobile application learning mostly concerns pedagogy, technology, or development; in the less developed world, it primarily concerns problem-solving and more accessible education. According to UNESCO's most recent report (2012), "mobile technology has proven to be an effective channel for providing inexpensive distance education in some Asian countries" (p. 15). The report focuses on mobile application learning in Asia. Underprivileged and semiliterate individuals in India receive basic medical education through mobile phones regarding popular regional topics like an epidemic and how it spreads, according to the ZMQ project (Traxler & Kukulska-Hulme, 2005).

In Asia, mobile application learning has been extensively studied. However, a UNESCO report (2012) states that the countries in this region can be divided into three groups: those with developed mobile markets (like Malaysia, Taiwan, Singapore, and South Korea) where mobile application learning is integrated into national ICT policies; those with developing mobile markets (like India, Bangladesh, and the Philippines) where mobile devices are used for informal and distance learning; and those with emerging markets (like Afghanistan and Nepal) where mobile application learning is uncommon. As a result, mobile application learning typically has an impact on English language learning and is connected with the adoption of mobile phones and ICT infrastructure. A comparative analysis between developed and developing nations will demonstrate the significant influence of mobile applications on language learning.

2.6 English Language Learning

According to Crystal (2003), English is a universal language that is also used in academic discourse, the internet, and worldwide business and trade (Education First, 2014; Graddol, 1997). A quarter of the world's population, or 1.75 billion people, speak English at a practical level, according to the British Council (2013). English is also thought to be essential for success in the workplace and in school (O'Neill, 2014). As a result, the importance of teaching and mastering English as a language is growing daily.

According to Al-Seghayer (2011), the introduction of English into Malaysia was a dynamic component that facilitated the communication of the requirements and policies to the outside world. The book discussed the history and current situation of English instruction in Malaysia. "Furnishing the students with at least one of the living languages, in addition to their original language, to enable them to acquire knowledge and sciences from other communities and to participate in the service of humanity" (AlHajailan, 2003, p. 23) is how the Policy of Education generally stated the goals of English language learning in Malaysia. However, studies show that learning English is challenging for Malaysian students and that traditional learning methods do not provide the desired outcomes (Nadzrah & Kemboja, 2009; Ratnawati & Ismail, 2003; Zaini & Koo, 2009). Malaysia was placed 59 (Very Low Proficiency) out of 63 nations in the EF EPI (Education First English Proficiency Index) study (2014). The study was based on assessments of 750,000 individuals, aged 18 and above, from all over the world in 2013.3 (p. 23).

Apart from the United Arab Emirates, which came in at number 32 (Low Proficiency), the Middle East and North Africa is the region with the lowest level of English proficiency worldwide. The difficulties faced by Malaysian students learning English

were discussed by Liton (2012). These difficulties included the disparities between Malay and English in terms of grammatical functions, linguistic elements in sentences, idioms and phrases, parts of speech, and oral expressions, despite differences in the socio-cultural backgrounds from which these two languages originated as well as semantic and syntactic differences. Liton (2012), however, notes that since Chinese students are learning English with all of the significant linguistic and sound system distinctions between Mandarin Chinese and English, this fact is no longer a barrier. China's English proficiency improved by 2.53 points in the fourth edition of the EF EPI Report (2014), despite the many differences between Mandarin Chinese and English. In contrast, Malaysia's English proficiency decreased by 8.57 points when comparing the scores of both countries in the first and fourth editions of the report (see Table 2.1).

Table 2.1
EF EPI Country Scores

Country	EF EPI 1st Edition	EF EPI 4th Edition	Score Change	Rank
Malaysia	48.05	39.48	-8.57	59 (very low proficiency)
China	47.62	50.15	+2.53	36 (low proficiency)

Source: EF EPI Report - English Proficiency Index (2014)

Wang (2008) argues that the development of the English language in China has resulted in a rise in the number of students studying the language. This is because the language is meant to equip people with the necessary skills for pursuing higher education in China, opportunities for education abroad, career development, job promotion, and functioning in a globalised context. According to Wang (2008), there are more than 300 million English language learners in China. Although Malaysia's programme of encouraging English language learning education has somewhat similar goals to China's, it does not provide the same outcomes (Zaini & Koo, 2009).

After comparing the situations in China and Malaysia, it can be concluded that even though Malaysian students appear to have an easier time learning English than Chinese students do, China nevertheless did better than Malaysia in terms of English competence. As a result, teaching English is difficult in Malaysia at all levels, particularly in higher education. Various approaches to teaching and learning the language should be explored. Even yet, it would take time if the government opted to construct additional universities using brick and mortar. Moreover, finding competent English language teaching staff members is a challenging problem, even if the facility can be completed quickly. Thus, measures must be put into action as a critical remedy.

By establishing a mixed learning environment, "mobile application learning" refers to the use of portable mobile applications to enhance English language learning. Authors refer to the use of mobile applications in English language learning as MALL (Mobile Assisted Language Learning), as will be explored in a few research below. Some studies go beyond the traditional educational framework for learning English. Bahrani (2011), for instance, contends that MALL can be extremely helpful in assisting individuals who wish to learn the language but are unable to enrol in classes as well as those who simply want to survive in a nation where English is the primary language. Kukulska-Hulme (2009) examines the potential benefits of mobile application learning and questions if this approach will alter the way that languages are taught and acquired.

The author concludes that the challenge lies in developing and designing mobile application learning that clearly identifies what is best learned in the classroom, what should be learned outside, and how these two modes are connected. He notes that "what makes mobile technology so intriguing is that it has an affinity with movement between

indoors and outdoors, across formal and informal settings, allowing learners to lead at least some of the way" (p. 164).

The Jahangirnagar University of Bangladesh also uses mobile phones as a teaching tool to educate students how to utilise prepositions correctly in English (Begum, 2010). Given that few people in Bangladesh own a personal computer and that the number of mobile phone users has increased significantly, the research findings showed that mobile phones offer a great deal of promise as teaching tools (ITU, 2011). The findings showed that nearly every student who took part in the study possessed a mobile phone, with the exception of 5% of female students who thought using a phone was disruptive and a kind of social abuse. Although 60% of kids knew how to utilise every feature on their devices, they mostly used them for communication not language learning with instructors, parents, and friends. Begun (2010) provides assurance that the difficulties posed by utilising mobile apps for education may be overcome by the genuine efforts of educators and authorities, as well as by challenging the conventional viewpoint that regards cell phones as nothing more than a distraction in the classroom.

Although it addressed the topic in the context of learning French, the study by Jaradat (2014) is noteworthy in this part since it examines the usage of mobile application learning in Arab nations. According to the findings, 43% of students agreed that mobile applications had affected how individuals do activities, while 18% said they were unfamiliar with technology use in general. Additionally, 39% of students said that they liked using their phones for learning over other mobile applications, while 37% said that they preferred using laptops. Additionally, 90% of students expressed satisfaction with the way they were able to learn French using mobile applications, 91% expressed willingness to continue studying through mobile devices, and 74% said that utilising

mobile applications in the classroom had improved communication between them and their teachers and fellow students. Additionally, pretest and post-test results were analysed to assess how students' learning performed before and after using mobile application learning. The pre-test and post-test had mean scores of 65.8 and 75.6, respectively. The substantial rise in the mean testing score by 9.77 points ($t = -9.07$, $p < .001$) indicated an improvement in learning. Jaradat (2014) came to the conclusion that students were utilising their mobile devices for online browsing for amusement, social networking, and reading both within and outside of the classroom, regardless of their attitudes or perceptions regarding mobile technology in language learning.

Using a design-based research methodology and the enormous popularity of social networks, Al-Shehri (2012) identified suitable design principles based on student input that may be used for mobile language learning. These ideas were developed and applied within the framework of social media. The research included thirty-three King Khalid University English language learners pursuing a Bachelor of Education degree. In a Facebook group set up specifically for this study, students were expected to use their phones to share resources. They had to submit real images and videos that they had taken with their phones, leave comments, or strike up a discussion by posing questions to the group. Students were told that social or cultural features and events should be reflected in the content utilised on Facebook. Additionally, students had to make connections between the Facebook contextual resources and the linguistics assignments they completed in class. In addition to watching the Facebook group activity, the author used qualitative research methods such as stimulated recollection sessions and focus groups both before and after the task. The use of social media increased students' interest in language learning and made them feel more pleasure rather than bored with their studies, according to the findings. Students also felt happier without experiencing

any destruction and gained "hedonic motivation" for better engagement with the learning task, which supported and encouraged student collaboration and helped them develop more advanced skills like critical thinking and decision-making. Furthermore, by contextualising language learning through the use of Facebook and mobile phones, more student-centered learning was preserved in a relaxed and informal community of practice.

According to Al-Shehri's (2012) results, Kim, Rueckert, Kim, and Seo (2013) created five class projects to assist 53 postgraduate (Masters) students studying TESOL at a major US institution. The students came from a variety of linguistic backgrounds and wanted to practice learning languages on the go with their mobile devices. According to information gathered from pre-study, post-study, and student reflections for class projects, mobile applications have the potential to offer novel learning opportunities where students may participate in educational activities more frequently, anywhere, and at any time. Furthermore, after participating in these initiatives, students' perspectives on mobile application learning had substantially evolved.

In contrast to the instructor-led mobile application learning projects of Al-Shehri (2012) and Kim, Rueckert, Kim & Seo (2013), Steel (2012) described the experiences of 134 language students at an Australian university who enhanced their language learning outside of class by using mobile applications. Ten foreign languages, including French, Japanese, Spanish, German, Chinese, Korean, Indonesian, Russian, Italian, and Portuguese, were represented in the sample. Students emphasised the benefits of learning on-the-go, time efficiency, portability, accessibility, and ease of use while utilising mobile applications. Additionally, students highlighted the benefits of using

mobile applications primarily for vocabulary study as well as reading, writing, grammar, and translation assignments for more focused language learning benefits.

In a similar vein, Muhammed (2014) employed focus groups to gather information from twenty Sulaimani University in Iraqi English language learners in order to ascertain the degree to which mobile application learning influences English learning. The findings demonstrated that 99% of the participants made extensive use of their mobile applications to further their English language learning using a variety of apps pertaining to vocabulary, grammar, language skills, and preparation for international exams like the TOEFL.

As previously mentioned, Bozdoğan (2015) used a qualitative meta-analysis approach to examine 32 MALL research articles published between 2010 and the first half of 2015 in order to highlight the current research trends in MALL and support the favourable image of employing mobile applications in language acquisition. More encouraging findings about the efficacy of mobile application learning in the context of language instruction at all levels were brought to light by this review. Taj, Sulan, Sipra, and Ahmad (2016) also carried out a meta-analysis of 13 studies that were published between 2008 and 2015 in order to determine the efficacy of MALL and compile the knowledge that has been gained thus far. Results showed that utilising mobile applications to learn English is beneficial, with an overall impact size of 0.8, which is regarded as a big one.

Similar findings were obtained by Sung, Chang, and Yang (2015) when they expanded the scope of a meta-analysis to include unpublished doctoral dissertations and peer-reviewed journal articles written between 1993 and 2013. This resulted in a significant improvement in student achievement and a moderate effect size of 0.55 for MALL.

According to the results, 70.7% of the students who used a mobile device outperformed the non-users in terms of performance, which may provide strong support for the usefulness of mobile applications for language learning.

There are certain research papers that express a different, contradictory perspective, despite the fact that many have shown and in some cases proven that mobile application learning may successfully increase language acquisition. Additionally, the pupils that use computers get higher grades. Thus, language learners showed reduced preference for mobile phones. In a subsequent piece, Stockwell (2010) questions why students seem to feel better about using mobile applications for studying even if they may prefer desktop computers. Because the study was done in a tiny advanced English class at Waseda University in Japan, with only 11 participants, he believed that his earlier work had relied too heavily on sparse data.

In certain research projects, like those carried out by Arús-Hita, Rodríguez-Arancón, & Calle-Martínez (2013) and Rodríguez-Arancón, Arís-Hita, & Calle-Martínez (2013), the assessment of the current mobile applications for English language learning was centred on how well they could develop the capacity to create educational applications for English language learning within the framework of the Social Ontology-based Cognitively Augmented Project, which is supported by the Spanish Ministry of Science and Innovation. To execute the project, initial research was carried out.

Arús-Hita, Rodríguez-Arancón, & Calle-Martínez (2013) evaluated all English language learning applications in the first phase, concentrating on the pedagogical aspects by taking into account the applications' cognitive value, their similarity to the pedagogic goals of the SO-CALL-ME project, and, lastly, their complementarity with those goals. The second step involved selecting the top five apps that had the most

potential to direct the project's application development. These applications were then evaluated using assessment rubrics to look at their pedagogical and technological aspects in order to analyse their strengths and weaknesses.

The SpeakingPal English Tutor, Englishfeed, Learn English Audio and Video, Clear Speech, and Learn English Elementary Podcasts were the five applications. In order to conduct more research and create high-quality English language learning experiences via mobile applications, a crucial conclusion was represented by the efficient utilisation and execution of these applications' current strengths and the integration of solid pedagogy. Regardless of the pedagogical and technical features of the applications, Calle-Martínez, Rodríguez-Arancón, and Arús-Hita (2014) used a rubric for the evaluation of apps in language learning (REALL) in the third phase. This rubric was created to assess the linguistic adequacy of the same English language learning applications that were evaluated in the second phase.

Calle-Martínez, Rodríguez-Arancón, and Arús-Hita (2014) came to the conclusion that "Since only two of the five applications with the highest score in the previous pedagogic assessment achieved a reasonably good score when applying REALL, the pedagogic and technical quality of the applications does not necessarily go hand in hand with their linguistic value and adequacy for English learning." The assessment demonstrated that not all MALL apps had solid linguistic foundations sufficient for consistent language acquisition (p. 141).

Ultimately, as mobile applications are still in their infancy and are constantly evolving, any research conducted on this topic must be comprehensive because it is still a relatively new area of study for English language learners. Within the span of two or three years, the range of approaches and learning activities using MALL is expanding

from a purely teacher-learner, text-based model to one that is beginning to support multimedia, collaborative listening and speaking activities and to allow learners to construct knowledge to solve problems and fill information gaps, according to Kukulska-Hulme and Shield's (2008) overview paper (p. 283). Additionally, they point out that the gadgets used in Mobile Assisted Language Learning (MALL) allow for novel methods of learning that are not limited by time or location, which sets it apart from Computer-Assisted Language Learning (CALL). It appears that MALL is run by and for learners, not teachers, even if the majority of its programmes are teacher-led. Furthermore, teachers, not institutions, are in charge of and belong to MALL when it comes to instruction.

Therefore, prior research indicates that in-depth learner and teacher profiles should be developed before devoting time and resources to such MALL programmes. It is clear that "mobile application learning is showing itself to be a creative environment, but it's critical to understand that social impact in the utilisation of new mobile and wireless technologies will be critical to mobile application learning's success. Only recently have the difficulties of mobile application learning with varied student demographics and on a broader scale come to light (Kukulska-Hulme, 2007, p. 1). Furthermore, Kukulska-Hulme (2009) argued that conflict may arise because the younger generation of learners is adopting new mobile applications for themselves, regardless of whether their instructors adopt them or not, informal education. This is because we are living in a new era of the global economy that affects higher education and where learners are the consumers whose needs should be addressed.

As a result, the studies that address students' and instructors' acceptability and preparation for mobile application learning are reviewed and discussed in the part that follows.

2.7 The acceptance of mobile applications in language classroom among English language learners

It is still difficult to implement such technologies because of social, cultural, and institutional factors, despite the fact that recent research indicates that students' perceptions of mobile application learning are positive and numerous studies have demonstrated the effectiveness of mobile applications in learning and teaching (Al-Fahad, 2009; Rogers et al., 2010; Venkatesh, Nargundkar, Sayed & Shahaida, 2006; Wang et al., 2009).

Research varies based on a number of factors, including: the population being studied (students, teachers, stakeholders, and administrators); the context (university, general education, and work-based learning); the discipline (math, science, business, computing, etc.); the mobile devices (cell phones, PDAs, MP3 players, tablets, etc.); and the models utilised to look into acceptance and preparedness (the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM) the Theory of Planned Behaviour (TPB).

Many millions of people use a vast array of potent portable computers and mobile apps while they go about their everyday lives, work, study, and even go to bed. People in academia and industry have realised that these technologies would help socio-economic and cultural growth in diverse ways. As a result, the internet, m-commerce, m-banking, and eventually m-learning have all emerged.

Upon observing the proliferation of innovative mobile applications, mobile operators came to the realisation that their business's success hinged on comprehending consumer issues and pinpointing the elements that encourage mobile internet usage. For example, upon seeing that the number of m-internet users in Korea was increasing exponentially, Cheong and Park (2005) investigated the human factors underpinning individual behavioural intents to use m-internet in Korea. To properly account for the m-internet on the original Technology Acceptance Model, the authors created a more thorough version of the model. The findings showed that is the most important element in determining people's behavioural intention to use mobile internet. Mobile apps with internet access are no longer considered a luxury in the majority of industrialised nation-states; they have become basic commodities (Liu & Li, 2010).

Thus, mobile commerce is being aided by the quick development of contemporary mobile apps as well as the rising rate of mobile internet adoption (Jen-Her Wua & Shu-Ching Wang, 2005). When businesses realised they had to keep up with the worldwide expansion of m-commerce in order to stay competitive, it became imperative to comprehend the characteristics associated with m-commerce acceptability. In order to discover and validate the elements that impact consumers' adoption of mobile commerce, Wua and Wang (2005) developed the extended Technology adoption Model (TAM2) and merged it with the Innovation Diffusion Theory (IDT), perceived risk, and cost. The results showed that behavioural intention influences actual usage.

While there is a wealth of data on technology acceptance that indicates people's propensity to embrace information systems, each information system is different, necessitating further study. In terms of mobile banking, Luarn and Lin (2005) assert that a trust-based construct is the extra variable needed to forecast customers' intentions

to utilise mobile banking more correctly. Luarn and Lin (2005) expand the TAM's applicability to a mobile banking context by incorporating two resource-based constructs perceived financial cost and perceived self-efficacy and one trust-based construct perceived credibility into their research model. The TAM is based on the Theory of Planned Behaviour (TPB) and the TAM. They gathered information from 180 respondents to test their concept, ranging in age from 17 to 48, who attended an e-commerce exposition and symposium held in Taiwan.

In the context of higher education, Derakhshan (2012) also investigated how instructors and students use portable devices, concentrating on their opinions of the value of certain LMS features that are present in desktop versions but absent in mobile versions. Two online questionnaires were used to gather the data: one was given to Oklahoma State University students (335 out of 4,400 graduate and undergraduate students) and the other to faculty (52 out of 600 professors). The findings reveal some intriguing parallels and divergences between the faculty and student perspectives on the value of LMS features. For instance, both parties think that the course schedule is a crucial component. However, while all students perceive grades and feedback to be the most important elements, university instructors do not think that a mobile learning management system should have these capabilities. Additionally, this also applies to information supplied through an LMS: academic members are less interested in this tool than students are. These findings suggest that while faculty members favour more conventional approaches to teaching and learning and are hesitant to embrace portable devices as teaching aids, students are excited about a mobile learning management system.

Transportable devices, mobile devices, and wearable devices are the three categories into which mobile devices may be categorised (based on factors such as weight, shape,

components, capacity, and connection) (Mehdipour & Zerehkafi, 2013). Smartphones and tablets have become the most popular mobile technology in terms of computing and communication. Tablets and smartphones are expected to take the lead in mobile computing (Adobe, 2013). According to this survey, "Internet users who browse on tablets and smartphones view 70% more pages per visit (Adobe, 2013)."

Unfortunately, as many studies primarily focus on students, this is not always the case. For example, Lowenthal (2010) limited his research to university students (from one of the American universities' business schools) and looked at the factors that influence students' behavioural intention to use mobile application learning technology. This research was based on the Unified Theory of Acceptance and Use of Technology (UTAUT) model. In his conclusion, he demonstrated that age and gender had no bearing on the positive, strong, and substantial correlations between performance expectation, effort expectancy, and the behavioural intention of utilising mobile application learning.

Donaldson (2011) investigated the determinants associated with the behavioural intention to use mobile application learning and mobile library resources among community college students enrolled in two-year courses at North Florida Community College. They used the same model (UTAUT) but arrived at a slightly different conclusion.

The variables influencing students' intents to adopt mobile application learning at Brunel University, UK's School of Information, Computing, and Mathematical Science were investigated by Abu-Al-Aish (2013). By removing the variables "use behaviour" and "facilitating conditions" and adding "quality of service" and "personal innovativeness" to the UTAUT's structure, Abu-Al-Aish (2013) created a model that

was also based on UTAUT. A questionnaire was used to get information from 174 individuals. The results, in line with other studies, showed that the behavioural intention to utilise mobile application learning was significantly predicted by performance expectancy, effort expectancy, quality of service, personal innovativeness, and the effect of lecturers (social influence). All these indicators were shown to be moderated by experience, with age and gender being removed from the model. Of the population that was targeted, this model was shown to be able to explain 55% of the Intent to Use mobile application learning.

Seliaman & Al-Turki (2012) investigated how people utilised mobile applications for learning activities such as sharing and gaining knowledge, accessing course materials and discipline-related information, and other learning activities using an enhanced Technology Acceptance Model (TAM). A questionnaire that was solely given to male students at King Faisal University's College of Computer Science and Information Technology was used to gather data. The study hypotheses were tested using Pearson correlation analysis on 55 valid replies. After outlining the study's limitations namely, that it only included male students from a single university institution and used a basic correlation analysis the authors ended with the findings.

Similar to this, Chung, Chen, and Kuo (2015) expanded the Technology acceptability Model (TAM) by include two more constructs: compatibility and self-efficacy, in order to determine the variables influencing the acceptability of mobile vocabulary learning resources by Taiwanese college students studying English. The researchers used a questionnaire to gather information from 84 students who were studying English. Perceived utility, perceived ease of use, self-efficacy, and compatibility were shown to

explain for 71% of the variance in behavioural intention to utilise mobile English language learning resources, according to regression analysis.

Yang (2013), Kang et al. (2015), Lewis et al. (2013), and Raman & Don (2013) carried out the most recent investigations that are relevant. Lewis et al. (2013) examined how Southeastern University's business faculty members adopted and accepted new and old classroom technologies using the Unified Theory of Acceptance and Use of Technology (UTAUT). Based on earlier studies, an online survey was created, and information was gathered from participants who made up 51% of the population. The findings demonstrated that performance expectation, effort expectancy, social influence, and habit all had a major impact on instructors' usage and acceptance of technology in the classroom.

Tests evaluating the moderating effects of gender and age revealed that gender had a substantial moderating impact but not age. 66% of the variation in behavioural intention was explained by the UTAUT; when moderators were added, this number rose to 78%. Moreover, 29% of the variability in technology usage with moderating interactions and 27% without them was described by the research model (UTAUT). Lewis et al. (2013) came to the conclusion that more investigation is required to fully examine the UTAUT's potential in the setting of higher education.

Kang et al. (2015) investigated the elements influencing the acceptance of mobile application learning in Korean universities using the UTAUT model. The survey was completed by 325 research participants in all, who were affiliated with four institutions located in Seoul. A total of 305 cases were reviewed due to incomplete and missing data in the questionnaires. The results demonstrated that performance expectancy, social influence, and enabling conditions were significant predictors of the behavioural

intention to use mobile application learning in Korean higher education, as they accounted for 45% of the variance in behavioural intention.

Numerous research projects and publications involving the administration of surveys may be found while examining the methodologies and procedures of studies examining the preparedness and acceptability of mobile application learning.

Table 2.2
UTAUT models and moderators used by past researchers

No	Author	Year	Technology	Region
1	Abu-Al-Aish et al.,	2013	Mobile learning application	UK
2	Yang S.,	2013	Mobile learning application	China
3	Yang,	2013	Mobile learning application	China
4	Jambulingam,	2013	Mobile learning application	Malaysia
5	Almatari et al.,	2013	Mobile learning application	Malaysia
6	Nassuora,	2012	Mobile learning application	Saudi Arabia
7	Wang et. al.,All	2009	Mobile learning application	China
8	Jairak et al.,	2009	Mobile learning application	Bangkok
9	Liu,	2008	Mobile learning application	Finland
10	Y.-L. Wu et al.,	2008	Mobile (3G)	Taiwan
11	Raman et. al.,	2013	Mobile (LMS)	Malaysia
12	Yu,	2012	Mobile (Banking)	Taiwan
13	Moran et al.,	2010	Mobile (Computing)	USA
14	Zhang et al.,	2010	Mobile (Search)	China
15	Sundaravej,	2010	Mobile (Validation)	USA
16	Williams et al.,	2012	Mobile App	Australia
17	Abdulwahab et al.,	2012	Mobile (Telecom)	Nigeria
18	Alrawesh et. al.,	2012	Mobile (WBT)	Jordan
19	S Pheerap et. al.,	2014	Smartphone	UK
20	Dong-Hee et. al.,	2011	Smartphone	South Korea

However, few studies use an experimental or quasi-experimental design (Cruz, 2012) or only depend on interviews (Cheng et al., 2010; Williams, 2009). The rationale is that, in order to use the research paradigm often used, data from a huge population must be surveyed rather being put through experimental procedures.

Various study models have been modified for application in these investigations and in various settings. Established by Venkatesh et al (2012), the Extended Unified Theory of Acceptance and Use of Technology (UTAUT) model was applied in the educational setting by Lewis et al (2013), Raman & Don (2013), Yang (2013), and Kang et al (2015). Escobar-Rodríguez & Carvajal-Trujillo (2013) used the UTAUT in a different study to examine the many determinants of online airline ticket purchase behaviour. These models have all been created to identify the elements that influence technology acceptance and how intentions and actions are influenced by them.

The distinction is that although some studies, such as those by Wu, Tao, and Yang (2007) and Wang & Wang (2010), focus on the individuals using the technology as consumers, other studies, such as those by Begum (2011) and Cruz (2012), which were carried out in the field of education, view students and faculty as recipients (rather than consumers) because they receive the technology at no cost. Numerous studies' findings indicate that while it might be difficult for schools to give every student a mobile device, having mobile apps is a need and a source of motivation for student involvement in mobile application learning initiatives (Naismith et al, 2004). According to Corlett et al. (2005), it is evident that having a mobile device is crucial since students are reluctant to spend their time and money to personalize loaned devices.

Furthermore, prior research has demonstrated the significance of evaluating faculty and student acceptance and preparedness for mobile application learning globally, as this

information is important to policymakers, developers of mobile applications, instructional designers, and educational technologists. Furthermore, since the pedagogy and technology of mobile application learning and teaching are still developing, it is critical to find out what faculty and students think and believe about this approach to education. After all, while students take the initiative outside the classroom, faculty control the technology that is used in the classroom. However, the use of mobile application learning cannot be carried out only by depending on and consulting previous global research; rather, it must take into account the particular environment in which it will be implemented including students, faculty, social and cultural issues, and the available technology itself.

Following a thorough manual search of databases including Science Direct, JSTOR, SAGE Online, Elsevier, ProQuest, Wiley Inter-Science, ACM Digital Library, Elsevier, and MIS Quarterly, the literature was chosen. "UTAUT," "UTAUT2," "Technology Acceptance," "Mobile Application Learning," "Smartphone," "Technology Acceptance in Engineering Education," "Technology Acceptance in Teacher Education," "Technology Adoption," and "Behaviour Intention to Use Technology" are among the terms found in the criterion.

Table 2.3
Critical review

Must Include	Preferred
1. involve quantitative analysis	1. involve mobile technology in higher education
2. UTUAT or UTAUT2 model	2. investigate ICT devices
	3. Mobile application technology acceptance
	4. Mobile application as a learning English tool
	5. published journal article
	6. published between 2008 to 2016

The study of relevant literature demonstrates the range of research approaches that are employed to investigate the adoption of technology in various settings. To help you understand how recent ideas were developed and trace the evolution of the model utilised in the present study, these models are examined in chronological sequence in the following section.

2.8 Research Framework and Hypotheses

A new technology must be ready for and accepted in order for its implementation to be successful. Thus, for a while now, there has been a lot of study being done on user intentions and behaviours towards new technologies (Davis, 1989; Davis, et al., 1992; Igbaria, et al., 1996; Taylor & Todd, 1995b; Venkatesh et al., 2003; Venkatesh et al., 2012). Studying technological acceptability and its aspects has led to the development, application, and extension of several models and theories. Table 2.4 provides illustrations for these models.

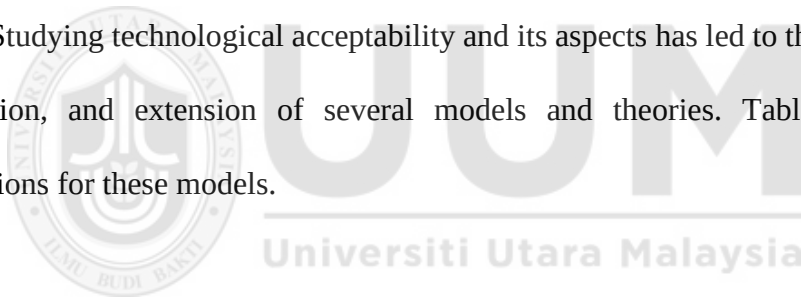


Table 2.4
List of Technology Acceptance Models

Theory/Model	Acronym	Developed By	Year
Theory of Reasoned Action	TRA	Fishbein and Ajzen	1975
Innovation Diffusion Theory	IDT	Rogers	1983
Social Cognitive Theory	SCT	Bandura	1986
Theory of Planned Behaviour	TPB	Davis, Bagozzi and Warshaw	1989
Model of PC Utilization	MPUC	Thompson, Higgins and Howel	1991
Motivational Model	MM	Davis, Bagozzi, and Warshaw	1992
Technology Acceptance Model	TAM	Taylor and Todd	1995
Combined TAM and TPB	C-TAM-TPB	Taylor and Todd	1995
Unified Theory of Acceptance and Use of Technology-I	UTAUT1	Venkatesh, Morris, Davis, and Davis Viswanath, Venkatesh, James Y.	2003
Unified Theory of Acceptance and Use of Technology-II	UTAUT2	L. Thong and Xin Xu	2012

Recently, eight earlier models of technology adoption and acceptance were included into the formulation and validation of UTAUT (Venkatesh et al., 2003). Venkatesh, Morris, Davis, and Davis's (2003) study provided an answer to the conundrum that arises when selecting one of the several models to use in order to examine technological acceptability. The UTAUT was most recently consolidated by Venkatesh et al. (2012), who took into account the model's numerous replications, applications, and expansions. To enhance comprehension of the origins and progression of the UTAUT, an examination of the eight distinct models is necessary.

2.8.1 The Theory of Reasoned Action (TRA) 1975

Fishbein and Ajzen proposed the TRA (1975). The theory of attitude is the source of this theory. TRA was "born largely out of frustration with traditional attitude behaviour research, much of which found weak correlations between attitude measures and

performance of volitional behaviours," according to Hale, Householder & Greene (2003) (p. 259). TRA makes the assumption that attitude towards the behaviour (A) and subjective norm (SN) are the two components associated with the intention to undertake a behaviour (IB). According to Fishbein and Ajzen (1975, p. 216), an individual's attitude towards a behaviour is defined as "his or her positive or negative feelings about performing the target behaviour," whereas the subjective norm is defined as "the person's perception that most people who are important to him think he should or should not perform the behavior in question" (ibid, p. 302). Based on this theory, the attitude toward a behaviour and the subjective norm can predict a person's behavior ($IB = A + SN$). The TRA model has been widely used to forecast and explain conduct in a variety of contexts. This theory has been applied extensively in the literature on technology adoption to investigate the factors that influence IT innovation consumption behaviour (Han 2003).

Numerous research have indicated that the TRA model, which focuses on attitudes and subjective norms, is effective in predicting behaviours related to information technology and computer use (Han, 2003; Mishra, Akman, & Mishra, 2014; Nink, 2003). However, because the theory behind TRA assumed that behaviours were fully aware, Ajzen (1991) noted that TRA could only describe behaviours that were consciously considered before they were really executed. However, the TRA model pays little consideration to other indicators, such as performance expectancy and effort expectancy that might have a substantial impact on behaviours. Therefore, and based on this theory, Davis (1989) developed the Technology Acceptance Model.

2.8.2 Technology Acceptance Model (TAM) 1989

The Technology Acceptance Model (TAM), which Davis created in 1989 to explain individual system use in the workplace, is one of the most significant expansions of TRA (Venkatesh et al., 2003). Fundamental factors of user approval were proposed to be perceived utility and perceived ease of use. According to page 320, perceived usefulness is defined as "the extent to which an individual believes that utilising a specific system would improve his or her job performance," whereas perceived ease of use is defined as "the extent to which an individual believes that utilising a specific system would require no effort" (p. 320). According to this paradigm, people are more likely to intend to utilise technology if it is practical and simple to use. Han (2003) draws the conclusion that TAM is suitable for assessing the adoption of any technology by people with diverse traits in a range of organisations after reading the relevant research.

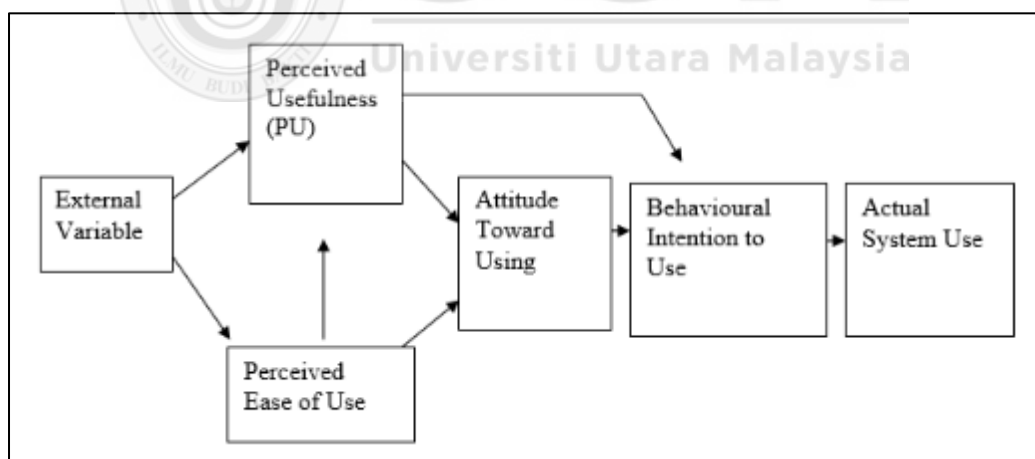


Figure 2.1 Technology Acceptance Model, (Davis et al., 1989)

Subjective norms, which are described as the perceived social pressure or social influence an individual may experience to engage in or refrain from engaging in a behaviour, are not reflected in the TAM as they are in the TRA (Fishbein and Ajzen, 1975). However, TAM did not take into account any organisational or system elements that can have an impact on an individual's adoption of technology. Instead, it suggested

external variables that can influence internal beliefs and attitudes. According to the following research, for instance, Hubona & Kennick (1996) proposed that these external variables can be person (age, gender, and innate cognitive talents), organisational (training and education), or system features (application functionality). Even though TAM appears to be a helpful model, further research has pointed out its shortcomings and come to the conclusion that it must be expanded upon and altered to include more pertinent elements and ideas.

2.8.3 Theory of Planned Behaviour (TPB) 1991

Unlike the TRA, which was used to forecast human behaviour in voluntary settings, the theory of Reasoned Action (TRA) was expanded and refined to the Theory of Planned Behaviour (TPB) by Ajzen (1991) to take into account the required situations. One major flaw in the TRA that Ajzen (1991) identified is that it cannot forecast "behaviours over which people have incomplete volitional control" (p. 181). Perceived behavioural control, a third component, was added to the TRA by the TPB model. This is defined as the degree to which an individual believes that a certain behaviour is difficult to accomplish in order to account for circumstances in which an individual lacks the resources or control required to conduct the targeted behaviour freely. According to Armitage & Conner (2001), TRA was able to predict relatively simple behaviours (i.e., those that were under volitional control) with sufficient accuracy. The purpose of integrating the perceived behavioural control variable in the TRA to TPB, according to Armitage & Conner (2001), is to provide light on potential restrictions on acting behaviour and explain why intentions do not always translate into actions.

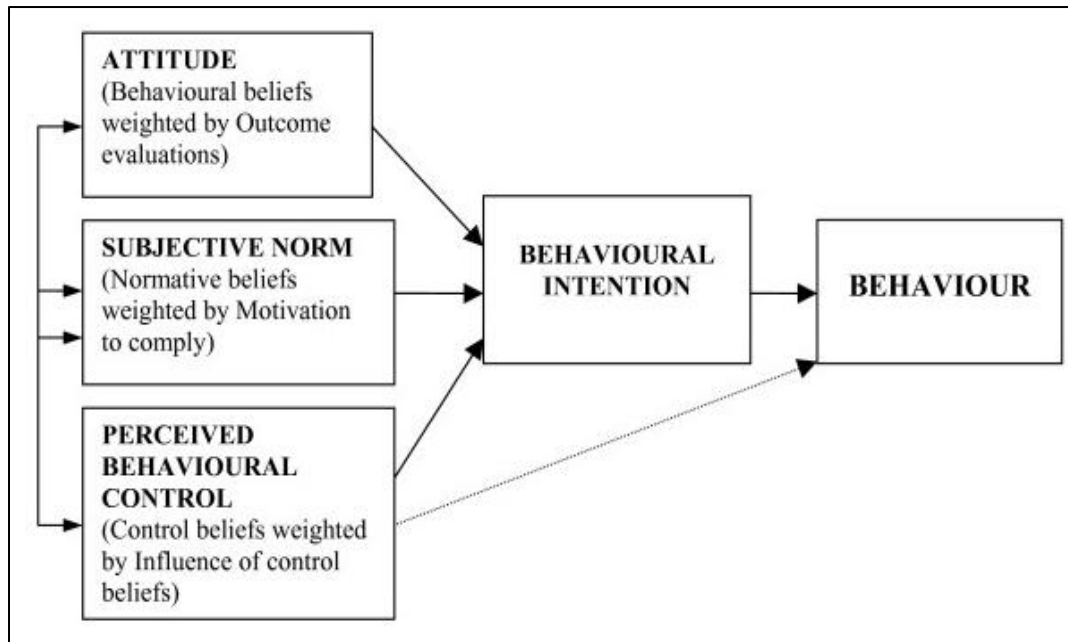


Figure 2.2 Theory of Planned Behaviour, (TPB, (Ajzen, 1991)

According to Ajzen (1991), the TPB constructs "are usually found to predict behavioural intentions with a high degree of accuracy" (p. 206). This definition enables one to anticipate and comprehend a certain behaviour within a given situation. Generally speaking, a vigorous human would desire to execute the behaviour in issue if they had a positive attitude, a subjective norm, and excellent perceived control over the behaviour in question. However, the TPB was criticised by Akour (2009) and Leong (2003) for lacking an adequate scale development and empirical foundation for research on technological acceptability. Perceived behavioural control, a novel construct in the TPB model, is replaced by perceptions of internal and external control when TPB is applied to the information technology constraints on behavior (Taylor & Todd, 1995b).

2.8.4 Decomposed Theory of Planned Behaviour (DTPB) 1995

Additionally, the constructions of TPB are broken down into several belief dimensions by the Decomposed Theory of Planned Behaviour (DTPB) (Taylor & Todd, 1995b). By dissecting the attitude structure, subjective norm, and perceived behavioural control into "multi-dimensional belief constructs," Taylor and Todd created the theory of

planned behaviour (p. 151). These dimensions include: self-efficacy, resources facilitating condition, and technology facilitating condition for perceived behavioural control; peer influence, superiors influence, and compatibility for attitudes; and ease of use, perceived utility, and compatibility for attitudes. According to Taylor and Todd (1995b), "the model becomes more managerially relevant, pointing to specific factors that may influence adoption and usage" (p. 151), when these beliefs are broken down. Nevertheless, they came to the conclusion that DTPB is more effective than TPB in determining use intentions because of its unique multi-dimensional belief constructions, which offer a better observation of the variables associated with IT usage intentions.

Numerous research have shown that the multidimensionality of DTPB's components contributes to its predictive value (Sadaf, Newby, & Ertmer, 2012; Shih & Fang, 2004; Taylor & Todd, 1995b). However, the DTPB may need to be modified and expanded to accommodate more variables depending on the context and technology addressed.

2.8.5 Combined TAM and TPB (C-TAM-TPB) 1995

By fusing the perceived usefulness component from the TAM with the predictors of the TPB model, Taylor and Todd (1995a) created a hybrid model. Drawing on student data acquired through the computing information resource centre, Taylor and Todd (1995a) discovered that the C-TAM-TPB, which included experience as a moderating variable, was a highly suitable model to describe user behaviours related to the adoption of new technologies. The combined model is better than the TPB and the TAM in explaining behavioural intention, according to the results of many research, including Chang & Chang's (2009). Moreover, Samaradiwakara & Gunawardena (2014) said that the C-TAM-TPB is a suitable model of IT usage for users who are both novice and

experienced with a technological system when experience is taken into account as a moderating component. They discovered that, even in circumstances with comparable structures, moderators can have a substantial impact on the explanatory power of all technology acceptance models.

2.8.6 Social Cognitive Theory (SCT) 1995

Compeau and Higgins (1995) extended the Social Cognitive Theory (SCT), one of the most well recognised and scientifically supported explanations of human conduct, to the domain of computer use. According to social cognitive theory, people's continuous self-influence motivates and controls their conduct (Bandura, 1991). Compeau and Higgins (1995) examined the relationship between affective factors (anxiety and affect), cognitive factors (self-efficacy, performance-related outcome expectations, and personal outcome expectations), and usage in their developed model. Some of the constructs included in the SCT were used in this investigation. Compeau and Higgins (1995) created and assessed a measurement based on the proposed model by surveying managers and professionals in Canada and utilising a regression-based technique (Partial Least Squares PLS) to analyse the structural model. They discovered that the model explained 32% of the variance in computing use behaviour overall. The findings showed that, in comparison to the other significant effects of result expectancies (particularly those pertaining to work performance), emotion, and anxiety, self-efficacy emerged as the most potent predictor of consumption.

Ratten (2013) asserts that the advantage of social cognitive theory over other models and theories is its ability to integrate analysis at both the individual and organisational levels. This means that it takes into account technological innovation that is sometimes required by organisations and not always under the control of users. The remaining 68%

of unexplained variance in use behaviour (Compeau and Higgins, 1995) motivated more research to be done in order to examine other factors and suggest models that would explain user behaviour, notwithstanding the benefits of the SCT model.

2.8.7 The Extended Technology Acceptance Model (TAM2) 2000

In order to explain perceived utility and usage intentions in terms of social influence and cognitive instrumental processes, Venkatesh and Davis (2000) created TAM2, which was an extension of TAM. This was done by adding subjective norms. Using longitudinal data from four distinct systems at four different organizations two involving voluntary usage and the other two having required usage the expanded model was validated.

The first organisation was a medium-sized manufacturing company, according to Venkatesh & Davis (2000), where 48 floor supervisors were given access to a proprietary system for their daily tasks. In the second, employees of the personal financial services department of a sizable financial services company were requested to transfer all present mainframe activities to a Windows-based environment. The third was a small accounting services company with 51 staff members who switched from a paper-based and DOS-based client account management system to a Windows-based one. The fourth company was a tiny, global investment banking firm whose staff members were trained on a new technology to help with portfolio creation and analysis for foreign stocks.

The model's constructs were measured by Venkatesh & Davis (2000) at three distinct time intervals inside each organisation: prior to implementation, one month after implementation, and three months after implementation. At all three sites of

measurement, all four organisations provided significant support for the TAM2. According to regression analysis, the TAM2 explained between 37% and 52% of the variance in usage intentions across the four trials, and the correlations between usage behaviour and intentions were found to be between .44 and .57 in each study throughout the course of the three implementation points.

TAM2 distinguishes between required and optional usage, in contrast to TAM. Thus, when usage was required, Venkatesh & Davis (2000) discovered a clear relationship between subjective norms and usage intentions. Conversely, in cases when usage was voluntary, there was no direct impact of subjective standards on usage intentions. But according to Donaldson (2011) and Marshall (2008), TAM2 makes the assumption that users have access to the technology or information system and ignores potential usage barriers, such as important outside variables that may affect the user's perceptions of the technology's utility, usability, or subjective norms. For instance, the cost of the devices, the cost of internet connectivity, and the necessary setup might all be prohibitive when it comes to mobile applications for teaching and learning. Numerous research were carried out in response to this in order to suggest adjustments and alterations to the original TAM or TAM2. The Unified Theory of Acceptance and Use of Technology (UTAUT), which was proposed by Venkatesh, Morris, Davis, and Davis (2003), is the most well-known of these changes.

2.8.8 Unified Theory of Acceptance and Use of Technology (UTAUT)

Scholars have been creating and evaluating models to better understand the adoption process of information technology for over thirty years. These models are extensively implemented, expanded upon, and employed. Venkatesh, Morris, Davis, and Davis (2003) tested the constructs of each of the earlier models by examining the literature on

user acceptance and conducting an empirical comparison of the models and their extensions in order to develop and validate the UTAUT. After that, the UTAUT model was tested using the original data, and it was discovered that, in contrast to the eight separate models, which each explained between 17% and 53% of the variance in user intention to use information technology, the UTAUT model performed better and explained 69% of the variance. Afterwards, UTAUT was validated using data from two other organisations, yielding comparable outcomes and accounting for 70% of the variation in users' intentions to utilise IT. As a result, UTAUT emerged as the top model that offers managers a helpful tool for determining the possibility that a technology introduction would succeed. Additionally, UTAUT aids in understanding the factors that influence acceptance so that interferences, marketing campaigns, and training may be directed towards user groups that might be less inclined to embrace and utilise new technology.

According to Venkatesh et al. (2003), the unified theory suggests that four fundamental constructs performance expectancy, effort expectancy, social influence, and facilitating conditions are directly responsible for determining usage intention and behaviour. The impact of these constructs on behavioural intention and usage is moderated by gender, age, experience, and voluntariness of use. Subsequent research has yielded evidence-based results that indicate the UTAUT model outperforms other similar theories and models in producing a better understanding of behaviour intentions and the usage of new technology (Wu, Tao & Yang, 2007). Thus, "since its original publication, UTAUT has served as a baseline model and has been applied to the study of a variety of technologies in both organisational and non-organizational settings (Venkatesh et al. (2003) (p. 158).

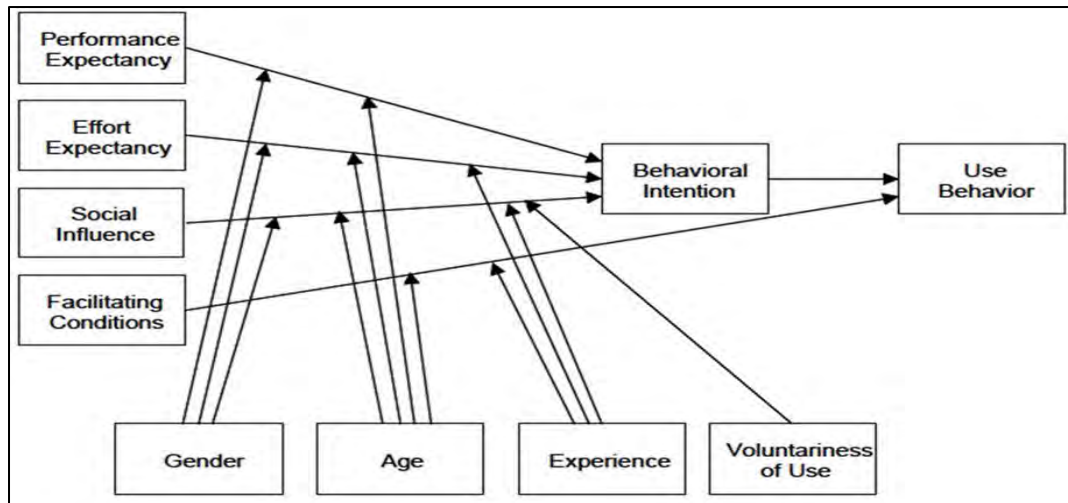


Figure 2.3 UTAUT model, (Venkatesh et al 2003)

2.8.9 Unified Theory of Acceptance and use of Technology UTAUT2

The UTAUT1 model was adjusted by Venkatesh et al. (2012) in light of their research's findings from Hong Kong. In order to propose the new UTAUT2 model, they employed three novel constructions. As seen in Figure 2.4, these three new constructs were Hedonic Motivation, Price, and Habit. According to Venkatesh et al. (2012), the recommended modifications to UTAUT2 demonstrated that 50% of the variance in technology usage and 70% of the variance in behavioural intention were explained (Guinness, 2015; Raman & Don, 2013; Slade et al., 2013).

After continuously improving the first UTAUT model, (Venkatesh et al., 2012) created the UTAUT2 model. The primary goal of UTAUT2's development was to accommodate new conceptual frameworks that might more aptly describe the new, emerging technologies giving rise to novel applications of consumer technology. According to Venkatesh et al. (2012), understanding technology adoption and use required theories that highlighted explicit context and found pertinent determinants. According to Johns (2006), by establishing new relationships, new contexts might

encourage changes in technology acceptance theories and refute previously hypothesised relationships as being insignificant.

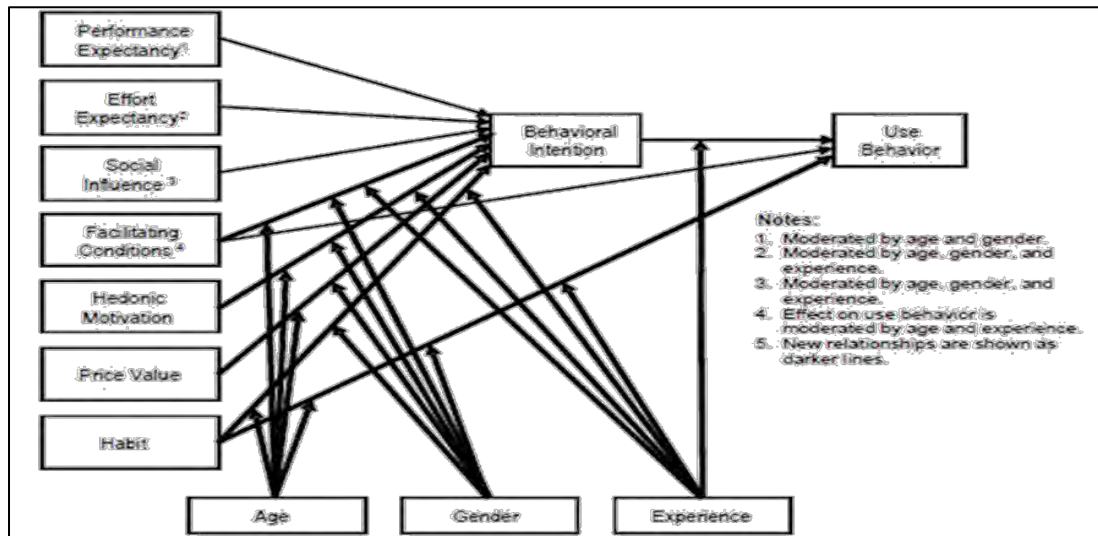


Figure 2.4 UTAUT2 model, (Venkatesh et al 2012)

Numerous research have extended the constructions and frequently added new constructs to the UTAUT1 or UTAUT2 models. The majority of research studies that employ these models adapt their findings to fit their particular study's framework. The UTAUT2 model has also been expanded by this study to better fit the context of evaluating a student's admittance into a university cohort.

2.9 UTAUT2 Constructs and Moderators

The UTAUT2 model, which predicts the eighth dependent variable construct using seven primary independent determinants, is incorporated into this study. The behaviour intention to use mobile applications as instruments for learning English is the dependent variable construct. Researchers may also examine modifiers that either limit or magnify the impact of core determinants using the UTUAT2 model. The following are the seven main constructs that affect a person's intention to utilise a technology:

1. **Performance Expectancy (PE):** the degree to which using technology is expected to enhance performance.
2. **Effort Expectancy (EE):** the degree of ease associated with the use of technology.
3. **Social Influence (SI):** the extent to which the user is influenced socially in his use of technology.
4. **Facilitating Conditions (FC):** refers to the resources and support available to use technology.
5. **Hedonic Motivation (HM):** the pleasure derived from using the technology
6. **Price (PR):** cognitive trade-off between perceived benefits of using technology and the costs of using them.
7. **Habit (HA):** the extent to which the user believes technology use is instinctive or habitual.

2.9.1 Performance Expectancy

The degree to which a student expects that using mobile applications would enable him to complete the various academic duties in an educational setting is known as performance expectation. Performance expectation is the most robust UTAUT2 model construct out of all those that evaluate technology adoption and utilisation (Pahnila, Siponen, & Zheng, 2011; Venkatesh et al., 2003). Performance Expectancy is the best predictor of technology adoption and usage behaviour, according to a number of contemporaneous research studies (Adell, 2010; Alrawashdeh et al., 2012; Oshlyansky et al., 2007; Pahnila et al., 2011; Raman & Don, 2013; Venkatesh et al., 2012; Yu, 2012).

Students anticipate their mobile device to enhance their academic performance and English language skills when they use the programme (Yang, Chiang, Liu, Wen, & Chuang, 2010). According to AlAwadhi and Morris's (2008) research, performance expectations were a significant driver of students' willingness to utilise mobile applications for electronic resources. A related study that evaluated students' intentions to use mobile devices for instant messaging likewise found that performance expectancy was a significant factor in determining behavioural intentions (Lin, Chan, & Jin, 2004; Yang et al., 2010). As indicated in Table 2.4, performance expectations were taken from the TAM, MM, MPCU, and IDT models.

Table 2.5
Performance Expectancy (Venkatesh et al., 2003)

CONSTRUCTS	MODEL
Perceived usefulness	TAM/TAM2 and C-TAM-TPB
Extrinsic motivation MM	MM
Job-fit MPCU	MPCU
Relative advantage IDT	IDT
Outcome expectations SCT	SCT

Six items on this study survey instrument, which primarily reflect the success, use, and support provided by mobile applications in English language acquisition, will be used to quantify Performance Expectancy (PE). All of the survey's questions were taken directly from highly referenced studies on the application of the UTAUT paradigm to technological adoption. In addition, only minor changes were made to the selected instrument's questionnaire to better fit the study's sample demographic, context, and content.

Gender, educational attainment, and the two study settings are predicted to moderate performance expectancy. The impact of each moderator will be evaluated as a series of hypotheses developed in the latter portion of this chapter.

2.9.2 Effort Expectancy

For the purposes of this study, the level of convenience related to using a mobile application as a learning aid is called Effort Expectancy (EE). Semantic views are formed by similar components found in other technology models and theories, such as the degree of complexity (diffusion theory), perceived ease of use (Technology Acceptance Model), and complexity (PC utilisation model). Moreover, effort expectation indicates that using mobile applications for learning will require less effort from the user. It is anticipated that an easy-to-use system will improve user integration across all age groups and genders (Venkatesh et al., 2003).

Given that mobile applications have intuitive interfaces, touch screen user interfaces, gesture-driven controls, smart controls, and sensors that greatly enhance the user's ease of access to and interaction with the tool, effort expectancy is predicted to play a larger role in evaluating them as learning tools (Wang et al., 2014). This gadget is widely used and ubiquitous, making it a highly familiar piece of technology for people of all ages. The mobile application may help with important duties like GPS mapping in addition to its numerous daily functions, such as emailing, communicating, monitoring the weather, taking photographs, and entertainment (Lee & Son, 2013; Nesaratnam & Taherzadeh, 2014).

Table 2.5 illustrates how Effort Expectancy was derived from five constructs from various human behavioural models: relative advantage (IDT), job fit (MPCU), intrinsic

motivation (MM), perceived usefulness (TAM and C-TAM-TPB), and outcome expectations (SCT) (Venkatesh et al., 2003; Wang et al., 2009).

Table 2.6
Constructors of effort expectancy (Venkatesh et al., 2003)

CONSTRUCTS	MODEL
Perceived ease of use	TAM/TAM2
Complexity	MPCU
Ease of Use	IDT

This concept is predicted to be affected by differences in gender, varying educational levels, and the two study contexts. It will be tested by asking five questions based on the common current literature collection.

2.9.3 Social Influence (SI)

According to Venkatesh et al. (2012), social influence is a factor that comes from the UTAUT. It is a social norm or social factor in which the user believes that social interactions, such as those with family, friends, or close peers, have an impact on his or her attitudes about using a technology. In this example, the technology is a mobile application.

It is fair to argue that social influence shapes an individual's conduct since individuals are constantly shaped by the social and cultural contexts in which they engage. Because of these influencing elements, the user is forced to respond to how utilising the technology will make others see him. In Venkatesh and Davis' 2000 paper (Venkatesh & Davis, 2000), they emphasised the growing significance of social elements in required contexts. Adopting a technology in a setting where adoption is required has

the effect of making social impact look important only initially and then gradually waning.

Social influence has a multifaceted role in influencing people's perceptions of certain technologies. Two different study studies (Venkatesh et al., 2003; Venkatesh et al., 2012) examined this. Using the UTAUT1 and UTUAT2 models, both evaluated the effect of social influence on behavioural intention. In situations where behaviour is required or optional, social influence has been shown to have a direct impact on behavioural intention.

The adoption of e-government services was evaluated in a related study by AlAwadhi and Morris (2008) using UTAUT, and it was shown that user influence from peers is substantial. This study did, however, suggest that when peers have less expertise with mobile devices, the same peer influence tended to have less of an impact. The researchers reached a consensus that it is critical to ensure that any technology integration results in pleasant experiences since peer pressure may play a significant role in influencing how people use technology.

An individual is typically impacted by others when considering the adoption of new technology, with family and close friends being the primary sources of influence. The likelihood that the person will embrace the usage of mobile applications increases dramatically if these social effects give him a favourable opinion of their use. Social impact was found to be significant for the adoption of technology in prior research related to mobile applications (Admiraal et al., 2013; Alrawashdeh et al., 2012; Fehrenbacher, 2013; Raman & Don, 2013; Slade et al., 2013; Venkatesh et al., 2012). In order to capture the idea of social impact, the UTAUT2 model combines three components from previous technological acceptance models: social factors (MPCU),

image (IDT), and subjective norm (TRA, TAM2, TPB, and C-TAM-TPB) (Venkatesh et al., 2003) as shown in the Table 2.6.

Table 2.7
Constructors of social influence (Venkatesh et al., 2003)

CONSTRUCTS	MODEL
Subjective Norm	TRA, TAM2, TPB/DTPB, and C-TAM-TPB
Social Influence	MPCU
Image	IDT

According to research, social influence plays a major role in users' adoption of technology when it is mandated (Davis et al., 1989; Venkatesh et al., 2003). Similar study suggests that social effect is highest in the early phases of technology integration and tends to decline with increasing use (Venkatesh et al., 2012). As mentioned in the previous chapter of this dissertation on the literature review, twelve questions were chosen to be used in this study.

2.9.4 Facilitating Conditions (FC) Peer Support

In the era of digital technologies, "facilitating conditions" refers to a wide range of systems, rules, learning settings, and technical assistance. Numerous studies have tried to evaluate each of these on its own or in combination. According to Cunningham and Duffy (1996), from the dawn of the computing era, information processing has been essential to recreating knowledge through the modelling and interaction paradigm. With the rise in digital social connection and communication in the modern era of communication technology, the emphasis has turned to using the relationship between mobile technology and education. As a result, there is a pressing need to investigate suitable teaching and learning paradigms for the mobile age.

The degree to which a person feels that an organisational and technological infrastructure exists to facilitate the adoption of mobile apps is one of the facilitating criteria derived from the UTAUT (Venkatesh et al., 2012). A user is assumed to have some past knowledge while attempting to accept new technology (Venkatesh et al., 2003; Zhou, 2008). Based on the facilitating condition construct, the elements of resource, technical assistance, previous knowledge, and peer aid may be articulated. A structured, formal or informal technical support system from peers and classmates at the university creates favourable conditions for a student to use mobile applications as an English language learning aid. This idea was taken from the Perceived Behavioural Control concept from TPB/DTPB and C-TAM-TPB as shown in the Table 2.7.

Table 2.8
Constructors of facilitating condition (Venkatesh et al., 2003)

CONSTRUCTS	MODEL
Perceived Behavioural Control	TPB/DTPB and C-TAM-TPB
Facilitating Conditions	MPCU
Compatibility	IDT

According to Triandis (1979), conduct cannot occur if the environment's objective circumstances preclude it. The feature of a suitable environment has shown a positive link between enabling conditions and behavioural intention in the context of mobile technologies (Wu, Tao, & Yang, 2007). The learner's satisfaction in an educational setting that encourages the use of mobile devices, such as smartphones, is influenced by his or her impression of the technical support that is available, the learning materials, the functionality of personal devices, peer support, and encouragement (Venkatesh, Brown, Maruping, & Bala, 2008). Numerous research confirm that one of the key factors influencing the adoption of new technology is the enabling conditions construct,

which is connected with technological acceptance (Venkatesh et al., 2012; Zhou, Lu, & Wang, 2010). According to Venkatesh and Davis's (2000) research, favourable circumstances might sometimes conflict with the effort expectancy construct in the Unified Theory of Acceptance and Use of Technology (UTAUT).

According to the findings of Venkatesh and Davis' (2000) research, the presence of the concepts Performance expectation and Effort expectancy may reduce the importance of enabling conditions (Venkatesh & Davis, 2000; Venkatesh et al., 2003). According to a review of the research, users' behavioural intentions to use any technology and their use of it are significantly influenced by the tools, training, and information they get. Given the aforementioned arguments, it seems that enabling conditions are a crucial component in determining whether or not a mobile application will be accepted as a useful aid for learning English using the UTUAT2 paradigm.

Given that women are more process-oriented than men, Venkatesh and Davis (2000) assert that women require enabling situations more than men do. According to this research, supportive conditions will influence the study's settings, which include students of education (CX2) and IT students (CX1). Moreover, the enabling circumstances for the usage of the mobile application as an English language learning tool will also be moderated by the students' educational backgrounds (undergraduate (UG) and postgraduate (PG)).

The connectivism idea put out by Siemens (2005) serves as the inspiration for this study, which aims to take use of mobile applications' widespread availability and round-the-clock connectivity for students in the digital age. Additionally, this study suggests evaluating the revised function of the UTAUT2 model's Facilitating Conditions

Construct by substituting the connection with a mobile application for English language learning for the original elements.

In order to determine the impact of enabling conditions on behaviour intending to utilise mobile applications as a tool for English language acquisition, this study employed seventeen questions. With the potential of the mobile device to connect with classmates, university buddies, and coworkers, this study altered the concept of facilitating conditions.

2.9.5 Hedonic Motivation (HM)

According to Igbaria, Iivari, and Maragahh (1995), hedonic motivation occurs when a person takes a nice experience and searches for feelings across several sensory channels. Technology designers take use of this tendency and motivate the user to extend use by offering multi-utilitarian functionality, hedonic design, and customisation. Hedonic motivation is one of the key factors influencing technology adoption, according to research studies in the field of information science (IS). Research has shown that there is a strong correlation between the usage of technology and both reported satisfaction and intrinsic motivation (Lee, Cheung, & Chen, 2005).

A key component of the Technology Acceptance Model (TAM) is the hedonic aspect of adopting a system or technology in the past. After examining the hedonic nature of technology on consumer enjoyment, numerous research findings using Technology Acceptance Model (TAM) have acknowledged this fact and proposed that hedonic motivation is a significant factor in determining technology acceptance (Lee et al., 2005; Lowry, Gaskin, Twyman, Hammer, & Roberts, 2012; Thong, Hong, & Tam, 2006); Childers et al. 2001). As seen in Table 2.8, perceived enjoyment was mostly

derived from the Technology Acceptance Model 3 (TAM3), which is defined as the degree to which utilising a certain system is thought to be pleasurable in and of itself (Venkatesh et al., 2012).

Table 2.9
Constructors of hedonic motivation

CONSTRUCTS	MODEL
Perceived Behavioural Control	TPB/DTPB and C-TAM-TPB
Intrinsic Motivation	TAM,
Utilitarian Motivation	IDT
CA	CA (Cognitive absorption) Agarwal and Karahanna (2000)

It was discovered that perceived enjoyment has a major impact on the desire to adopt new technology (Davis, 1993). Previous research (Shin, 2007; Song & Han, 2009) revealed the contextual implications of users' subjective satisfaction of accessing the Internet using mobile applications. Van van Heijden (2004) found that hedonic environment is a strong and reliable predictor of behaviour intention (BI) based on study with 665 participants.

Numerous earlier research (Igbaria et al., 1995; Thong et al., 2006) indicate a high, positive association between user satisfaction and enjoyment when using technology. Park and Lee (2011) have observed that the first and continuous usage of web-based information systems and entertainment devices is positively correlated with reported satisfaction. According to other studies, reported enjoyment of technology use may have a greater impact on IT usage than other criteria like perceived utility and simplicity of use (Turel, Serenko, & Giles, 2011).

2.9.6 Price (PR)

The perceived value, a significant predictor of the user's perceived value of utilising a technology relative to its advantages, is where the pricing value construct in the UTAUT2 model originates (Dodds, Monroe, & Grewal, 1991). Because there are financial expenses associated with using a technology in a consumer setting, Venkatesh et al. (2012) introduced Price Value (PV) as a concept in UTAUT2. According to Zeithaml (1988, p. 14), a user's notion of price value is a compromise between the advantages and disadvantages of using a certain technology. This idea was used to examine how consumers are utilising new technology, such as tablets and smartphones.

This architecture also includes recurring operation costs like data plans and phone bills, as well as the price of maintaining a mobile application and its accessories. Additionally, if the student's normal bill is nearly unchanged or the operating and maintenance costs of utilising the mobile application for education are significantly lower, they will consider it acceptable. This might support the learner's good experience. Peers and friends of the user may be further encouraged to utilise the mobile application for education by this element.

Price value is the term used to describe the mental trade-off made by users between the financial advantages and disadvantages of a specific programme or technology (Venkatesh et al., 2012). This indicates that when the advantages of utilising a technology are determined to outweigh the expenses, the price value is positive. Moreover, behaviour intentions to utilise a technology are positively impacted by the additional value advantage of pricing (Pitchayadejanant, 2011). The perspective of pricing value has two connotations in business marketing terminology: the monetary cost and the nonmonetary cost. Pitchayadejanant (2011) defines monetary cost as the

value attributed to the price paid, whereas nonmonetary cost is the value attributed to the time and effort invested. The present study employs the idea of price value to examine the acceptability of mobile application pricing in relation to the advantages they offer for English language acquisition.

According to Venkatesh et al. (2012), price and cost may have a big influence on how people utilise technology. Ulaga and Eggert (2003) contend, however, that values can accurately predict intentions for conduct. According to Kenney and Von Burg (1999), technologies are doubling in capability every year, while the cost of ownership is falling by half or more. According to a recent study on mobile phone usage in emerging nations, an increase in the number of users—both young and old—will have an impact on smartphone pricing and the ongoing decline in data plan costs (Boksberger & Melsen, 2011).

The decision of the user to purchase and maintain the smartphone will be influenced by this anticipated usage. The pricing value in this study refers to the monetary values used to gauge the adoption of mobile applications for English language learning among students.

2.9.7 Habit (HB)

According to Limayem and Hirt (2003), habit is defined as an instinctive activity as opposed to a blatantly purposeful behaviour. When someone utilises a product or piece of technology with short-term repetitions, reinforcement, idea clarity, curiosity, and learning capacity, they become habituated (Triandis, 1979). Reflexes and habits are different in that an action must be learned by a variety of means, including multiple

brief repetitions, reinforcement, situational clarity, interest, and the capacity to learn (Triandis, 1979).

Mobile technologies are made to meet humankind's primary demand, which is the ability to communicate on their own. Smartphones are designed to be user-friendly and productive. They are constantly being updated to displace and disrupt other electronic devices like GPS units, gaming consoles, DVD/video players, mp3 players, voice recorders, basic browsers, instant messaging, email, and text messaging systems, as well as cameras, radios, and laptops. As a condensed version of these technologies, smartphones are easier to use, simpler to understand, and less expensive than the bulky, difficult-to-use, and expensive technical instruments mentioned earlier.

According to Wood and Neal (2007), both internal and external states that are somewhat tied to the present might act as triggers for habitual actions. According to Spencer (1890), habits are essential for the management of action and can have both good and negative impacts on behaviour. Learners who possess habit or automaticity are more equipped to multitask, pick up complicated abilities, and maintain a level of performance appropriate for novel approaches. Users of smartphones are more naturally inclined to check their devices than laptops; that being said, they utilise mobile applications for shorter periods of time and more evenly spaced out throughout the day (Oulasvirta et al., 2012). Users that utilise mobile applications tend to check their phones more frequently, which leads to an increase in phone usage in general. Information seeking and regular exposure to dynamic content, according to Fogg and Hreha (2010), can create persuasive habits. According to Wood and Neal's (2007) theory, the habit of using mobile applications is closely linked to the persuading factor of regular use. As proposed in the prior literature, this study will examine the direct

relationship between habit and behaviour intention (Kroeze, Werkman, & Brug, 2006; Verplanken & Orbell, 2003).

2.10 Behaviour Intention (BI)

Behavioural intention (BI) is defined by Fishbein and Ajzen (1975) as the degree to which a person intends to carry out a certain behaviour and, consequently, forecasts actual usage (Davis et al., 1989). The Theory of Reasoned Action (TRA) is where this notion first appeared. In the social sciences, the idea of reasoned action (Ajzen & Fishbein, 1980) is frequently utilised as a foundation for examining behaviour intention.

The Theory of Planned Behaviour (TPB) and the Technology Acceptance Model (TAM) are credited with the invention of behavioural intention. According to Davis et al. (1989), both TBP and TAM propose that behavioural intention comes before using conduct. Furthermore, according to Ajzen (1991), the most accurate predictor of real conduct is behavioural intention, or BI. In the realm of information sciences, this relationship between behaviour intention and actual usage has been thoroughly investigated and confirmed.

The foundation and genesis of all Technology Acceptance Models may be traced back to psychology theories that assert that personal purpose and predictability govern individual conduct. According to Venkatesh et al. (2003), the Unified Theory of Acceptance models (UTAUT1 and UTAUT2) both argued and demonstrated that behavioural intention has a substantial impact on technology adoption. In research by Venkatesh et al. (2003), the Unified Theory of Acceptance and Use of Technology (UTAUT2) model performed better in predicting the elements impacting behavioural intention and actual use behaviour than eight prior technology acceptance models.

The UTUAT2 model's strength lies in its ability to provide an explanation within a specific context. Approximately 70% of the variation in behavioural intention to utilise a technology can be explained by this model. The impact of Performance Expectancy, Effort Expectancy, Hedonic Motivation, Price Value, and Habit on Behavioural Intention was verified by this study. A strong and frugal model that aids in understanding technology adoption behaviour is the UTAUT2 (Venkatesh et al., 2003; Venkatesh et al., 2012).

Therefore, it is strongly advised to look at behavioural intention to utilise a technology if it is required. This research uses the purpose of user activity as a proxy for user acceptability.

2.11 Moderators of the study

The two original moderators of UTAUT2, "Age" and "Experience," have been replaced in this study by the university's "educational contexts" (CX1 and CX2) and "educational level" (UG, MS, and PhD). The "Gender" moderator (Men and Women) is still in the research. Using the aforementioned moderators is justified by the fact that their participation aligns with the study's objectives, which include comparing the two university environments. The primary hypothesis of this research is that students in CX1 utilise mobile applications in a different way than students in CX2. Numerous studies (Alrawashdeh et al., 2012; Fehrenbacher, 2013; Pahnla et al., 2011; Pheeraphuttharangkoon et al., 2014; Pitchayadejanant, 2011; Raman & Don, 2013; Venkatesh et al., 2012; Xu, 2014; Yang, 2013) have empirically tested and demonstrated the significance of the original moderators.

According to Kirkwood and Price (2006), it's critical to identify the educational goals, pedagogies, and standards that enable technological adoption and integration in addition to comprehending the digital tools and technologies that students utilise. We will get a better knowledge of how mobile applications are integrated into English language learning and be able to create new pedagogies that take this integration into account by studying the intention to use them in an educational setting with pertinent moderators.

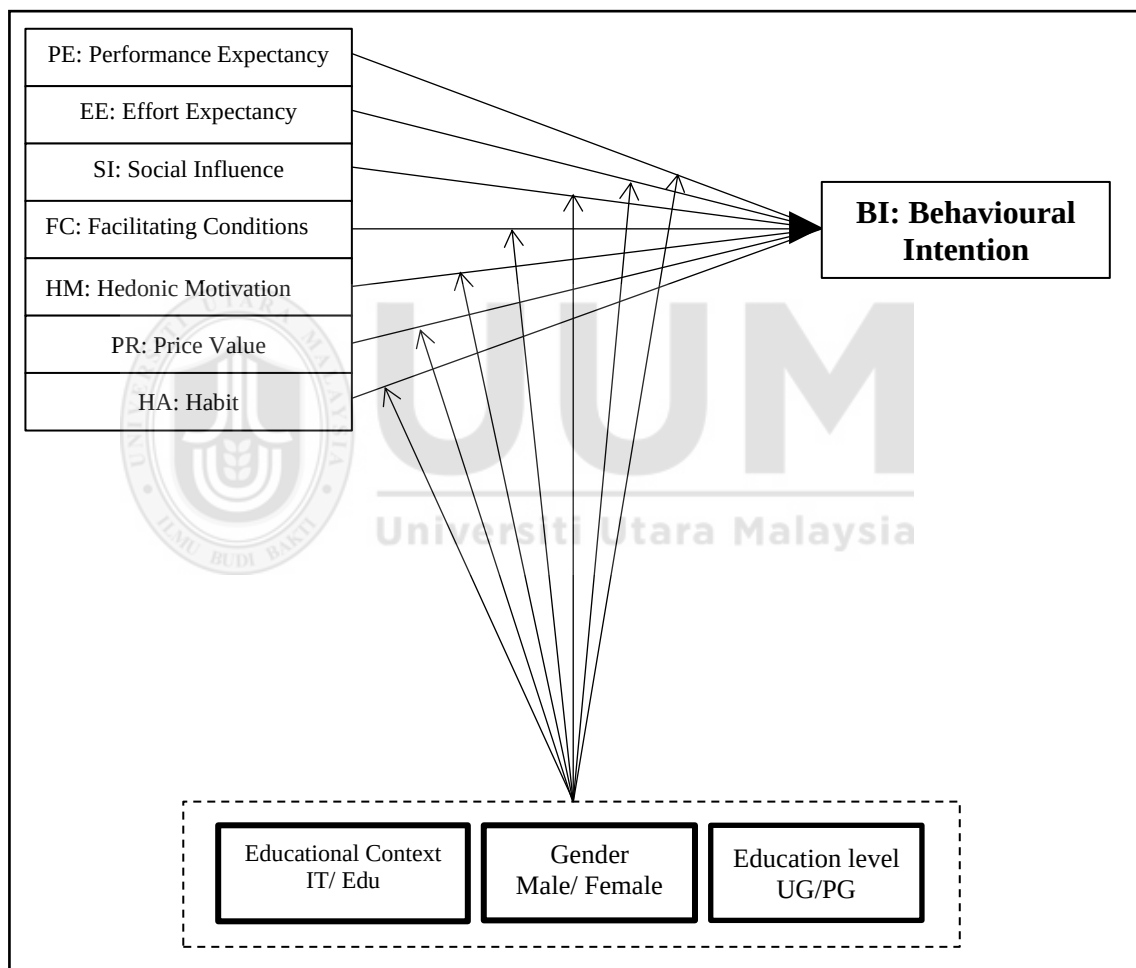


Figure 2.5 UTAUT2 model, after replacement of two moderators (context and education level) with age and experience

2.11.1 Gender as Moderator

Since there was a substantial gender difference between the two research settings, it was essential to add this moderator to eliminate any chance of bias. Additionally, in every study using the UTAUT2 model, gender was examined as a primary moderator (Alrawashdeh et al., 2012; Pahnla et al., 2011; Venkatesh et al., 2012; Xu, 2014; Yang, 2013).

Gender is an effective moderator since it is based on two fundamental theories that form the basis of the UTAUT model: the Theory of Planned Behaviour (TPB) and the Technology Acceptance Model (TAM). After completing a longitudinal research based on TAM and TPB, Venkatesh and Davis (2000) proposed the effect of gender; the study findings showed considerable influence. According to the study's findings, men and women accepted new technology to varying degrees when it came to evaluation and adoption. Additionally, this study discovered that women had greater importance with subjective standards and perceived behavioural control, whereas males demonstrated a greater relevance with regard to behaviour purpose.

When measuring perceived usefulness, males performed better in this study, but when measuring ease of use, women's gender had a major impact. Additionally, this study discovered that whereas women's effects tended to be more impacted by ease of use, males were obviously more influenced by perceived utility. Using the UTAUT1 model, Venkatesh et al. (2003) demonstrated in a different research that the influence of gender considerably affected each of the model's assumptions. According to this study, women's intentions to use technology were more significantly correlated with effort expectation than men's, with males experiencing a higher influence from the independent variable Performance expectation and the dependent variable Behavioural

Intention. When using technology was made mandatory on Women, the effect of independent variable ‘social influence’ and dependent variable ‘use behaviour’ showed significance.

Many studies (Abu-Al-Aish & Love, 2013; Alrawashdeh et al., 2012; Pahnla et al., 2011; Raman & Don, 2013; Slade et al., 2013; Venkatesh et al., 2012; Wang et al., 2009; Xu, 2014; Yang, 2013; Yu, 2012) that have examined technology acceptance have discovered gender as the primary moderating factor. It is clear from this that gender influences behaviour intending to use technology in a significant and fundamental way. Therefore, this study takes into account how gender functions as a moderator in determining whether or not a mobile application is accepted as an aid for learning English. Male (M) and female (F) will be the two gender groups serving as moderators for this investigation.

2.11.2 Education Level as Moderator

The literature review on the use of educational attainment as a moderator reveals that technological acceptability is influenced by educational attainment. According to Chen (2011), there is an innate relationship between educational attainment and the cultural environment of the research as a moderating factor. Park, Yang, and Lehto (2007) performed a research in China that examined the impact of moderating variables, including gender, education level, and prior Internet experience, and found that these variables contributed to a better understanding of the adoption patterns of mobile technology. This study also showed that the UTAUT model described how social influence was the primary factor used by members of the higher education group to form their attitudes towards mobile technology. This study further emphasises how

important performance expectancy is in influencing conduct and how important it is intention to use a technology with a highly educated user (Mupaikwa & Bwalya, 2024).

Using the UTAUT1 model, different research on the adoption of e-governance contends that there are variations in education levels and gender among users of information computing technology (AlAwadhi & Morris, 2008). In academic contexts, this indicator has significant limits. The population's educational attainment has a notable impact on technology use. Research that employed educational attainment as a mediator revealed variations between groups (AlAwadhi & Morris, 2008; Van Dijk, Peters, & Ebbers, 2008).

This moderator was primarily grouped into two categories: Undergraduate (UG) and Post Graduate (PG), with Masters and PhD students falling under the PG category. According to the survey's demographic data, the majority of undergraduate students belonged to the same age group, and the master's and doctoral student clusters were also mostly composed of students in the same age range (Nikou, 2024).

2.11.3 Educational contexts as Moderator

As previously mentioned, the two main settings of this research are students from the same institution who study information technology (CX1) and education (CX2). A thorough knowledge of the behaviour intention while using mobile applications as instruments for learning English in two situations may be gained by comparing and evaluating the moderation by these three metrics. The elements that influence the acceptability of mobile applications in an academic setting may also be evaluated by comparing the comparative analysis of these two contexts to cohorts that are similar (Ojiaku et al., 2024).

According to Jeng, Wu, Huang, Tan, and Yang (2010), learning using mobile devices produces a microchasm, which highlights the need of delivering learning materials at the appropriate time and location. It was determined that 98% of students utilise mobile apps extensively based on the literature review this research conducted and the data gathered on the use of mobile applications by the study's sample population. The purpose of this study is to evaluate how mobile applications are used in a university context to support English language learning. The basic basis of this contextual comparison is founded on the idea that mobile apps are utilised uniquely by individuals according to their demands (Gómez, Zervas, Sampson, & Fabregat, 2014; Jeng et al., 2010). In-time, ubiquitous, and context-aware learning are products of the multifaceted usage of mobile apps. These learning styles make use of an efficient learning management system that links the learner to a wider domain of the learning community and tailors and modifies the learning content to match the needs of the learner, his learning style, and his location (Wu, Chang, Chang, Liu, & Heh, 2008).

Moreover, it is thought that a comparative study and comprehension of the acceptability of mobile apps across the two contexts (students in computer schools and education and language schools) may facilitate the use of mobile applications as instruments for English language learning. According to Rogers (2000), a context-aware system necessitates organised technology integration and tailored content design for learning materials sent via mobile apps. According to this research, the main advantages of this method are that learners are given the centre of attention when they receive learning experiences that are tailored to meet their specific educational needs. This will optimise their happiness, accommodate their learning style, and facilitate a productive learning environment (Or, 2023).

2.12 Conclusion

While an examination of related literature suggests that there is a growing body of research on technology acceptance in general and mobile applications for English vocabulary in particular, more research is necessary to build a solid understanding of the subject and keep up with the most recent developments in mobile applications and the rising ownership of these applications. The significance of these studies differed depending on the situation. Examining Universiti Utara Malaysia's acceptability and preparedness for mobile application learning is essential. Students studying advanced courses like physics, medicine, and health sciences in Malaysian universities are being taught in a language that is not their first language or even a second one.

Given that technologies have an impact on how people learn and create effective learning and teaching environments (Beetham & Sharpe, 2007), their implementation must be fully informed and practically applied with consideration for the unique national, social, and cultural contexts in which they will function, as well as all associated embedded limitations and challenges, in order for mobile applications to be widely and wisely used (Cobcroft, 2006). A rigorous study technique was created and is presented in the next chapter in order to examine the acceptability and preparedness of mobile applications.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology used in this study, the adopted educational research paradigm, the process of developing the research instrument and the analytical techniques used to test the hypothesis. The selection of research method and instrument was followed by instrument testing as Pre-Pilot and Pilot studies. The results from the Pilot study shaped the main data collection. As a result, this chapter describes the instruments used for data collection, the methodological processes used to gather the pertinent data for the research topic, and the methods for data analysis. A description of the research journey, sampling and data sources, research instrument design, and research strategy and design are all covered in this chapter.

3.2 Mixed methods Research

In order to better understand the research topic, many authors describe mixed methods research as a process that involves gathering, analysing, and integrating both quantitative and qualitative data at some point throughout the research process (Tashakkori and Teddlie, 2003; Johnson et al, 2007; Tashakkori and Creswell, 2007; Creswell and Tashakkori, 2008; Bergman, 2011; Guest, 2012; Greenwood and Terry, 2012; Creswell, 2012; Caruth, 2013). They also point out that mixed-method research is more thorough, imaginative, varied, and complete than mono-method research. As a result, it gives researchers flexibility to use a variety of methods while organising and carrying out their research. In order to quantify psychological qualities more accurately, Campbell and Fiske (1969) recommended combining quantitative and qualitative

approaches, which gave rise to the concept of a "mixed methods approach." They wanted to make sure that the attribute itself received more attention than the approach taken. Denzin later referred to this combination of techniques as "triangulation" (1978).

Furthermore, utilising both techniques is meant to be a test of consistency rather than a means of achieving the same outcome through the use of two distinct strategies. This is significant because different levels of replies to the same study topic may be found by the researcher. It prompts the researcher to look for more information on the connections between the phenomena being examined and the methodologies employed (Patton, 2002).

During the data collecting and/or analysis stages of a research project, the mixed methods approach to research applies both quantitative and qualitative methodologies (Armitage, 2007; Bazeley, 2003; Creswell, 2003; Rocco et al., 2003; Tashakkori & Teddlie, 1998). Depending on how best to answer the study topic, the researcher chooses to gather the data concurrently or sequentially. In fact, it is believed that using a mixed methods approach is a suitable means of reducing the shortcomings associated with both qualitative and quantitative research (Tashakkori and Teddlie, 1998).

According to Tashakkori and Teddlie (2003), there are three reasons why a mixed techniques approach is superior to a single method. First off, unlike single techniques, such an approach may respond to inquiries that are exploratory and confirmatory. Second, a mixed methodologies research approach offers a more comprehensive and in-depth response to the research query. Thirdly, conflicting conclusions might lead to different points of view (Armitage, 2007). These factors have led to a rise in the adoption of the mixed method research approach by researchers as a means of supporting their investigations and conclusions (Rocco et al., 2003). Since the goal of

the interviews was to supplement and enhance the survey's findings, several of the survey questions were also covered in the discussions. To achieve complementarity and triangulation, this study used quantitative and qualitative methods (Bazeley, 2004; Greene, 2007).

3.3 Explanatory Sequential Research Approach

The explanatory sequential strategy to Mixed-Methods research was utilised in this study, wherein the qualitative (interview) data was obtained after the quantitative (survey) data. The study's middle and final stages involved the integration, or "mixing," of the two sets of data. In addition to compensating for the shortcomings in the survey data (Brewer and Hunter, 2006; Small, 2011), the interview replies supplement the survey responses (Dixon-Woods et al., 2001; Small, 2011). Therefore, this strategy aided in seeking consistency in the answers and triangulating them (Ivankova et al., 2006; Small, 2011). The following qualitative data and their preliminary analysis clarify and enhance the statistical analysis of the quantitative data, which offers a broad grasp of the study topic in the form of statistical analysis (Creswell, 2003; Ivankova et al., 2006).

Cooper (1996) states that the goal of a descriptive research is to identify the who, what, where, and how of a phenomenon. This study aims to address these questions. Hence, the researcher decided that the design was suitable for the study. Due to its association with both quantitative and qualitative approaches in the data collecting, analysis, and presentation processes, the research employed a mixed methodologies approach (Punch, 2009). A single study or a long-term programme of inquiry might combine quantitative and qualitative research (and data) collection, analysis, and integration using the mixed methods research technique.

This type of study aims to give a deeper insight of the research topic or issue than any research methodology could by itself by combining qualitative and quantitative research methods. In order for the final database to include both quantitative and qualitative information, the data collecting process entails obtaining both textual information (interviews) and numerical information (instruments).

This research was appropriately designed with a non-experimental correlational design, which was useful in identifying the strength and direction of the acceptance of mobile applications in language classroom among English language learners in Malaysian university based on a unified theory of acceptable (UTAUT) model. According to Creswell (2013), there are several basic reasons why researchers who are interested in statistical associations between variables would decide against using an experimental research design in favour of a correlational study.

Additionally, Gall et al. (2007) state that two key benefits of a correlational design are its capacity to assess the association between several variables and to offer information regarding the strength of the relationship between the variables. Furthermore, they proposed that drawing indiscriminate conclusions about the statistically significant association found in correlational research would be improper.

3.4 Quantitative Phase Approach

The positivist (and post-positivist) paradigm and the interpretivist/constructivist paradigm were the two conventional research paradigms that were combined in this mixed-methods study (Mackenzie and Knipe, 2006; Migiro and Magangi, 2011). Paradigmas are defined by Mertens (2012b) as presumptions about reality (ontology), ethics, and epistemology that give rise to various presumptions on the nature of

systematic inquiry. The interpretivist/constructivist paradigm (Creswell, 2003:8) relies on the participants' perspectives of the situation under study and employs qualitative methods, whereas the positivist (and post-positivist) paradigm tends to use quantitative approaches to data collection and analysis (though not always exclusively). (Mertens, 2010, 2012a&b; Migiro and Magangi, 2011; Mertens and Hesse-Biber, 2012). Based on the premise that no one set of acceptable procedures is deemed appropriate, the pragmatic paradigm has been proposed as a philosophical framework that enables the use of both of the above paradigms. Thus, in this study, the best fit criteria for the research topic are adhered to (Johnson and Onwuegbuzie, 2004; Mertens, 2012b).

When collecting quantitative data, the researcher can follow the post-positivist paradigm's beliefs, and when collecting qualitative data, the constructivist paradigm's beliefs. Eventually, the researcher can put both paradigms into conversation with each other throughout the study to enable deeper understanding based on the convergence and dissonance found in the approaches (2012b:256).

Thus, the task the study attempted to solve was to locate and learn about incentives and procedures. This is the reason the researcher used a positivist approach to learn more about the mechanisms and these motivations (Bassey, 1995). According to positivist ontology, reality is unitary and objective rather than many and subjective.

Figure 3.1 provides a quick representation of the explanatory sequential mixed-methods design of this study. Table 3.1 provides a brief illustration of the research design with the research questions.

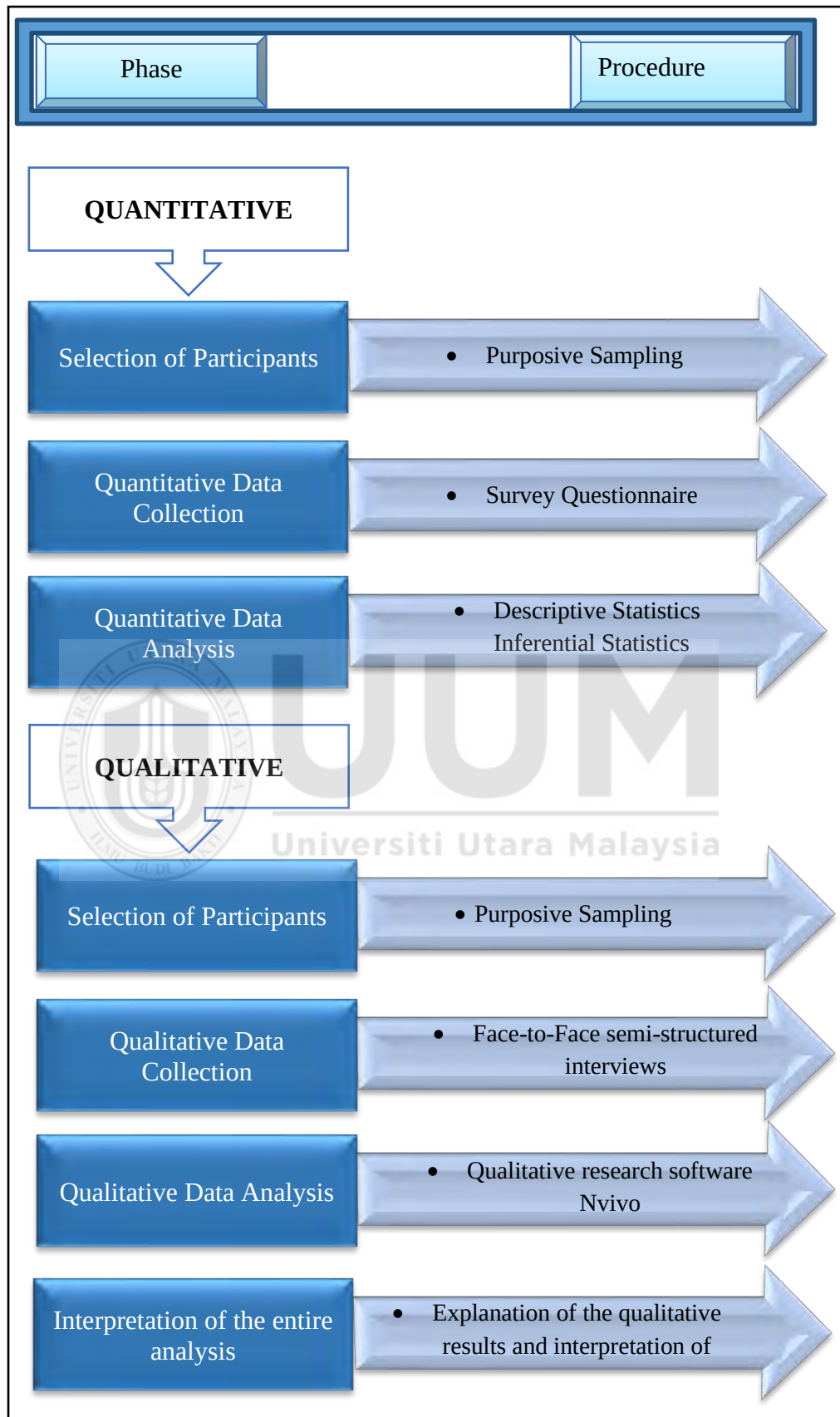


Figure 3.1 The visual model of an explanatory sequential mixed-methods design adopted in the current study

Table 3.1
Research Design

Research Questions	Statistical Analysis	Data Source
1. To what extent is mobile application accepted as an English language learning tool among English language learners in Malaysia?	Descriptive & Inferential Analysis	Survey Questionnaire
2. What is the significance of UTAUT2 model parameters which derive the acceptance of the mobile application in language classroom among English language learners as a learning tool?	Principal Component Analysis (PCA), and the second phase Confirmatory Factor Analysis (CFA).	Survey Questionnaire
3. What is the effect of acceptance of the mobile application in language classroom among English language learners in Malaysia?	Structural Equation Modelling (SEM)	Survey Questionnaire
4. What are the perceptions of English language learners in Malaysia on the acceptance of the mobile application?	Transcripts/Interpretation	Semi-structured Interview

3.5 Phase I: Quantitative

3.5.1 Hypothesis Development

Due to the complexity of the large number of hypotheses required to be tested, this research divided them all into four sets (Set-I, II, III and IV) by grouping them as per the study's objectives of this research. The fundamental objectives of this research are to:

1. empirically assess the acceptance of the mobile application as an English language learning tool
2. to assess the significance of UTAUT2 model parameters which derive the acceptance of mobile application as an English language learning tool
3. to assess the significance of gender as a moderator in the acceptance of mobile application as an English language learning tool
4. to assess the significance of context as a moderator in the acceptance of mobile application as an English language learning tool
5. to assess the significance of educational level as a moderator in the acceptance of mobile application as an English language learning tool
6. to assess the Intra moderator (gender, educational level and Context) effect and its significance between the two contexts (CX1 and CX2) in the acceptance of mobile application as an English language learning tool
7. to assess the Inter moderator (gender and educational level Context) effect and its significance between the two contexts (CX1 and CX2) in the acceptance of mobile application as an English language learning tool

3.5.2 Hypothesis Sets

1. **Set-I:** The **first** set of hypotheses will assess the **significance of UTAUT2** for the acceptance of mobile application as an English language learning tool on the combined context sample population as listed in Table 3.1.
2. **Set-II:** The **second** set of hypotheses will assess the effect of the **moderators** - gender (M:W) and educational Level (UG:PG) - on the acceptance of mobile application as an English language learning tool on the combined context sample population as listed in Table 3.2.
3. **Set-III:** The **third** set of hypotheses analysed the effect of **Intra-contextual** moderation between (CX1:CX2), gender (M:W) and educational levels (UG:PG) as listed in Table 3.3.
4. **Set-IV:** The **fourth** and the final hypotheses will assess the **Inter-contextual** moderation between gender CX1(M):CX2(M), CX1(W):CX2(W), educational levels (CX1(UG):CX2(UG), CX1(PG):CX2(PG) as listed in Table 3.4.

3.5.3 Set-I Hypothesis

Significance of the UTAUT2 Constructs on Context Combined: In the first set hypothesis, this research postulates that the seven constructs significantly influence behavioural intention to adopt Smartphones for education for the total population of this study as shown in Table 3.1.

Table 3.2

Research Hypothesis Set-I, UTAUT2 Model significance

Constructs		(CX1+CX2)	
BI	←	PE	H1
BI	←	EE	H2
BI	←	SI	H3

BI	←	FC	H4
BI	←	HM	H5
BI	←	PR	H6
BI	←	HA	H7

1. **H1:** *Performance Expectancy will have a significant positive influence on Behaviour Intention*
2. **H2:** *Effort Expectancy will have significant positive influence on Behaviour Intention*
3. **H3:** *Social Influence will have significant positive influence on Behaviour Intention*
4. **H4:** *Facilitating Condition will have significant positive influence on Behaviour Intention*
5. **H5:** *Hedonic Motivation will have significant positive influence on Behaviour Intention*
6. **H6:** *Price Value will have significant positive influence on Behaviour Intention*
7. **H7:** *Habit will have significant positive influence on Behaviour Intention*

3.5.4 Set-II Hypothesis

Effect of moderators on total population (CX1+CX2): Bem (1981) proposed the Gender Schema Theory, which posits that an individual's gender (Men or Women) affects their cognitive structure (a neural network of connections which guides the individual's perception). As explained above, gender remains the primary moderator in many studies which use the UTAUT2 model to assesses the acceptance of technology (Admiraal et al., 2013; Alrawashdeh et al., 2012; Fehrenbacher, 2013; Slade et al., 2013; Venkatesh et al., 2012; Xu, 2014; Yang, 2013).

There are many studies in the field of technology acceptance which have incorporated educational level (AlAwadhi & Morris, 2008; Foon & Fah, 2011; Jairak et al., 2009; Jaradat & Al Rababaa, 2013; Oshlyansky et al., 2007; Yap & Hii, 2009). These studies suggest that education level is a significant moderator that influences the behaviour intention to use technology.

Hence, this set of research hypothesizes that the seven constructs influencing behavioural intention to adopt mobile application for English language will be moderated differently by the gender and educational level on context combined as shown in Table 3.2.

1. Gender CX1+CX2 (M:W)
2. Educational Level CX1+CX2 (UG:PG)

Table 3.3
Research Hypothesis Set-II, Gender, and Educational Level Moderation

Constructs			Gender	Educational Level
			M:W (CX1+CX2)	UG:PG (CX1+CX2)
BI	←	PE	H8a	H8b
BI	←	EE	H9a	H9b
BI	←	SI	H10a	H10b
BI	←	FC	H11a	H11b
BI	←	HM	H12a	H12b
BI	←	PR	H13a	H13b
BI	←	HA	H14a	H14b

1. **H8a, H8b:** *The effect of Performance Expectancy on Behaviour Intention in the context combined will be moderated differently by gender (M:W) and educational level (UG:PG)*

2. **H9a, H9b:** *The effect of Effort Expectancy on Behaviour Intention in the context combined will be moderated differently by gender (M:W) and educational level (UG:PG)*
3. **H10a, H10b:** *The effect of Social Influence on Behaviour Intention in the context combined will be moderated differently by gender (M:W) and educational level (UG:PG)*
4. **H11a, H11b:** *The effect of Facilitating Condition on Behaviour Intention in the context combined will be moderated differently by gender (M:W) and educational level (UG:PG)*
5. **H12a, H12b:** *The effect of Hedonic Motivation on Behaviour Intention in the context combined will be moderated differently by gender (M:W) and educational level (UG:PG)*
6. **H13a, H13b:** *The effect of Price on Behaviour Intention in the context combined will be moderated differently by gender (M:W) and educational level (UG:PG)*
7. **H14a, H14b:** *The effect of Habit on Behaviour Intention in the context combined will be moderated differently by gender (M:W) and educational level (UG:PG)*

3.5.5 Set-III Hypothesis

Intra Contextual Comparison: Every activity takes place in a particular context. Equally, technologies are employed in specific contexts that determine how they are and can be used (Cole, 1998). Cole (1998) defines context in the following manner: “that which surrounds us” and “that which weaves together” In short, context is presented as an environment where students continually receive data that is interpreted as meaningful knowledge.

This set hypothesizes that the seven constructs influencing behavioural intention to adopt mobile application for English language will be Intra contextually moderated between the two contexts, gender and educational level as shown in Table 3.3.

1. Context (CX1:CX2)
2. Gender CX1(M:W):CX2(M:W)
3. Educational Level CX1(UG:PG):CX2(UG:PG)

Table 3.4
Research Hypothesis Set-III, Intra Contextual Moderation

Constructs			Context	Gender		Educational Level	
			CX1:CX2	M:W (CX1)	M:W (CX2)	UG:PG (CX1)	UG:PG (CX2)
BI	←	PE	H15a	H15b	H15c	H15d	H15e
BI	←	EE	H16a	H16b	H16c	H16d	H16e
BI	←	SI	H17a	H17b	H17c	H17d	H17e
BI	←	FC	H18a	H18b	H18c	H18d	H18e
BI	←	HM	H19a	H19b	H19c	H19d	H19e
BI	←	PR	H20a	H20b	H20c	H20d	H20e
BI	←	HA	H21a	H21b	H21c	H21d	H21e

1. **H15a, H15b, H15c, H15d, H15e:** The effect of Performance Expectancy on Behaviour Intention will be moderated by context, gender and educational level within the same context group
2. **H16a, H16b, H16c, H16d, H16e:** The effect of Effort Expectancy on Behaviour Intention will be moderated by context, gender and educational level within the same context group
3. **H17a, H17b, H17c, H17d, H17e:** The effect of Social Influence on Behaviour Intention will be moderated by context, gender and educational level within the same context group

4. **H18a, H18b, H18c, H18d, H18e:** *The effect of Facilitating Conditions on Behaviour Intention will be moderated by context, gender and educational level within the same context group*
5. **H19a, H19b, H19c, H19d, H19e:** *The effect of Hedonic Motivation on Behaviour Intention will be moderated by context, gender and educational level within the same context group*
6. **H20a, H20b, H20c, H20d, H21e:** *The effect of Price Value on Behaviour Intention will be moderated by context, gender and educational level within the same context group* **H21a, H21b, H21c, H21d, H21e:** *The effect of Habit on Behaviour Intention will be moderated by context, gender and educational level within the same context group*

3.5.6 Set-IV Hypothesis

Inter Contextual Comparison: Leadbeater (2004) argues that in the age of digital technology, students perceive learning as a personalised activity. This is due in part to ever evolving technologies which provide personalised entertainment and limitless applications. Mobile application learning has liberated learners from cabled connections and has permitted access to knowledge without limiting the need to sit in a fixed location or a computer (Moustakas & Oliveira, 2012). As a result of these features, context as a moderator assumes greater importance.

This set hypothesizes that the seven constructs influencing behavioural intention to adopt mobile application for English language learning will be Inter contextually moderated between the same gender and same educational level as shown in Table 3.4.

Table 3.5
Research Hypothesis Set-IV, Inter Contextual Moderation

Constructs			Gender	Educational Level		
			CX1(M):CX2(M)	CX1(W):CX2(W)	CX1(UG):CX2(UG)	CX1(PG):CX2(PG)
BI	←	PE	H22a	H22b	H22c	H22d
BI	←	EE	H23a	H23b	H23c	H23d
BI	←	SI	H24a	H24b	H24c	H24d
BI	←	FC	H25a	H25b	H25c	H25d
BI	←	HM	H26a	H26b	H26c	H26d
BI	←	PR	H27a	H27b	H27c	H27d
BI	←	HA	H28a	H28b	H28c	H28d

1. Inter Gender Moderation

a. CX1(M):CX2(M)

b. CX1(W):CX2(W)

2. Educational Level

i. CX1(UG):CX2(UG)

ii. CX1(PG):CX2(PG)

1. **H22a, H22b, H22c, H22d:** The effect of Performance Expectancy on Behaviour

Intention will be moderated by the same gender and the same educational level between the two contexts

2. **H23a, H23b, H23c, H23d:** The effect of Effort Expectancy on Behaviour

Intention will be moderated by the same gender and the same educational level between the two contexts

3. **H24a, H24b, H24c, H24d:** The effect of Social Influence on Behaviour

Intention will be moderated by the same gender and the same educational level between the two contexts

4. **H25a, H25b, H25c, H25d:** *The effect of Facilitating Conditions on Behaviour Intention will be moderated by the same gender and the same educational level between the two contexts*
5. **H26a, H26b, H26c, H26d:** *The effect of Hedonic Motivation on Behaviour Intention will be moderated by the same gender and the same educational level between the two contexts*
6. **H27a, H27b, H27c, H27d:** *The effect of Price Value on Behaviour Intention will be moderated by the same gender and the same educational level between the two contexts*
7. **H28a, H28b, H28c, H28d:** *The effect of Habit on Behaviour Intention will be moderated by the same gender and the same educational level between the two contexts*

3.5.7 Scale Evaluation

Research is susceptible to human errors such as bias and inadequate research methods which can subsequently lead to irrelevant results (Worthington & Whittaker, 2006). This study placed importance on the fact that no matter how well the research is conducted, it still carries the potential to be inaccurate (Carmines & Zeller, 1979, p. 11). Hence it used scale measurement and instrument validation aimed at lessening the possibilities of inaccuracy.

The process of scale measurement followed in this study started by developing, testing, and using the survey instrument in order to avoid errors. Testing criteria include usability, reliability and validity (Finstad, 2006). This research tested the usability to identify how easily the survey instrument will understand by the participant; it also tested the reliability of the instrument to assess the stability of its measures (Carmines

& Zeller, 1979). Wenger and Spyridakis (1989) posit that usability, validity and reliability are three important characteristics required to substantiate any research work, each consisting of a number of elements also outlined in the Figure 3.2. The next section talks about those in turn.

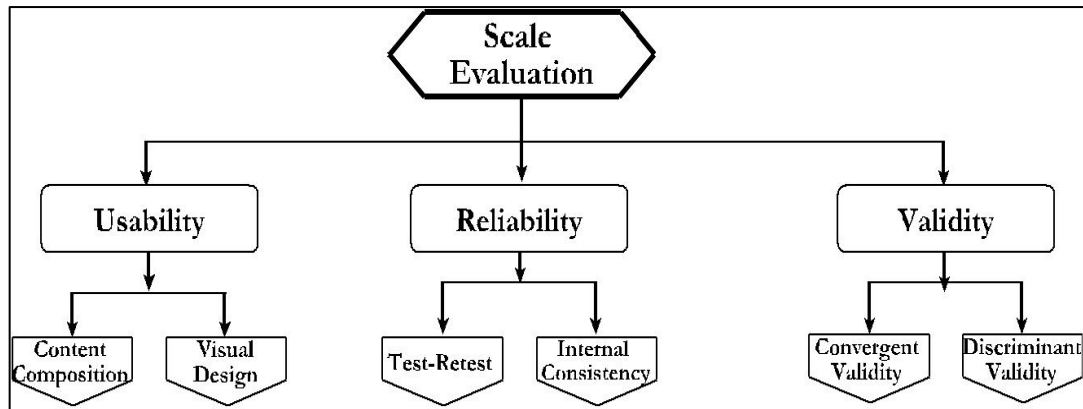


Figure 3.2 Type of Instrument Scale Evaluation

3.6 Research Design

The nature of this research is descriptive design which is based on comparing two or more groups of participants or entities (Ross, 2005). Quantitative research methods are best suited to investigate attitudes, determine factors and explore relationships between factors or different groups (Gogolin & Swartz, 1992). A qualitative data to support the results of quantitative. A thorough literature review on technology acceptance was conducted in order to establish relevant parameters, variables and moderators which could better define the acceptance of mobile application as an English language learning tool. As noted, this study compares the acceptance of M learning in the two different educational contexts (The School of Computing - CX1 and School of Education and Modern Languages - CX2).

The survey used in this research was divided into two parts. The first section (Part – I) collected information regarding the characteristics of the respondents; for example, age,

gender, school, educational level, and mobile application. The second section (Part – II) dealt with measuring items from the UTAUT2 constructs. The total numbers of items in the questionnaire for each section are: Part-I=07 Demographic Questions and Part-II=28 items which consist of different variables 1) Performance Expectancy 2) Effort Expectancy 3) Social Influence 4) Facilitating Conditions 5) Hedonic Motivation 6) Price value 7) Habit 8) Behavioural Intention.

3.7 Research Procedures

Descriptions of the research methodology adopted by this study include explanations of the research context, information about the sample population, sampling methods, sample sizes, research techniques and demographic information regarding the research questions. The hypothesis chapter contains the detailed descriptions of the hypotheses formulations of this research. This study uses a quantitative method in which the results are confirmed using the support from the hypothesis.

3.8 Quantitative Research

As stated earlier, this study uses a quantitative correlation research methodology to construct a quantitative research design based on an established scientific method. This technique employs deductive reasoning by formulating a research hypothesis at an early stage.

The quantitative research in this study was initially pursued by gathering facts and statistical parameters, which were used to study the relationship of one set of facts to another as suggested by Fan, Sivo, and Keenan (2002). According to Hopkins, Marshall, Batterham, and Hanin (2009), quantifying the relationships between dependent and independent variables expresses those relationships after using statistical

techniques. The research methodology employed in this research was an inferential form of logic, whereas theories and hypotheses are tested in a cause-and-effect order using multivariate regression techniques (Creswell, 2013).

Data was collected and statistical results are analysed to confirm support for the hypotheses. A quantitative research design used cross-sectional survey data after gathering all the survey responses at a single point in time (Hopkins et al., 2009). The collected quantitative data of multiple variables will be analysed using multivariate statistical technique using Structural Equation Modelling (SEM) (Khine, 2013). This study conducts meta-analysis of the literature review in order to identify an appropriate research model and determine the research's parameters, as well as statistical testing techniques and sample size.

3.9 Participant

This research employed the opportunity sampling technique, which is also known as convenience sampling (Joy, 2007). Convenience sampling allows a researcher to choose the nearest individuals to serve as respondents and to continue to execute this process until the required sample size is achieved by the research in the available and accessible time. (Weir & Jones, 2008). Researchers often choose the sample from those whom they have easy access to, and thus, the main advantage of convenience sampling is the ease with which it can be carried out. The other advantage in using the convenience sampling technique is that the data is collected in a short span of time without the need of conducting exhaustive research on the entire population (Marshall, 1996). In order to ensure that the data collected for this study will free from bias, influence or under-representation, the following precautions will observe:

1. Data collection done by visiting all of the department classrooms of both the contexts of the study equally (The school of computing: CX1 and the school of education and modern languages: CX2)
2. Data collected by placing a kiosk in the school of computing and The school of education and modern languages who volunteered to take the survey
3. An online version of the survey will have developed on the university polling application “Qualtrix.” The online link will distribute to students in their classrooms.

At the time of the study, the total number of students enrolled in the university was 33,725, of which 11,943 were full time students. A further breakdown of the students enrolled in the university showed that 9,721 were undergraduates (81%), while 2,222 were enrolled as postgraduates (19%). The participants in this study came from two schools under the College of Arts at Universiti Utara Malaysia - the School of Computing [1,852 respondents (16%)] and the School of Education and Modern languages [2,849 respondents (24%)]. Their enrolment took place during the 2017 academic year. This study will distributed a total of 300 questionnaires.

3.10 Ethical Considerations

Every research aims to adhere to a strict code of conduct, hold to some core principles and finally aims to contribute to the body of knowledge (Resnik, 2011). Sammons (1989) describes research ethics as a researcher’s commitment to conducting the research honestly to respect a participant’s privacy and, dignity and to truthfully observe human values and ethics. According to Resnik (2011), ethical considerations aid researchers to distinguish between acceptable and unacceptable behaviour.

Educational institutes follow strict ethical standards that aim to help the researchers, academic societies, and students, conduct, and coordinate their research or activities in ways that both establish and respect public opinion. They also aim to promote the values that are essential to collaborative work, accountability, respect, and fairness. This research took all these aspects and criteria into strict consideration and developed the research methodology. Special care was taken to keep all information given by the participants strictly and confidentially to guard their privacy. A cover letter was included which explained the purpose of the research to the respondents before conducting the survey. This letter was designed so as not to violate the self-esteem or self-respect of the participants and that no one would be feel forced to respond to the survey and it was made clear that all aspects of the survey is voluntarily. Finally, it was also mentioned that all the aspects of the survey responses would be logged without the registration of the respondent's identity, and that all the data would be kept strictly confidential.

The survey respondents will also have reminded regarding their ethical behaviour that once they volunteer to take part in this research, they should cooperate fully with obligations to be honest in their responses. A brief proposal for this study was submitted to UUM Collage of Arts for approval to conduct surveys with human subjects. It included information about the instrument to be used, the population sample, and the nature of this project, its purpose, focus and methodology. A detailed cover letter explained the mechanisms in place to preserve the respondents' anonymity and what the survey would include.

3.11 Sample Size

This assessment of the sample size depends on two criteria: the ratio of the number of variables to the number of factors; and the number of the factors to be extracted. In general, over 300 cases are considered adequate for analysis (Field, 2013). The sample size can seriously influence the reliability of the extracted factors. Factor analysis is a technique that requires a large sample size. Tabachnick and Fidell (2001) and Caprara, Barbaranelli, and Comrey (1995) advise that 50 cases are a very poor sample size, 100 are considered poor, 200 cases is considered fair, while 300 cases is the best (Fan, Thompson, & Wang; (1999) consider a sample size of 200 to be adequate. Meta-analysis of literature review revealed that most of the studies conducted in the technology acceptance field had collected data in the range of 200-300 samples.

After considering the previous research, the number of sample subjects was set at 300 (Alrawashdeh et al., 2012; Chen et al., 2009; Leong, Hew, Tan, & Ooi, 2013; Luan & Timothy, 2008; Pitchayadejanant, 2011; Raman & Don, 2013; Shin et al., 2011; Wang et al., 2009; Wilson, Mao, & Lankton, 2010). A good sample size tends to minimize the probability of errors, maximize the accuracy of population estimates and increase the generalisability of the results. A good sample size also achieves a better “goodness of fit” for the data.

3.12 Data Collection

Final Study Instrumentation: Student responses were based on the Likert scale, as explained earlier. These items were adapted from various published sources (Luan & Timothy, 2008; Pahnla et al., 2011; tharangkoon et al., 2014; Venkatesh et al., 2012; Wilson et al., 2010; Yu, 2012). Five-point Likert Scales ranging from “strongly disagree” to “strongly agree” were employed for responses to all these items. In

accordance with the usual methods, the reliability, validity, covariance and model fit indices were analysed.

3.13 Usability

At the outset this research assessed the usability of the content composition of the survey questionnaire. This assessment included the layout of the textual content, which should be legible, interesting and visually appealing. Barnum and Dragga (2001) describe usability as making systems easier to use and are closer to user needs and requirements of the user. The basic elements of usability which create visual designs include: the selection of typography, form, the unification of the text content hierarchy and maintaining a balance between dull and overwhelming designs (Fanning, 2005).

This study incorporated document formatting, content layout and visual design as suggested by the literature review (Smyth, Dillman, Christian, & Stern, 2006). The content designed to be as readable as possible, so that the respondent will be able to follow it easily. Line dividers were used to separate information and checkboxes were used for obtaining answers. Care was taken to avoid lengthy questions that could exceed two lines. All the sections of the questionnaire had simple and concise headings. The spacing between characters, words, lines and paragraphs were kept within the visual design standards which enhanced their legibility.

3.14 Reliability

One of the main concerns of this study is to assess the reliability of the instrument and to test its ability to measure a construct consistently for what it is intended to measure (Hayes, Walton, Szomor, & Murrell, 2001). This research followed Hayes et al. (2001)'s recommendations to assess the Internal Consistency Reliability.

Cronbach's alpha is the most common assessment performed to assess internal consistency (Santos, 1999). This test measures how well a survey addresses different constructs and provides reliable scores, by measuring two different versions of the same item within the same test. Cronbach's alpha test gives a score of between "0.00" and "1.00.", A score of 0.7 is generally accepted as a sign of reliability (Hair, Black, Babin, Anderson, & Tatham, 2006). This acceptance level accommodates both the sample size and the number of available responses.

According to Tavakol and Dennick (2011), the alpha value should be at least 0.70 to achieve an "adequate" scale and 0.80 to achieve a "good" scale. A detailed discussion of the internal consistency reliability and instrument Validity for the main study is conducted in the Principal Component Analysis (PCA) factor extraction stage of this study.

3.15 Instrument Validity (Construct Validity)

This research investigates instrument validity by conducting convergent validity and discriminant validity tests which are also termed as construct validity. These tests are discussed in the Results and Analysis chapter of this study due to their applicability associated with the results chapter.

3.16 Survey Instrument Design

As explained earlier, this study used surveys as the primary way of collecting empirical data. All of the UTAUT2 constructs and moderators will measure with multiple items. Each of these construct items was adapted as a result of an extensive review of technology acceptance literature (Luan & Timothy, 2008; Pahnla et al., 2011; Pheeraphuttharangkoon et al., 2014; Venkatesh et al., 2012; Wang et al., 2009; Wilson

et al., 2010; Yu, 2012). The questionnaire content was modified to suit the research requirements and the context of the study.

The Social Influence construct was redefined to suit the background of this study by replacing the original items which focused on the influence of family and friends to a purely academic social influence. This redefinition concentrated on the influence of classmates, peers and teaching staff in accepting the mobile application as an English language learning tool. Similarly, the Facilitating Conditions construct was redefined from the original item (which focused on technical support and technology reliability) to creating an environment which fosters the use of mobile application to get English language learning support from peers and friends.

The survey instrument adapted in this study had been used by numerous studies and was proven to be valid and reliable (Alrawashdeh et al., 2012; Pahnla et al., 2011; Raman & Don, 2013; Venkatesh et al., 2012; Wang et al., 2009; Yang, 2013; Yu, 2012). The questionnaire was developed on the basis of the UTAUT2 model (Venkatesh et al., 2012).

3.17 Pre-test: Preliminary Survey Instrument Testing

The assessment of content reliability for the survey instrument was performed using a two-step process. A Pre-Pilot was conducted which incorporated the views of three faculty members and 16 students from both contexts. This two-step instrument testing technique provided good feedback relating to the administration of the instrument, data collection methods, testing the instrument's reliability and validity and data logging techniques. It also provided a basic understanding of the statistical software which would be used for data analysis. Most of the students consulted for the Pre-Pilot were

directly involved in conducting survey-based research and instrument development. This Pre-Pilot was anonymous and was divided into two parts Pre-Pilot-I and Pre-Pilot-II:

Pre-Pilot-I

The Pre-Pilot-I survey was divided into two parts. The following section describes all the two parts (I and II) of the survey in succession.

Part I:

This part dealt with acquiring participants' demographic data, including their gender, age, university enrolment level and current year of study. It also collected information about their mobile ownership, mobile make, and duration of mobile use in years, mobile operating system, mobile expertise, and awareness of online learning resources. There were questions in this part of the questionnaire. The response scale for this section of the questions was subjective. This section will provide the data relating to the moderators of the study and aided in generating descriptive statistics.

Part II:

Part - II was the main questionnaire of this study, based on the UTAUT2 model. It enquired into all the seven constructs by using 28 questions. All the items of the survey were measured with a five-point revised Likert scale. The Likert scale for the main study was revised after discovering that 40% of the respondents preferred to choose neutrality as their response during the Pre-Pilot and Pilot survey. The Likert scale of the survey instrument was reorganised by assigning “strongly agree” (1), “agree” (2), “disagree” (3) “strongly disagree” (4) and “neutral” (0). Bishop (1987) posits that respondents prefer selecting the middle response (i.e., the neutral response) when given the option in the questionnaire. Schuman and Presser (1981) have conducted

experimental research in relocating the middle response of the Likert scale or omitting it. The Pre-Pilot respondents were asked about the clarity, wording, and format of the instrument. After the Pre-Pilot, a Pilot-test was conducted to further validate both the reliability and validity of the instrument.

Pre-Pilot-II: Feedback

The second part of the Pre-Pilot survey was the assessment of feedback over the clarity of the questions from each section, the sentence phrasing, the terminology used, the motivational level to answer the survey, the understanding of mobile applications and redundant questions in the survey. Respondents were asked to answer them in a ‘yes’, ‘no’ and ‘can’t say’ format as shown in Table 3.5. To improve the survey, the respondents were encouraged to underline errors, write suggestions or comments on the following topics: content language, content comprehension, language, grammar, survey time, content comprehension and the consistency of the questionnaire. It was assumed that such feedback would be very valuable in making the instrument more accurate and consistent and subsequently develop a successful questionnaire.

Table 3.6
Pre-Pilot Respondents’ Feedback

No Pre-Pilot Survey Feedback	YES	NO	Can't Say	<i>f</i>
Were the items in Part - I clear in meaning?	94%	0%	6%	16
Were the items in Part - II clear in meaning?	56%	38 %	0	16
Kindly underline unclear words or statements	88%	0%	0	16
Was the questionnaire scale appropriate for rating?	88%	6%	6%	16
Was the questionnaire targeted to English language?	94%	0%	6%	16
Do you understand the mobile applications?	75%	13 %	13%	16
Do you think the survey was well articulated?	13%	81 %	6%	16
Was the questionnaire time consuming to answer?	88%	6%	6%	16
Did the questionnaire interest you?	50%	38 %	13%	16

Were the questions repetitive?	88%	5%	5%	16
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Consequent improvements were conducted on the survey to improve the clarity of the text meaning or for the selection of better words as suggested by the respondents. After reviewing the feedback from the Pre-Pilot respondents, the survey's content, language, wording, technical terminology and a number of redundant questions were modified. Care was also taken to compose the survey layout, font type and size to make it graphically pleasing to read and answer, as explained in the usability aspect of this chapter. After the detailed revision from the Pre-Pilot response, the survey instrument was then tested in the Pilot study.

3.18 Pilot Study: Instrument Testing

To further confirm both the reliability and validity of the instrument, a Pilot study was also conducted. Teijlingen and Hundley (2001) suggest that Pilot studies provide good information as a preparation for the major study to test the instrument's validity and reliability. Denise, Beck, and Hungler (2001) recommend that the Pilot study should identify potential cautionary areas where the survey could fail.

The Pilot sample for this research comprised of a smaller number of participants with characteristics similar to those of the target group of respondents (Carmines & Zeller, 1979; Denise et al., 2001; Hair Jr, Hult, Ringle, & Sarstedt, 2013). Further, the Pilot study was conducted in both contexts (CX1 and CX2) separately in order to better understand the feedback of both the contexts. It was expected that this would not only represent the sample configuration of the main study, but it would also provide insight into how the survey could be administered and distributed in the two contexts.

Section - A of the Pilot test contained questions concerning the demographic data of the respondents. Section - D, the last part of the survey instrument, had the main questionnaire items of this research, which comprised of an initial 25 questions for the Pilot and were later increased to 28 questions. As noted earlier, the design of the survey instrument of this research was based on the earlier validated and tested UTAUT2 model (Venkatesh et al., 2012).

3.19 Pilot Study: Descriptive Statistics

The main objectives of the Pilot study were to improve the content validity of the preliminary version of the survey, as well as to understand the administration and feedback gathering methods. Content validity is the assessment of how much an empirical measurement reflects a specific area of content (Carmines & Zeller, 1979, p. 20). The assessment of the initial version of the survey instrument for face and content validity was performed by analysing Pilot data with Pearson's correlation.

As explained earlier, the UTAUT2 model measures seven constructs to assess student's behavioural intention to use mobile applications as English language learning tools. Similar to the survey instrument used in the Pre-Pilot, the Pilot study also incorporated all of the survey items by structuring them into two parts (I, and II) Part - I of the questionnaire comprised of demographic questions; Part - II was the main questionnaire of this study which was based on the UTAUT2 model and was designed to investigate the seven constructs via 28 questions. All of the items of the survey were measured with a five-point Likert scale, ranging from "strongly agree" (1), "agree" (2), "neutral" (3), "disagree" (4) and "strongly disagree" (5).

3.20 Pilot Study: Part - I Results

Of the 30 subjects surveyed, two were Men and 13 were Women for CX1; while 11 females and four males formed CX2. Between both contexts of the study, more than 85% of the students were found to be using mobile applications, and more than 60% of the users rated themselves as *expert to good* users of mobile applications. 33% of CX1 students used Apple iPhones and 60% of them used Android. In CX2 33% of the students used Android mobile applications and 40% used Apple iPhones. 50% of the students seem to be well aware of online content for English language learning as illustrated in Table 3.6.

Table 3.7
Pilot Study Questionnaire Part I: Descriptive Statistics

Part I: Questions		CX1		CX2	
		%	Frequency	%	Frequency
1	Gender				
	Female	13%	2	73%	11
	Male	87%	13	27%	4
2	Age (years)				
	Below 18	0%	0	0%	0
	18-20	7%	1	13%	2
	21-25	20%	3	13%	2
	26-30	40%	6	20%	23
	31-40	27%	4	47%	7
	Over 40	7%	1	7%	1
4	Program				
	Undergraduate	20%	3	20%	3
	Postgraduate	27%	4	53%	8
	PhD	53%	8	27%	4
5	Skill level				
	Expert User	20%	3	0%	0
	Good User	60%	9	60%	9
	Limited user	20%	3	33%	5
6	Choice Device		0		
	Smartphone	20%	3	40%	6
	Tablet	20%	3	7%	1
	Both	27%	4	7%	1
	None	33%	5	27%	4

3.21 Pilot Study: Part - II Results

This thesis examined the correlation between each question's scores with the dependent variable (behaviour intention). Statistical analysis was performed using SPSS 22. The

demographic data and scores were expressed in the form of percentage. Cronbach's α was used to evaluate internal consistency; the correlations among preliminary data were measured using Pearson's correlation. In this study, Pearson's correlation was defined as follows: $r < 0.3$, weak; $0.3 < r < 0.7$, moderate; $r > 0.7$, strong (Hair et al., 2006). P values of less than 0.05 were deemed to be statistically significant.

The correlation coefficients that form Part II of the questionnaire were examined individually for both contexts, using SPSS 22. The quantity r , which is the linear correlation coefficient, measures the strength and the direction of a linear relationship between two variables. Table 3.7 illustrates the relationship with the dependent variable behaviour intention (BI) against which all of the seven constructs of the UTAUT2 technology acceptance model was tested. The linear correlation coefficient is also referred to as the "*Pearson product moment correlation coefficient*" and is denoted by the letter r . To interpret the proportion of the variance of the dependent variable from the independent variable, the coefficient of determination is used. The coefficient of determination, r^2 gives the proportion of the variance (fluctuation) of one variable that is predictable from the other variable and this is the square of the correlation (r). It is computed as a value between 0 (0 %) and 1 (100 %). All the predictor variables of the UTAUT2 constructs in CX1 showed strong correlations with the dependent variable behaviour intention. This is indicative that the seven constructs are predictor variables.

The dominant correlation coefficients of the UTAUT2 model constructs on behaviour intention in CX1 are performance expectancy (0.929), hedonic motivation (0.876), social influence (0.855) and facilitating conditions (0.719). The correlation coefficient for effort expectancy (0.387) was low. Those for price (-0.039) and habit (-0.006) showed inverse effects. The dominant determinant coefficients for CX1 on BI were

performance expectancy (86%), hedonic motivation (77%) and social influence (73%). The determinant coefficient for effort expectancy (15%) was low. Price and habit did not show any correlation. The dominant correlation coefficients of the UTAUT2 model constructs in CX2 were hedonic motivation (0.847), performance expectancy (0.839), social influence (0.839), facilitating conditions (0.832) and effort expectancy (0.718). The correlation coefficients for habit (0.582) and price (0.342) were low. The dominant determinant coefficients for CX2 were hedonic motivation (71%), performance expectancy (70%), social influence (70%), facilitating conditions (69%) and effort expectancy (51%). The determinant coefficients for habit (34%) and price (11%) were low as shown in Table 3.7.

Table 3.8
Part-II, Correlation Coefficients of UTAUT2 variables

Constructs	Correlation Coefficients				Reliability Statistics	
	CX1		CX2		Cronbachs-Alpha	
	r	r ²	R	r ²		
					Performance Expectancy (PE)	0.879
BI-PE	0.929	0.863	0.839	0.704	Effort Expectancy (EE)	0.717
BI-EE	0.387	0.149	0.718	0.515	Social Influence (SI)	0.784
BI-SI	0.855	0.731	0.839	0.704	Facilitating Conditions (FC)	0.712
BI-FC	0.719	0.517	0.832	0.692	Hedonic Motivation (HM)	0.886
BI-HM	0.876	0.768	0.847	0.718	Price (PR)	0.879
BI-PR	-0.039	0.001	0.342	0.117	Habit (HA)	0.762
BI-HA	-0.006	0.000	0.582	0.339	Behaviour Intention (BI)	0.892

The comparative assessment of the determinant coefficients between the two contexts reveals that performance expectancy, social influence, facilitating conditions and hedonic motivations had almost similar effects in both the contexts. Effort expectancy, price and habit had different correlation coefficients between the two contexts.

Similarly, price and habit showed negative influence in CX1 while exhibiting positive correlation coefficients in CX2.

The main idea behind the comparison of the two contexts of this study was to prove the hypothesis that the BI to accept mobile applications as English language learning tools would vary across different contexts. This was clearly reflected in the Pilot study results as shown in Table 3.7. However, the sample size for the Pilot study was small. The effects referred to previously would be better reflected in the main sample.

The internal consistency reliability of the Pilot data was also assessed to ensure that all the items measuring the different constructs would deliver consistent scores. Table 3.7 illustrates the Cronbachs-Alpha values for all of the UTAUT2 constructs. All of the values obtained were above 0.7. According to Hair et al. (2006), any Cronbachs-Alpha values above 0.7 are considered excellent and Cronbach's alpha is a measure of internal consistency, which describes how closely, related a set of data are as a group. To conclude, the required levels of instrument reliability were established.

3.22 Summary of Pre-Pilot and Pilot Study Observations

The instrument, survey distribution, data collection and analytical techniques were all designed by incorporating the observations, analytical results, participant feedback from the Pre-Pilot as well as the Pilot study. To get the best feedback, thirteen participants were involved in the Pre-Pilot (three professors and 16 PhD research students from the education disciplines).

The participants of the Pre-Pilot and the Pilot were asked to complete the questionnaire and write their comments on those items that they considered could have better alternatives. The participants were also requested to review the words of each item as

well as comment on the time involved to complete the questionnaire (time that ideally should not exceed 12 to 15 minutes). The Pre-Pilot feedback was used to design the instrument with an appropriate, legible, easy to understand language and clear questions. Respondents were also consulted for their opinions in order to maximize the response. Many of the respondents from the Pilot study had emphasized a minimization of the number of pages in the questionnaire.

The results obtained from the Pilot study Pearson correlation revealed a strong positive correlation between all the items against the dependent variable showing strong evidence of theory proposed by this research. Internal consistency reliability was also measured to ensure that all the questionnaire items were measured consistently. The final version of the instrument was verified by identifying any confusing and ambiguous items, difficult vocabulary or complex sentence structures. Many items of the survey were rephrased for clarity after feedback was obtained from participants. A few items that were considered redundant were removed. Section headings were also modified, after the recommendations from the pre and Pilot survey feedback.

The Pilot study helped this research in identifying the potential means and, locations for questionnaire distributed and also in identifying the faculty of the two schools who could expedite a more homogenous, effective and unbiased distribution of the questionnaire. The validity of the questionnaire's content was tested during both the Pre-Pilot and the Pilot test. The faculty from the School of Computing, who are involved in various areas of questionnaire development and sampling, were solicited in order to improve the quality of the questionnaire. Data gathering, entry, and storage and management techniques were all improvised following the lessons learned during the Pilot study. Field notes were documented, and the filled survey responses were arranged

and coded in a manner that made sense to the researcher. The Pilot data also helped in identifying the list of students to be contacted. Their contact details were then organized in order to arrange for class visits where the survey could subsequently be distributed and administered. The experience from the Pilot study also helped in keeping the anonymity and, voluntariness of the respondents and in identifying any bias affecting the data collection procedure.

The Pilot study analytical results were conducted to test all of the items of the survey which were measured using the five-point Likert scale, ranging from “strongly agree” (1), “agree” (2), “neutral” (3), “disagree” (4) and “strongly disagree” (5). The Likert scale for the main study was changed after discovering that 40% of the respondents preferred to remain neutral in their response during the Pre-Pilot and Pilot surveys. The Likert scale of the survey instrument was reordered by assigning “strongly agree” (1), “agree” (2), “disagree” (3) and “strongly disagree” (4) and the “neutral” (0). This rearrangement of the scale was done to extract strong variance from the responses. This will subsequently aid in conducting efficacious factor analysis as well as building a robust structural equation model for hypothesis testing (Bishop, 1987; Nowlis, Kahn, & Dhar, 2002; Presser & Schuman, 1980).

3.23 Design of the Main Study Survey

The final version of the questionnaire (see Appendix B) was divided into two sections after analysing the results from the Pre-Pilot and the Pilot study. The questionnaire’s usability, validity and reliability were enhanced; whilst the few questions from parts I, and II which were found to be redundant, were removed or rephrased. Twenty-eight out of 48 items in Part II were retained after the Pilot study results. Most of the items that were removed were with low Cronbach’s Alpha, and a few were removed due to their

redundancy. All the items of the survey in Part - II were randomly placed. Special attention was paid to the usability and layout design principles to make sure the survey was interesting and graphically balanced. All of the elements of text and feedback tick boxes were placed in proximity and were aligned with each question. Enough space was added to create white spaces, around, above, below, or within the elements, creating positive and negative spaces that would be pleasing to the reader.

The instrument measurement was drawn from a solid theoretical foundation, while quantitative research was performed to select appropriate reliable measures required for this thesis. After conducting a detailed literature review, the following reliability and validity tests were identified as key measurements.

3.24 Data Analysis

This research conducted both inferential and descriptive statistics. Ryon (2013) posits that all quantitative data collected through a survey instrument, conducts descriptive and inferential statistics analysis. Both descriptive and inferential statistics provide different insights into the nature of the data gathered and engaging with one alone cannot give the complete picture (Creswell, 2009). The following paragraphs explain the descriptive and inferential statistics drafted for this research:

3.24.1 Descriptive Statistics

Descriptive statistics are statistical analyses that describe the gathered data. They are straightforward analyses which do not implicitly generalise beyond the collected data (Park, Nam, & Cha, 2012). The descriptive statistics used in this research was aimed to describe the basic features of the data and render simple summaries of the sample and the measures (Bless & Kathuria, 1993). IBM SPSS 22 software was used to conduct

descriptive statistics, factor extractions. Descriptive statistics conducted for this research is: arithmetic mean, frequency and percentage, range and standard deviation, skewness and kurtosis.

3.25 Inferential Statistics

Inferential statistics are often used to obtain conclusions after conducting data analysis, hypothesis testing, validating and reliability testing on the collected data (Babbie, 1992). With inferential statistics, the research tries to reach for conclusions that extend beyond the realm of descriptive statistics. The key benefit of inferential statistics lies in its ability to analyse and infer results from data which are based on random samples, taken from a population in order to deduce research hypotheses (Babbie, 1992; Lowry, 2014).

Multivariate data analysis involves taking appropriate steps and utilising the best practices to avoid subjective critical decisions (Williams, Brown, & Onsman, 2012). A detailed literature review in the domain of multivariate regression analysis revealed that a two-phase quantitative analysis would answer these challenges (Thompson & Daniel, 1996; Williams et al., 2012). The technique of multivariate regression analysis begins with conducting factor analysis, which is divided into two phases.

The first phase of this factor analysis is to conduct Principal Component Analysis (PCA), and the second phase Confirmatory Factor Analysis (CFA). PCA examines the data and its variables and extracts the best set of variables. IBM SPSS 22 software was used to conduct, factor extractions. Data after factor extraction was then made ready for the CFA phase. The second phase (CFA) checked the extracted set of variables against the model fit index, assessed the research validity and reliability, and in the end

it verified the research hypothesis as suggested by (Beavers, Lounsbury, Richards, Huck, Skolits, & Esquivel (2013). IBM AMOS 22 software application was used to conduct CFA, which involves developing measurement structural models' Convergent validity. Discriminant validity was conducted to check the validity of the instrument. The following sequence describes both PCA and CFA.

3.25.1 Phase-I: PCA (Factor Analysis)

The researcher assessed the seven constructs of the UTAUT2 model (Venkatesh et al., 2003; Venkatesh et al., 2012) on behaviour intention. This model was used to predict behavioural intentions to use mobile application as English language learning tools by comparing two contexts: the School of Computing (CX1) and the School of Education and Modern languages (CX2). All of the items used in the questionnaire were based on previously conducted research on the UTAUT and UTAUT2 models, as well as the research relating to the adoption and use of technology.

The first stage in the PCA technique helps to test the adequacy of statistical power, sample size and, data readiness for factor analysis. The second stage test checks the measure for sampling adequacy using Kaiser-Meyer-Olkin (KMO) and goodness of fit test using Bartlett sphericity tests (Beavers et al., 2013). The KMO test indicates significant results (0.924*** $P < 0.001$). For factor analysis to be suitable, Bartlett's test of sphericity must be significant ($p < .05$) (Wu, Yu, & Weng, 2012; Wu, Tao, & Yang, 2008). Inaccurate sampling sizes are one of the main reasons for poor model fit. Poor reliability and validity of the instrument may also be the reason for a model which displays a poor fit (Hair et al., 2006).

The third stage extracts factors which are in accordance to conforming to the eigenvalue rule. Any factor whose eigenvalue is less than 1.0 will be retained for interpretation (Kaiser, 1958). Kaiser's criterion reasons that a component having an eigenvalue greater than 1 account for more variance than a single item. This suggests combining such items into a factor/component in conjunction to the corresponding percentage of the variance explained.

The fourth and the final stage conducts PCA in which variance between the unobserved variables are analysed. These techniques attempt to identify any underlying "factors" using a multivariate analysis procedure that identifies the covariation among a set of independent variables (Joy, 2007). PCA also reduces the number of variables used to explain a relationship, or to determine which variables that show a relationship.

3.25.2 Phase-II: Structural Equation Modelling (SEM)

Structural Equation Modelling is a series of quantitative methods which allow analysing complex relations between one or more independent variables with one or more dependent variables (Abdulwahab & Zulkhairi, 2012; Hair et al., 2006). SEM combines factor analysis and multiple regression analysis. Path analysis and multivariate regression are all special cases of SEM (Maruyama, 1997). SEM is a largely confirmatory, rather than exploratory technique (although they have been used as exploratory research tools) (Weston & Gore, 2006). As described earlier, the SEM involved four steps which begins with testing for Model Fit and Goodness of Fit followed by testing of the Validity and Reliability of the model. The third step in the CFA is developing the Structure Model (Multivariate Regression) and the final fourth step tests the Hypotheses (Z-Score Group Difference test) in this research.

The first stage includes Model Specification and Model Estimation. Model specification involves using all relevant theories and research information to construct a theoretical model. Model identification refers to the loads on an individual construct. A measurement model is the part of the model that examines relationships between the latent variables and their measures. The Model Estimation step involves estimating the parameters in the measurement model in order to compute the sample regression weights for the independent predictor variables. It is assumed here that there are no missing data and no outliers in the sample data. There are five known methods of model estimation:

1. Diagonally Weighted Least Squares
2. Unweighted Least Squares
3. Normal Theory Generalized Least Squares
4. Maximum Likelihood for Multivariate Normal Distributions
5. Weighted Least Squares for Arbitrary Distributions

The second stage includes Model testing which involves determining the fit of the theoretical model by examining the extent to which the theoretical model favours the collected sample data supporting that model (Browne & Cudeck, 1992). The common fit indices included for this research are; goodness of fit index (GFI), the normed fit index (NFI), the comparative fit index (CFI), the root mean square of approximation (RMSEA), the root mean square residual (RMR), and standardized root mean square residual (SRMR) (Hair et al., 2006; Hooper et al., 2008; Schumacker & Lomax, 2004; Weston & Gore, 2006).

The third stage deals with developing a structure model which is a path diagram with the dependent and independent variable relationships as per the adopted UTAUT2

model. This step conducts path analysis and the resultant significant regression path coefficients which will be used to assess the hypotheses of this research. The final stage of CFA will then test the four sets of hypothesis. The first hypothesis set will be tested by reporting the significant levels of path coefficients. The other three sets of hypotheses will be tested, using the Z-score group comparison testing, which is discussed in detail in the conclusion and discussion chapter of this thesis.

3.25.3 Hypothesis Testing Criteria

The structural model developed in the CFA third stage depict correlations among dependent and independent variables which are identified with positive or negative directions (Byrne, 2013).

In this study, the two groups' path coefficients (regression weights) are computed to generate a z-score. The ratio of this group difference test must exceed ± 1.96 in order for the relationship to be judged significant as shown in Table 3.8.

Table 3.9
Critical P-Values and Z-Scores for Different Confidence Levels

Z-score (Standard Deviations)	P-value (Probability)	Confidence level
< -1.65 or > +1.65	< 0.10	90%
< -1.96 or > +1.96	< 0.05	95%
< -2.58 or > +2.58	< 0.01	99%

To reject the null hypothesis, the research will make a subjective judgment regarding the degree of risk to accept for falsely rejecting the null hypothesis. This thesis adopts a range of 0.01, 0.05 and 0.1 levels of confidence to reject the null hypothesis. The Table 3.8 shows the critical p-values and z-scores for different confidence levels.

3.26 Phase II: Qualitative

The second phase of the data collection in this study was semi-structured interviews. The qualitative data was collected from the participants of this study (undergraduates and master students of SOC & SEML) through face-to face interviews (Creswell, 2003). The interviews were conducted with ten participants who had experience in Universiti Utara Malaysia. The Interview results were integrated during the discussion of the outcomes of the current study (Ivankova, Creswell, & Stick, 2006).

3.26.1 Sampling Techniques

Kothari (2004) defines sampling as the process of choosing a portion of the aggregate or totality of the individuals that make up the population. One of the most effective methods for selecting a group of people that is both large enough to be really representative of the community from which it has been picked and small enough for easy data collection is sampling.

Purposive sampling, a non-probability method of sampling in which a group of persons is specifically targeted to get reliable research data, was utilised in this investigation (Tromp and Kombo 2006). The purpose of the participant selection process was to help the researcher get insight into the field of study. Using purposive sampling, undergraduates and master students of SOC & SEML UUM students as the participants.

Data collected from surveys was complemented by semi-structured interviews with undergraduates and master students of SOC & SEML selected population. The interviews were conducted with the final consent of the interviewee. Interviews are valuable for gathering oral data from predetermined categories, which cannot be anticipated beforehand (Brown, 2001). They also help researchers understand participants' personal contexts (Richie & Lewis, 2003). Interviews are also very useful

in exploring participants' thoughts, feelings, and intentions, which are challenging to observe otherwise (Patton, 1990).

Therefore, to ensure the honesty and accuracy of the interviewees' viewpoints, one-on-one interviews were arranged. These interviews allow for the interviewees' confidentiality (Brown, 2001) and give them the freedom to express their true opinions. For this study, a separate room was utilized for the interviews, as is available in the institutions. This allowed the interviewees to share their unbiased views. The interviews were conducted with ten individuals from undergraduates and master students of SOC & SEML.

Table 3.7 presents the attributes of interviewees that the researcher took into account when analyzing the qualitative data, including gender, education, and area of expertise. The majority (seven) of the participants were female, while three were male. All interviewees held a bachelor's and master's degree in various fields.

Table 3.10
Profile of participants

Sr. No.	Name	Gender	Under Graduate/ Semester	Masters	Years of Studying in UUM	Specialization
1	Ameenah	Female	III		01	Education
2	Shahrul	Female	IV		01	Computers
3	Zuleka	Female		Final Year	03	Education
4	Shamima	Female	V		02	Computers
5	Ahmed	Male		Final year	04	Education
6	Husmah	Female	V		02	Education
7	Pooja	Female		Final Year	03	Computers
8	Subramanyam	Male		Final year	03	Computers
9	Zulfi	Male		Final Year	04	Education
10	Lu yu chi	Female	II		01	Computers

3.26.2 Data Collection

A methodology for conducting interviews was created in order to collect data from the participants. Before the first interview, each participant received a copy of the consent letter asking for their permission to take part in the study. The interview was scheduled to last 30 to 120 minutes, as determined by the researcher. Semi-structured interviews were recorded with the participants on an audio cassette (Creswell, 2014). There was no variance in the substance or context of the questions since the researcher addressed pertinent questions in an effective manner. Nonetheless, the questions were sufficiently open-ended that answering one may lead to another (the interview questions are in Appendix C).

3.26.3 Data Analysis

Face-to-face interviews were used to gather data from the participants (undergraduates and master students of SOC & SEML.) in the second phase of the qualitative study. NVivo a qualitative analysis program was used to do a thematic analysis of the data that had been gathered. The programme made it easier to save, sort, analyse, and be ready for a graphical depiction of the data. The researcher was able to prepare study reports and create diagrams of the data more quickly and easily with the help of NVivo, which also sped up the process of analysis.

3.26.4 Ethical Consideration

Prior to the interviews, each participant signed a written consent form (Appendix-B), which included information about the study's objectives and an assurance of confidentiality. During the interviews, the researcher noted several standard ethical issues noted by Saunders et al. (2009), such as:

- I. Respecting participants' right to privacy.
- II. Allowing participants to withdraw from the study at any time.
- III. Obtaining consent forms signed by participants.
- IV. Preserving the confidentiality of the data provided by participants and their anonymity.
- V. Engaging with participants to gather relevant data, and the impact of the method.
- VI. Behaviour and objectivity of the researcher.

3.27 Summary of the Chapter

This chapter discussed the research methodology adopted for this study. The nature of this research is explanatory sequential mixed methods design was adopted in this study, where the questionnaire and interview were used in collecting the data. The strategy, the type of data and the analysis method adopted was a quantitative comparison between two groups' intention to accept mobile applications as English language learning tools. The model adopted was UTAUT2 and the survey instrument was a developed after conducting a Pre-Pilot and Pilot study. Data was collected after employing opportunity sample techniques, with responses from 300 participants. The study measured seven independent constructs of the UTAUT2 model against the dependent variable (Behaviour Intention). The data analysis includes descriptive and inferential statistical techniques. The inferential analysis commenced by conducting factor analysis in order to identify the best set of variables for each measured parameter, tested the model fitness and finally validated the instrument using the confirmatory factor analysis technique. To test the hypothesis of this research, the validated data was path analysed and compared with the group difference test. The next chapter will

discuss the descriptive and inferential statistical analysis and results in detail. The qualitative research software, NVivo was used for the qualitative data analysis.



CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the results from the four parts of the survey (Parts I and II). Part I recorded demographic data; Part II collected information regarding the UTAUT2 model for technology to access the acceptance of Mobile application in Universiti Utara Malaysia for English language learning. As explained in the research methodology chapter, this thesis aims to investigate technology acceptance by comparing two different education contexts: – the School of Computing (CX1) and the School of Education and Modern languages (CX2).

The first section explains how the data was collected, logged and screened. It provides descriptive statistics and demographic information from Part I of the questionnaire. It also examines the students' impressions of using mobile application for English language learning, as assessed in the survey, as well as the feedback gained from students about their current use of mobile application as an English language learning tool.

Section two describes two important aspects of data analysis from Part II of the questionnaire. Foremost, it describes the best set of variable extraction (extraction of the best set of items or questions using Principal Component Factor Analysis or PCA). The second part defines the Confirmatory Factor Analysis (CFA). The CFA model confirms the appropriateness of the extracted items from the PCA. Section two concludes by validating the extracted set of questionnaire items, the reliability of the instruments used to collect the data and the results. It also explains the Structural Model

(Paths) which were used for multivariate regression analysis to test the four sets of hypotheses used in this thesis.

4.2 Section 1: Descriptive Statistics (Questionnaire Part I)

Data were collected over a six-month period. The final questionnaire was distributed after the pre-Pilot and Pilot testing. These two preliminary tests were intended to validate the initial content reliability and consistency and to check how long it would take to administer the questionnaire before it was given to the sample population. The results and observations of the Pre-Pilot and Pilot study enabled the survey to be fine-tuned. The Pre-Pilot and the Pilot studies were also conducted to achieve the acceptable levels of face validity, reliability and consistency for the final administration of the questionnaire to the survey population.

The development and testing of the survey instrument focussed on its proper fit for the statistical analysis methods to be used in the data analysis. The final questionnaire instrument was based on the UTAUT2 model, this study distributed a total of 770 questionnaires and received 311 responses. Approximately 99% of the questionnaire was answered on paper, and 1% was answered online. A cover letter informed and instructed students about the scope of the survey. A total of 12 questionnaires were invalidated due to incomplete submissions. A detailed description of the data sample and descriptive information is illustrated in Table 4.1. The frequency column summarises the total number of cases.

Table 4.1
Descriptive Statistics of the Total Sample of this Study

Variables	N	Mean	Std. Deviation
	Statistic	Statistic	Statistic
Performance Expectancy (PEX01)	299	2.63	1.02
Performance Expectancy (PEX02)	299	2.32	1.112
Performance Expectancy (PEX03)	299	2.8	1.036
Performance Expectancy (PEX04)	299	2.31	1.072
Effort Expectancy (EEX01)	299	2.86	0.974
Effort Expectancy (EEX02)	299	2.53	1.018
Effort Expectancy (EEX03)	299	2.63	1.071
Effort Expectancy (EEX04)	299	2.28	1.145
Social Influence (SI01)	299	1.57	1.358
Social Influence (SI02)	299	1.61	1.327
Social Influence (SI03)	299	1.4	1.258
Facilitating Conditions (FC01)	299	2.67	0.927
Facilitating Conditions (FC02)	296	2.97	0.825
Facilitating Conditions (FC03)	294	2.47	1.159
Facilitating Conditions (FC04)	299	2.02	1.163
Hedonic Motivation (HM01)	299	2.25	1.263
Hedonic Motivation (HM02)	297	2.19	1.239
Hedonic Motivation (HM03)	299	2.18	1.219
Price Value (PR01)	299	2.31	1.196
Price Value (PR02)	299	2.52	1.202
Price Value (PR03)	299	2.37	1.15
Habit (HA01)	298	2.44	1.045
Habit (HA02)	299	1.86	0.945
Habit (HA03)	299	2.03	1.096
Habit (HA04)	299	2.54	1.037
Behaviour Intention (BI01)	299	2.51	1.047
Behaviour Intention (BI02)	299	2.2	1.13
Behaviour Intention (BI03)	299	2.51	1.063

4.2.1 Data screening

In order to ensure that the data is clean for conducting multivariate regression analysis, it is first screened for accuracy, usability and consistency. The next step of the data screening phase deals with ensuring the reliability and validity of the survey instrument. Data was inspected visually for possible bias, outliers and any other possible errors.

Eleven cases were excluded from the study as they did not include the complete details of the respondent's School name, educational level or gender.

IBM SPSS 22 and Microsoft Excel 2010 software applications were used throughout the descriptive data analysis of all the sections of the questionnaire and for conducting factor analysis. Initial data entry was done in Microsoft Excel 2010 as it offers intuitive tools, interface and techniques in order to simplify data entry, check its consistency and missing data. It offers excellent data handling and superb data backup.

4.2.2 Missing Data

Respondents might neglect some questions or choose not to answer them, possibly due to stress, fatigue, sensitivity or lack of information; this data, or lack of it, is termed "missing data" (Schlomer, Bauman, & Card, 2010). A lack of response is considered a missing value, and a good understanding of such missing values is critical to efficient data management. Inaccurate results could result if missing values are not properly handled.

There are many techniques used to manage missing data. One of these is the list wise deletion method that requires discarding any record missing from one variable. Another technique is the pairwise deletion for bivariate correlations where statistics are calculated based on existing pairwise data. Mean substitution is a technique where the mean value is substituted for the missing variable. There is also regression methods which are used to develop regression equations built upon complete cases for each variable. These equations are used to predict missing values.

Only 22 items from 8708 items in the questionnaire set (28 questions X 311 respondents = 8708 responses) were missing. However, these missing items did not affect the

analysis of the data. No corrective measure was taken on data missing from the demographic section. This situation was due to student error where a single question would be answered twice and the preceding or following question would be unmarked. The recommended percentage of any missing data is 5% to 10%, and the missing data in this thesis amounted to 0.15% which is favourable (Sekaran, 2006). The number of questions with missing data was studied; 28 items had missing data from nine questionnaires, which is considered insignificant with respect to 299 cases for each item. This percentage of missing data was not a problem.

Demographic data was acquired for all of the respondents leaving three exceptions. Missing data appears in most studies related to behavioural science (Acock, 2005; Allison, 2001). The American Psychology Association (APA) suggests that researchers should report missing data configurations and the underlying techniques used to challenge this difficulty (Brulhart & Klein, 2005; Wilkinson, 1999).

Previously, popular data analysis applications and software that were used to analyse missing data were complex and expensive. Now, tackling missing data can be more easily achieved using cheaper and more powerful computing resources. Even though the proper reporting and handling of missing data is essential for data analysis, this is often omitted from research reports. However, in the case of this thesis, the levels of missing data were negligible, rendering such efforts unnecessary.

4.2.3 Normal Distribution Assessment

While it is essential to assess normality at the outset of data analysis, the main point of interest is to check for outliers and linearity (Field, 2009). Before starting with the multivariate analysis technique, it is assumed that the data is normally distributed, and

the two indicators of normality are skewness (bias) and kurtosis (Mardia, 1970). The curve is normally distributed as a bell-shaped curve with the graph falling off evenly on either side of the mean with zero skewness and kurtosis. This research notes that positively skewed distribution curves illustrate scores clustered to the left, with the tail extending to the right. A negatively skewed distribution curve shows scores clustered to the right, with the tail extending to the left corresponding to the values of the Likert scale used in this research (Garson, 2012).

A consistent negative skewness was displayed, which indicated that a higher number of students agreed to all the variables of the study. This is further supported by the large variable means which indicate that most of the variables have been agreed with (10% strongly agree, 47% agree, 16% have no opinion, 22% disagree and 5% strongly disagree). No apparent outliers were detected, as shown in Figure 4.1.

The results relating to the normality test for sample two indicated that the maximum and minimum absolute values of skewness were 0.143 and -1.167 respectively. The range of values were well below their respective cut-offs of 3 for skewness and 8 for kurtosis as suggested by Weston and Gore (2006). Hence it can be inferred that the data sample variables for the two education contexts of the study were approximately normally distributed.

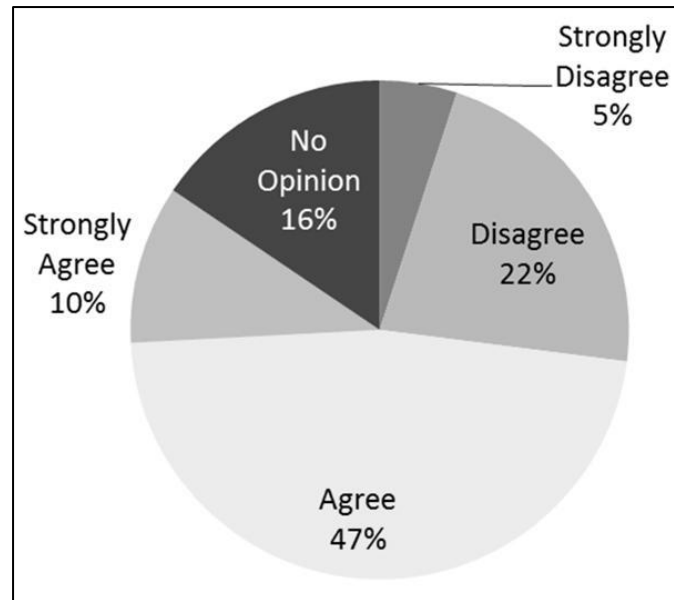


Figure 4.1 Percentage of Student Response for all of the Survey Questions

The results pertaining to the normality test for sample one indicated that the maximum absolute values of skewness and kurtosis were 2.715 and -1.560 respectively except for two items which were above 2.5 skewness levels. All the values were well below their respective cut-offs of 3 for skewness and 8 for kurtosis as suggested by Hooper et al., (2008), implying that the observed variables in sample one were normally distributed. Often, researchers report that each of the univariate distributions has skew and kurtosis within reasonable ranges. Different rules of thumb have been suggested (based on various simulation studies for factor analysis type models). Kline and Santor (1999) stated that skew > 3 is extreme skewness and kurtosis > 10 is extreme kurtosis.

4.2.4 Outliers

Outliers are values that differ significantly from the majority of the data set and may fall outside the overall trend. Outliers are generally caused by measurement error; or they may indicate the presence of an unknown phenomenon. In this study only two outliers were identified in the demographic section of the data set of this study by

examining the Tables produced from the SPSS 22.0 for the observed variables. According to Anderson, Chu, and Weitz (1987) if outliers are a section of the population, these outliers should be included in order to ensure generalizability of the entire population. The outliers identified in this thesis were retained in the data set. True normality is an ideal that is technically rare. Data that shows a reasonable departure from normality can be used in parametric procedures without losing validity (Elliott & Woodward, 2007).

4.2.5 Evaluating Correlation Matrix

The correlation matrix of all the construct items was assessed by visual inspection individually. The analysis of this matrix shows substantial significant correlations above 0.30 for all the items except effort expectancy (EE03) and facilitating conditions (FC02) (Pallant, 2007). The data collected in this thesis can be analysed and developed using the structural equation model (SEM) to test the research hypotheses.

4.3 Questionnaire Part-I: Demographic Data Analysis

Table 4.2 presents the frequencies among respondents' demographic data (i.e., gender, age, university enrolment level) as well as the current year of study, mobile application expertise and student awareness of mobile applications. The frequency column summarises the total number of cases while the other column displays this frequency in percentage form. The school of computing consists of Build a strong knowledge, principles and skills in information technology, develop analytical and critical thinking skills to solve problems by applying knowledge, principles and skills in information technology, understand the concept of analysing, designing, implementing and managing information technology solutions and resources, and recognise the impact of technology on individuals, organisation and society.

The school of education and modern languages consists of the history and philosophy of education, educational sociology and educational psychology. This research hypothesises that the two contexts, gender and educational levels, are more likely to moderate the behaviour intention of the student to use mobile application. Approximately 99% of the survey responses were answered on paper, with only 1% answered online. The students were thoroughly guided and informed about the scope of the survey via a cover letter. As noted above, a total of 12 questionnaires were invalidated owing to incomplete submission. This is illustrated in Table 4.2.

Table 4.2
Respondents gender distribution (Total Sample):

Part I Question-01	CX1 (133)		CX2 (166)	
Gender	Frequency	%	Frequency	%
Female	30	23%	111	67%
Male	103	77%	55	33%

There were 133 respondents in CX1 and 166 respondents in CX2. In CX1, females made up 23% of the respondents and males made up 77%. In CX2, females made up 67% of the respondents and males made up 33%. The difference in percentages between the two contexts portrays an ideal contrast of gender, where the number of females in CX1 is balanced by the number of females in CX2 and the number of males in CX1 is balanced by the number of males in CX2, as shown in Table 4.3.

Table 4.3
Respondents' Age Group

Age	CX1 (133)		CX2 (166)	
	Frequency	%	Frequency	%
Below 18	1	1%	0	0%
18-20	42	32%	60	36%
21-25	54	41%	55	33%
26-30	21	16%	16	10%
31-40	15	11%	19	11%
Over 40	0	0%	16	10%

The respondents were divided into six age groups; below 18, 18-20, 21-25, 26-30, 31-40, and those over 40. This grouping was done after obtaining feedback from the Pre-Pilot survey. Of these age groups, 21-25 showed the highest rate of response in both contexts (CX1 - 41%, CX2 - 33%), followed by the age group 18-20 (CX1 - 32%, CX2 - 36%) while almost no response was received from those below 18. The age group below 18 showed almost no response in both contexts, with CX1 showing only 1% and CX2 showing nothing.

It was observed that the population was the highest for the respondents aged 18-25 with a percentage of 70 for each of the two education contexts. The data also showed an almost equal distribution between two of the age groups (18-20 and 21-25) of the two education contexts. Between the two education contexts, the age group 21-25 showed a slightly higher percentage of respondents in CX1, while the 18-20 age groups showed a slightly higher percentage of respondents in CX2. The age groups 26-30 and 31-40 displayed a lower rate of response (in both education contexts), with a percentage ranging between 10%-16%; with the age group 26-30 in CX1 displaying a higher

percentage of 16. The age group over 40 from CX1 was absent, while in CX2 they accounted for 10% of the respondents.

The third question was designed to determine students' educational levels, and was divided into undergraduates and postgraduates. The postgraduate category included both Master's and PhD students. Undergraduates in CX1 and CX2 showed a response rate of 68% and 76% respectively while postgraduates in CX1 and CX2 showed a response of 31% and 24%. These responses reflect the total university enrolment of undergraduates and postgraduates (CX1 and CX2) focused on in this study, as demonstrated in Table 4.4.

Table 4.4
Respondents' Education Levels

I am currently enrolled in	CX1 (133)		CX2 (166)	
	Frequency	%	Frequency	%
Undergraduate	91	68%	126	76%
Postgraduate (Masters+PhD)	42	31%	40	24%

The fourth question sought to determine the student's current year of study. Second year students were the highest respondents in both contexts (CX1-39%, CX2-46%), followed by first year students (CX1-30%, CX2-13%), and then by fourth year students (CX1-17%, CX2-17%), as shown in Table 4.5.

Table 4.5
Respondent's Year of Study

Year of study for current programme	CX1 (133)		CX2 (166)	
	Frequency	%	Frequency	%
First	40	30%	22	13%
Second	52	39%	77	46%
Third	18	14%	38	23%
Fourth	23	17%	29	17%

The fifth question asked whether respondents owned Smartphones. This was a significant question in order to discover the ownership of Smartphones in these schools, and whether their popularity followed the global trend as evident in the literature review of this study. Around 95% of the respondents from both contexts owned Smartphones, thus proving their universal usage as shown in the Table 4.6.

Table 4.6
Respondents Smartphone and Tablet Ownership

I own a Smartphone/Tablet	CX1 (133)		CX2 (166)	
	Frequency	%	Frequency	%
Smartphone	102	77%	114	69%
Tablet	5	4%	1	1%
Both	23	17%	44	27%
None	3	2%	7	4%

The sixth question examined the user's competency with using mobile application. Almost 90% of the respondents from both education contexts expressed their range of skills at using mobile application as good to expert (see Table 4.7). The last question focused on the respondent's awareness and knowledge of free available famous mobile application. Almost 75%-65% of the respondents from both education contexts was aware of popular mobile application for English language learning. This is illustrated in Table 4.8. These popular resources were listed from the literature review.

Table 4.7
Mobile Application User Expertise

My skill in using mobile application	CX1 (133)		CX2 (166)	
	Frequency	%	Frequency	%
Expert User	39	29%	28	18%
Good User	84	63%	119	72%
Limited User	9	7%	16	10%

Table 4.8
Respondents' Awareness of Online Resources

I am aware of the following Mobile Application for ELL	CX1 Frequency	%	CX2 Frequency	%
Duolingo	2	2%	1	1%
Memrise	3	2%	0	1%
Busuu	7	5%	13	8%
FluentU	30	23%	2	1%
Mosalingua	3	2%	0	0%
Rosetta Stone	24	18%	29	17%
Mind Snacks	31	23%	86	52%
None	33	25%	33	20%

Part I clearly indicates that students believe that the mobile application is a useful tool for English language learning. The descriptive data analysis also indicated that students believed that mobile application based English learning resources are understandable and easy to use. Furthermore, they believe they would help them to collaborate with peers, friends and communities.

The descriptive statistics also supported student confidence that they had the necessary resources, knowledge and expertise to use mobile application for English language learning. Students in this survey believed that mobile application learning was a good idea. The two parts of this questionnaire evoked students' responses that strongly supported the use of mobile application as English language learning tools.

4.4 Questionnaire Part II

Part II focused on the main set of questions for this thesis. In this part of the survey, questions were designed for hypothesis testing and to validate the efficiency of the UTUAT2 model. Part II was designed to assess the effect of moderators on the

acceptance of mobile application as English language learning devices in the two education contexts.

As explained earlier, the initial data analysis included validating the UTAUT2 model followed by testing the effect of the contexts (the School of Computing: CX1 and the School of Education and Modern Languages: CX2), as well as gender (Men and Women) and educational level (undergraduate and postgraduate). The third set of data compared the effects of these moderators; that is, the differences between opposite genders in a context, as well as the differences between the same genders across the education contexts.

As noted elsewhere, the main purpose of this thesis is to test the effect of different contexts (CX1 and CX2) of education to moderate the adoption of mobile application as English language learning tools. In CX1, Men constituted 77% of the respondents; while in CX2, they made up 33%. In CX1, Women constituted 23% of the group sampled and in CX2, 67%. Gender was studied as a principal moderator in all of the research using the UTAUT2 model (Alrawashdeh et al., 2012; Pahnla et al., 2011; Venkatesh et al., 2012; Xu, 2014; Yang, 2013).

Educational level is a better representation of age in the educational context. This thesis found that undergraduate students were mostly of similar age, as were the postgraduate population. Study participants were students from the School of Computing (CX1=133) and the School of Education and Modern Languages (CX2=166), both from Universiti Utara Malaysia. Data was collected in person, by visiting all of the classrooms of both schools. Kiosks were also placed in the library for any student wanting to submit a survey. An online version of the survey was also developed using the university polling

application “Qualtrix”. The online link was also distributed to students in the library and student café via handouts.

4.5 Extracting Best-Set of Factors using (PCA)

The stage of PCA deals with examining the communalities and screening the set of extracted variables using factor extraction criteria, as outlined below.

1. Minimum items loadings on the appropriate factor should be above 0.50
2. Items should not load on multiple factors
3. Items should not demonstrate negative loadings

Once the factor extraction has been completed, the ‘communalities’ are examined to reveal how much of the variance in each of the original variables is explained by the extracted factors. A 75.1 % of the variance in the PX02 (performance expectancy) variable is explained by the extracted components. Any item with less than 50% demonstrated communality for a variable is excluded from the analysis. This means that the factor solution contains less than half of the variance in the original variable, and the explanatory power of that variable is not well represented, hence higher communalities are desirable. Table 4.11 illustrates the initial and extracted communalities.

By definition, the initial value of the communality in a principal components analysis is 1. The values in this column indicate the proportion of each variable’s variance that can be explained by the principal components. Variables with high values are well represented in the common factor space, while variables with low values are not well represented. The communalities illustrated in Table 4.11 display all the variables above 0.50. No variable was excluded on the basis of low communalities. The finalisation of

factor extraction in principal component analysis was carried out by using the Promax factor rotation technique and Kaiser normalization. This step primarily eliminates variables which do not load on any factor, or variables that load on multiple factors, or variables which load lower than 0.5. With the exception of items of the habit construct which cross loaded heavily with other factors, all the relevant items were retained as listed in Table 4.12.

Table 4.9
Communalities: Extraction Method: Principal Component Analysis

Items	Initial	Extraction
PE02	1.000	0.751
PE04	1.000	0.660
PE03	1.000	0.780
EE02	1.000	0.790
EE03	1.000	0.769
EE04	1.000	0.666
FC01	1.000	0.648
FC02	1.000	0.739
FC03	1.000	0.708
BI01	1.000	0.765
BI02	1.000	0.752
BI03	1.000	0.676
HD03	1.000	0.868
HD04	1.000	0.739
HD02	1.000	0.733
SI03	1.000	0.689
SI01	1.000	0.775
SI02	1.000	0.782
PRI01	1.000	0.810
PRI03	1.000	0.858
PRI02	1.000	0.797

According to Costello and Osborne (2011), to simplify the factor extraction, the effect of habit was eliminated as a construct. In Table 4.13 (extracted from SPSS 22), all of the seven items loaded above 0.5 and most of the 7 items from the initial set of 28 did not meet the above-mentioned criteria (i.e., item loading loaded above 0.5) and were eliminated at this screening level.

The set of factor extraction was obtained after seven iterations of rotation during the principal component factor (PCA) item analysis and evaluation. Table 4.14 contains the extracted factor loading along with their reliability alphas for students' acceptance of mobile application as an English language learning tool in the two contexts. The number of items was reduced to 21, resulting in a reliability improvement of above 0.90 for all the extracted items. Hair et al. (2006) recommends loadings on the appropriate factor should be above 0.50. Moreover, all the factors combined explained 75% of the total cumulative variance.

Table 4.10
PCA Pattern Matrix and Extracted Factor Loading

		1	2	3	4	5	6	7
Price (PR)	PR03	0.943						
	PR01	0.888						
	PR04	0.850						
Social Influence (SI)	SI11		0.844					
	SI03		0.841					
	SI12		0.837					
Hedonic Motivation (HM)	HM03			0.976				
	HM02			0.791				
	HM01			0.747				
Facilitating Conditions (FC)	FC03				0.852			
	FC02				0.843			
	FC01				0.644			
Effort Expectancy (EE)	EE03					0.785		
	EE02					0.727		
	EE04					0.670		
Behaviour Intention	BI01						0.881	
	BI02						0.874	

(BI)	BI03	0.542
Performance	PE02	0.844
Expectancy	PE01	0.762
(PE)	PE03	0.512

Table 4.11

Factor Matrix and Measurement Model Instrument Reliability and Validity

Constructs	Code	Item	Mean	Std. Dev.	Cronbach's Alpha ≥ 0.8, Meritorious)
Performance Expectancy	PE	PE02	2.32	1.112	0.936
		PE01	2.18	1.160	0.935
		PE03	1.82	1.294	0.936
Effort Expectancy	EE	EE02	2.53	1.018	0.936
		EE03	2.63	1.071	0.937
		EE04	2.28	1.145	0.936
Social Influence	SI	SI01	1.66	1.350	0.936
		SI02	1.78	1.313	0.938
		SI03	1.78	1.360	0.936
Facilitating Conditions	FC	FC03	2.60	1.033	0.938
		FC02	2.72	1.015	0.938
		FC01	2.36	1.186	0.936
Hedonic Motivation	HM	HM03	2.18	1.219	0.936
		HM04	2.16	1.151	0.936
		HM03	2.10	1.288	0.935
Price	PR	PR03	2.37	1.150	0.936
		PR01	2.31	1.196	0.936
		PR03	2.34	1.203	0.935
Behaviour Intention	BI	BI01	2.51	1.047	0.936
		BI02	2.20	1.130	0.936
		BI03	2.51	1.063	0.935

The principal component factor analysis solution lead to seven constructs identical to the UTUAT2 model and this justifies using this model. All the seven factors were left with three items each after stringent criteria elimination. The reliabilities of these

dimensions are in the excellent range (> 0.90) for each as shown in Table 4.14. The factor loadings of each item per construct also demonstrate prominent and distinct higher factor loadings than on other constructs, suggesting adequate convergent and discriminant validity (Hu et al., 1999). The techniques used to extract the best set of variables with high factor loading also prove high reliability and construct validity, thereby signifying the adequacy of the measuring tool.

4.6 Confirmatory Factor Analysis (CFA)

As stated earlier, after extracting the best set of factors from the PCA stage, the data was analysed using confirmatory factor analysis. The CFA stage assessed the model's goodness of fit, reliability, validity and test the hypothesis. Similar to the steps adopted for extracting latent factors in PCA, conducting confirmatory factor analysis also illustrated comparable steps to assess model fit, model validation and testing of the research hypothesis.

Structural Equation Modelling or SEM is a generic statistical modelling technique which involves variants of factor analysis, path analysis and multivariate regression analysis. The confirmatory aspect of a model is carried by confirmatory factor analysis (CFA), a multivariate regression procedure that is used to test how well the measured variables represent the number of constructs from the hypothesised commonality among latent variables. The principal aims and outcomes of confirmatory factor analysis (CFA) are discussed below.

1. To see if factor models fit a new sample - the confirmatory aspect.
2. To study the properties of individuals by examining factor variances, and covariance

3. To study factor variances that shows heterogeneity in a population.
4. To study factor correlations that shows the strength of the association between factors.
5. To study the behaviour of new measurement items embedded in a previously studied measurement instrument.
6. Estimate factor scores.
7. To re-investigate a Principal Component Analysis (PCA)
8. To study how well a hypothesized factor model fits a new sample population.

In a structural equation model, CFA technique hypothesises a set of parameters (factor loadings, correlations, and uniqueness) and tests the model for its validity. Structural equation models are primarily divided into two - the measurement model and the structural model. The measurement model deals with the relationships between measured variables and latent variables. The structural model deals with the relationships between latent variables only. To achieve the above outcomes, a four step confirmatory factor analysis procedure was designed below.

1. Stage - One (CFA): Developing Measurement Model for Individual Constructs
2. Stage - Two (CFA): Assess the Structure Model Validity
3. Stage - Three (CFA): Develop Structure Model for Multivariate Regression
4. Stage - Four (CFA): Develop Path Models for Research Hypothesis Testing

4.6.1 Stage - One (CFA)

Measurement Mode Stage-one focuses on defining the individual constructs of the theorised model and the relationships between the unobserved variable (latent) and the dependent variable. Furthermore, this step of confirmatory factor analysis (CFA) considers the concept of uni-dimensionality between construct error variances. The construction of the measurement model involves two steps:

1. Model Specification
2. Model Estimation (Identification)

Model specification involves determining the parameters that are to be fixed or free. Fixed parameters are not estimated from the data, indicating no relationship between variables while free parameters are estimated from the observed data. When testing the fit of the model, the freeing and fixing of the parameters is done to compare the hypothesised model. The model adopted for this research was developed from UTUAT2 technology acceptance. The UTAUT2 model attempts to define the relationship of behaviour intention (dependent variable) in relation to the other seven independent constructs.

Model Identification dictates that each measure should load on only one construct and each construct has at least two or more indicators or items. In the SEM model identification procedure, causal variables (independent variables) are called exogenous variables and the effect variables are called endogenous variables (dependent variables). The earlier performed PCA provided a clear set of relationships, as theorised in the UTUAT2 model using IBM AMOS 22 software application.

The oval shaped elements are latent variables (constructs) of the UTAUT2 model and the rectangles represent the best sets of item variables extracted during the PCA factor

extraction process. The circular elements are the measurement errors which are the variability in the indicators not attributable to the latent variables.

4.6.2 Stage – Two: Assess the Measurement Model Fit and Validity

The second aim of CFA is to assess the measurement model validity. In this stage the theoretical measurement model is compared with the reality model to see how well the data fits. To check the measurement model fit, a number of indicators are used. The key indicators that help in measuring the model validity are Chi-square test (CMIN) and other goodness of fit indicators (Abu-Al-Aish & Love, 2013; Leong et al., 2013; Luan & Timothy, 2008).

CFA was conducted using AMOS 22 to assess the measurement model goodness of fit, and later to extract the imputed values of each construct for conducting multivariate regression analysis for hypothesis testing. The most common five model-fit measures used to assess the model's overall goodness of fit are: CMIN is the ratio of X^2 to degrees of freedom (df), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI) and root mean square residual (RMSR) and RMSEA (Jöreskog, 1993). Hair et al. (2006) suggest that if three or four indexes meet the required recommended value, this measurement model is recommended for further analysis.

Table 4.12
Fit Indices for Measurement Model

Goodness-of-Fit Measure	Recommended Value	Measurement Model	Result
CMIN: Degrees of Freedom (X^2 /d.f.)	≤ 3.0	1.980	Good Fit
CFI: Comparative Fit Index	≥ 0.9	0.952	Good Fit
RMSEA: Root Mean Square of Error	≤ 0.8	0.058	Good Fit

SRMR: Root Mean Square Residual	≤ 0.09	0.059	Good Fit
GFI: Goodness of Fit Index	≥ 0.9	0.906	Good Fit
AGFI: Adjusted Goodness of Fit	≥ 0.8	0.870	Good Fit

As shown in Table 4.15 above, all of the model-fit indices exceeded their respective common acceptance levels suggested by previous research, thus demonstrating that the measurement model exhibited a good fit with the data collected. The next step of the fitness test will proceed to evaluate the psychometric properties of the measurement model in terms of convergent validity and discriminant validity.

Convergent validity ensures that a particular item is designed to measure the construct it is supposed to measure. Average variance extracted (AVE) and composite reliability (CR) were proposed by (Fornell & Bookstein, 1982) as measures to assess convergent validity. Of all the constructs, composite reliability exceeded the recommended level of 0.7 as illustrated in Table 4.16 (Hair Jr et al., 1986). An AVE of more than 0.50 implies 50% variance of its items, demonstrating adequate convergent validity. The extracted results from convergent validity test indicate that all items fit their respective factors beyond the required threshold of $AVE > 0.5$ and furthermore, all correlations were below the threshold value of 0.90 (Hair Jr et al., 1986).

Discriminant validity is described as the degree to which constructs differ from each other, and indicate that items do not unintentionally measure something else. Fornell and Bookstein (1982) posit that an item should not load more highly on the items belonging to other constructs. Discriminant validity is achieved if the square of the AVE (underlined in Table 4.16) is higher than correlation between constructs. However, during the initial factor extraction, indicators in the BI03 item of behaviour intention cross-loaded excessively with items of effort expectancy and hence was removed.

Table 4.13
Construct Correlation Matrix (Discriminant Validity)

Constructs	CR>0.7	AVE>0.5	BI	PR	SI	HM	FC	EE	PE
BI	0.744	0.592	0.770						
PR	0.891	0.732	0.612	0.855					
SI	0.826	0.616	0.590	0.552	0.785				
HM	0.856	0.665	0.672	0.624	0.658	0.816			
FC	0.755	0.506	0.688	0.577	0.584	0.634	0.712		
EE	0.800	0.570	<u>0.783</u>	0.626	0.625	0.598	0.708	0.755	
PE	0.803	0.576	0.760	0.700	0.722	0.728	0.632	0.731	0.760

Note: Diagonal values shows square root of AVE, the off-diagonal shows the correlations between construct

After considering the removal of the BI03 item, the discriminant validity of all the latent factors improved to acceptable levels. However, effort expectancy still shows some increased levels of correlation against behaviour intention.

However, it has been argued that this construct loses its influence on behaviour intention when users accumulate experience during their continued use (Hackbarth, Grover, & Mun, 2003). Farrell and Rudd (2009) suggest that, in the case of multi-sample population, the discriminant validity should be assessed independently to achieve a higher level of acceptable values.

4.6.3 Stage - Three (CFA): Developing a Structure Model

This section deals with developing a structure model which is a path diagram for all the causal relationships in accordance to the adopted UTAUT2 model theory. The resultant significant regression path coefficients from the structure model will be used to assess the hypotheses of this research. In the first stage, the first set (Set - I) of hypothesis will be confirmed by finding significant levels of path coefficients. The remaining three sets of hypotheses (Set - II, Set - III and Set - IV) will be carried out in the next three stages

for hypothesis testing, using Z-score group comparison testing, which are discussed in detail in the conclusion and discussion chapter of this thesis.

The first set (Set - I) of hypotheses attempts to find the relevance of the UTAUT2 model and its significance in predicting the acceptance of mobile application as an English language learning tool in a university context. The second set (Set - II) of hypotheses deals with finding the significance of the UTAUT2 moderators. As mentioned earlier, the three moderators theorised in this research, in order to assess the behaviour intention to use mobile application as an English language learning tool, are contexts, gender and educational level.

The third set (Set - III) of hypotheses analysed the effect of moderator's context (CX1 and CX2), gender (Men and Women) and educational level (undergraduate and postgraduate) and compared them. The third set also contains the main findings of the study and is expected to contribute to the body of knowledge surrounding technology acceptance.

The fourth and the final (Set - IV) of hypotheses examine the intra moderation effect. This set of data analysis investigates each moderator and its moderating effect across the two contexts of the study.

4.6.4 Stage – Four: Develop Path Models for Research Hypothesis Testing

The final outcome of conducting CFA is to test the hypotheses from the commonalities embedded among the variables. CFA is a multivariate procedure, used to test multiple hypotheses that constitute a structural model (Beavers et al., 2013). Section 3 will discuss the multivariate regression analysis for the four sets of hypotheses while section 4 will discuss testing the thesis' hypotheses.

4.7 Structural Model Results

This part deals with conducting multivariate regression on the structural model to examine hypothesised relationships. The resultant path coefficients from the structure model were analysed using the Statistical applications IBM SPSS 22.0 and IBM AMOS. The section commences with multivariate regression path coefficients, and proceeds with each research hypothesis set individually.

4.7.1 Regression Analysis: Hypothesis Set - I

This study aims to investigate whether students from two contexts (the School of Computing– CX1 and The School of Education and Modern Languages - CX2) are open to using mobile application as an English language learning tool. Thus, some modifications have been made to the UTAUT2 model to ensure a good fit.

4.7.1.1 Significance of UTAUT2 Constructs on the Total Population (CX1 + CX2)

This research uses the UTAUT2 model to assess the continuous intention of students to use mobile application as an English language learning tool. The total number of hypotheses in set 1 is illustrated in Table 4.17. The seven adapted UTAUT2 model constructs, namely performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit, are seen as significant predictors of behaviour intention to use technology in many research studies, as mentioned in the literature review chapter. This section of the study investigates and tries to validate the significance of the UTAUT2 model constructs in finding the total variance explained in mobile application as an English language learning tool. As explained above, the two contexts of this study were chosen after hypothesising the students' acceptance of the mobile application as an English language learning tool.

Table 4.14
Research Hypothesis Set – I; UTAUT2 Model Significance

Constructs		Hypothesis Results
BI	← PE	H1: Supported
BI	← EE	H2: Supported
BI	← SI	H3: Supported
BI	← FC	H4: Supported
BI	← HM	H5: Supported
BI	← PR	H6: Not Supported
BI	← HA	H7: Not Supported

Notes: *** p -value < 0.01; ** p -value < 0.05; * p -value < 0.10

Figure 4.2 explains the scores from the structural model with the assessed path coefficients and their respective significant levels P , as overall results of the hypotheses. The context combined here in this study specifies the total population of the contexts (CX1: The School of Computing and CX2: The School of Education and Modern Languages).

The total population's (CX1+CX2) multivariate regression results show that the significant path coefficients that affected behavioural intention were effort expectancy (EE=0.468), performance expectancy (PE=0.329), hedonic motivation (HM=0.160) and facilitating conditions (FC=0.151), ranked according to their intensities. Social influence (SI=-0.145) displayed negative significance. The model displayed 86% (R^2 adjusted) of the total variances explained in behavioural intention for the total population. The results also show that all the constructs except price (PR) show significant determinants for using the mobile application as an English language learning tool by the total population of the study.

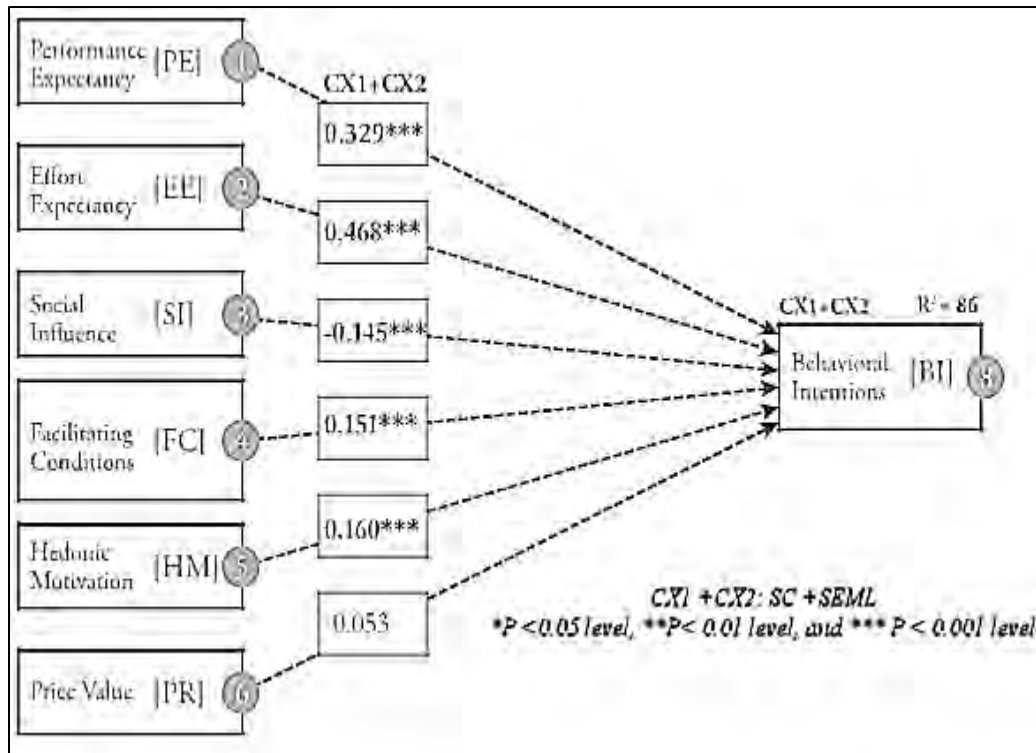


Figure 4.2 Regression Path Coefficients of Seven UTAUT2 Model Constructs

4.7.2 Regression Analysis Hypothesis Set - II

The Effect of Moderators on the Total Population (CX1+CX2)

- Gender CX1+CX2 (M:W)
- Educational Level CX1+CX2 (UG:PG)

In this research, moderating roles of individual characters are also explored (gender and educational level) in relation to the independent and dependent variables as proposed in UTAUT2 against the second set of hypotheses (see Table 4.18).

The findings from this research are expected to expand the existing body of knowledge by determining whether the original UTAUT2 and moderators (gender and educational level) changed at the contextual level. These results would play a pivotal role in predicting the intention to use mobile application as an English language learning tool in a university setting.

Table 4.15

Research Hypotheses Set – II: Gender and Educational Level Moderation

Constructs			Gender	Educational Level
			M:W (CX1+CX2)	UG:PG (CX1+CX2)
BIN	←	PE	H8a	H8b
BIN	←	EE	H9a	H9b
BIN	←	SI	H10a	H10b
BIN	←	FC	H11a	H11b
BIN	←	HM	H12a	H12b
BIN	←	PR	H13a	H13b
BIN	←	HA	H14a	H14b

4.7.2.1 M (CX1+CX2) Gender Moderation on Total Population: Men

The significant path coefficients moderated by Men (CX1+CX2) on the total population of this study that affected behavioural intention were performance expectancy (PE=0.433), effort expectancy (EE=0.383), social influence (SI=-0.111), facilitating conditions (FC=0.301) and price (PR=-0.120), are shown in Table 4.19. The model displayed 87% (R^2 adjusted) of the total variances explained in behavioural intention for using mobile application as an English language learning tool for the total population.

4.7.2.2 W (CX1+CX2) Gender Moderation on Total Population: Women

The significant path coefficients moderated by Women (CX1+CX2) on the total population of this study that affected behavioural intention were performance expectancy (PE=0.293), effort expectancy (EE=0.557), social influence (SI=-0.134) and hedonic motivation (HM=0.244). Notably, facilitating conditions and price did not

show any significance as shown in Table 4.19. The model displayed 88% (R^2 adjusted) of the total variances explained in behavioural intention to use mobile application as an English language learning tool for the total population. The common construct moderated by the gender (M:W) on the total population (CX1+CX2) of the study was effort expectancy (EE) only.

Table 4.16

Path Coefficients of Gender as a Moderator on Total Population

Constructs		Men (CX1+CX2)		Women (CX1+CX2)	
		Path Coefficient	P	Path Coefficient	P
BIN	← PE	0.433	***	0.293	***
BIN	← EE	0.383	***	0.557	***
BIN	← SI	-0.111	**	-0.134	**
BIN	← FC	0.301	***	0.007	NS
BIN	← HM	0.087	NS	0.244	***
BIN	← PR	-0.120	*	0.022	NS

4.7.2.3 UG(CX1+CX2) Educational Level Moderation on Total Population: UG

The significant path coefficients moderated by undergraduates (CX1+CX2) of the total population of this study that affected behavioural intention were performance expectancy (PE=0.376), effort expectancy (EE=0.469), social influence (SI=-0.129), facilitating conditions (FC=0.178) and hedonic motivation (HM=0.137) as shown in Table 4.20. The model displayed 77% (R^2 adjusted) of the total variances explained in behavioural intention to use mobile application as an English language learning tool for the total population.

4.7.2.4 PG(CX1+CX2): Educational Level Moderation on Total Population

The significant path coefficients moderated by Women (CX1+CX2) on the total population of this study that affected behavioural intention were: performance expectancy (PE=0.383), effort expectancy (EE=0.469), social influence (SI=-0.129), facilitating conditions (FC=0.178) and hedonic motivation (HM=0.137). Price (PR) did not show any significance as shown in Table 4.20. The model displayed 83% (R^2 adjusted) of the total variances explained in behavioural intention to use mobile application as an English language learning tool for the total population. All of the constructs were moderated significantly by the level of education (UG:PG) on the total population (CX1+CX2) of the study except price.

Table 4.17

Path Coefficients on Educational Level as a Moderator on Total Population

Constructs		UG (CX1+CX2)		PG (CX1+CX2)	
		Path Coefficient	P	Path Coefficient	P
BIN	← PE	0.376	***	0.383	***
BIN	← EE	0.469	***	0.457	***
BIN	← SI	-0.129	**	-0.152	***
BIN	← FC	0.178	***	0.109	*
BIN	← HM	0.137	***	0.201	***
BIN	← PR	-0.067	NS	-0.010	NS

Additionally, the results from the gender and the educational moderation show that both of these moderators play a significant role in regulating the use of mobile application as an English language learning tool; this proves the significance of all the constructs of the UTAUT2 model. The next stage of the study explores the effect of groups, comparing the regression weights of the contexts in total, followed by the effects of the two moderators and educational levels between the two contexts (CX1 and CX2).

4.7.3 Regression Analysis: Hypothesis Set - III

Inter Contextual Comparison: Effect of “Context,” “Gender” and “Educational Level” between the Two Contexts (CX1:CX2)

The third set of hypotheses seeks to discover the effect of the two contexts, gender and educational level between the two contexts individually. The first set of regression weights will compare the significance of UTAUT2 constructs on the two contexts (CX1 and CX2), then it will assess the effect of combined gender on the two contexts. The effect of combined educational levels in the two contexts will also be assessed as illustrated in Table 4.21.

1. Context (CX1:CX2)
2. Gender CX1(M:W):CX2(M:W)
3. Educational Level CX1(UG:PG):CX2(UG:PG)

Table 4.18
Research Hypotheses Set – III: Inter Contextual Moderation

Constructs			Context	Gender	Educational Level		
			CX1:CX2	M:W (CX1)	M:W (CX2)	UG:PG (CX1)	UG:PG (CX2)
BIN	←	PE	H15a	H15b	H15c	H15d	H15e
BIN	←	EE	H16a	H16b	H16	H16d	H16e
BIN	←	SI	H17a	H17b	H17c	H17d	H17e
BIN	←	FC	H18a	H18b	H18c	H18d	H18e
BIN	←	HM	H19a	H19b	H19c	H19d	H19e
BIN	←	PR	H20a	H20b	H20c	H20d	H20e
BIN	←	HA	H21a	H21b	H21c	H121d	H21e

4.7.3.1 Context (CX1:CX2): Effect of Context as a Moderator

This study identifies important moderating factors that affect the use of mobile application as an English language learning tool, as well as the parameters which influence their use. This thesis works on the premise that the use of mobile application

as an English language learning tool differs between contexts. This effect is hypothesised due to their intrinsic differences in curriculum, programme, schedule, mode of teaching, culture, learning content, student behaviour, aptitude, gender enrolment, assessment, faculty, infrastructure, support, teaching and learning methodology and pedagogy. This thesis does not intend to replicate the UTAUT2 model, rather it aims to examine whether the UTAUT2 model constructs influence mobile application as an English language learning tool.

Descriptive statistics from the questionnaire (Parts I and II) show that 98% of students use mobile applications. The evidence obtained from descriptive statistics also show that students currently use mobile applications for English language learning. This thesis aims to investigate the factors that affect mobile application use for English language learning. The detailed literature review demonstrates that UTAUT2 model constructs are some of the most accurate technology acceptance predictors in the field. As explained earlier, the third stage of this study assessed the inter contextual moderation of (educational context, gender and educational level) on behaviour intention to use mobile applications for English language learning, focusing on six constructs of the UTAUT2 model.

4.7.3.2 CX1: The School of Computing Context

The path coefficients of this study, (see Figure 4.3), explain the scores from the structural model with the assessed path coefficients and their respective significant levels *P*.

In CX1, significant path coefficients that affected behavioural intention were performance expectancy (PE=0.328), effort expectancy (EE=0.424) and facilitating

conditions (FC=0.315). Social influence (SI), hedonic motivation (HM) and price (PR) did not demonstrate significance. The model displayed 86% (R^2 adjusted) of the total variances explained in behavioural intention for CX1.

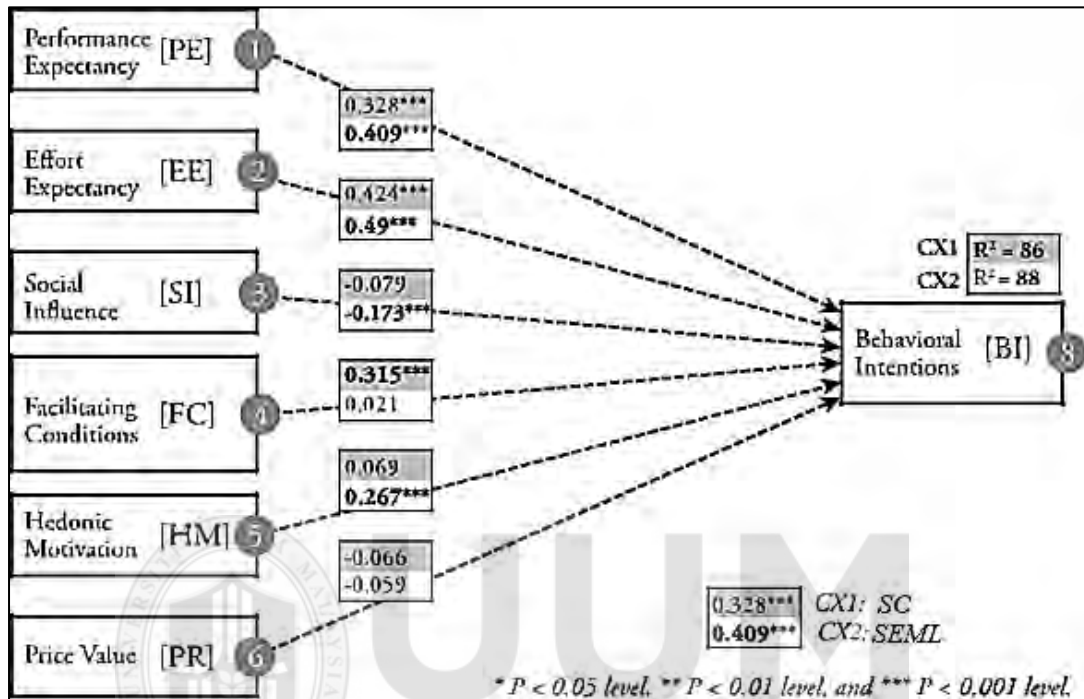


Figure 4.3 Regression Path Coefficients of CX1 and CX2

4.7.3.3 The School of Education and Modern Languages Context

In CX2, performance expectancy (PE=0.409), effort expectancy (EE=0.490), social influence (SI=-0.173), facilitating condition (FC=0.021) and hedonic motivation (HM=0.267) displayed significant effects on behavioural intention. Social Influence (SI) and hedonic motivation (HM) did not demonstrate any significance. The model displayed 88% of the variances (R^2 adjusted) in explaining the behavioural intention to use mobile application as an English language learning tool for CX2 as shown in Figure 4.4. The common constructs, which show the intention to use mobile application as an English language learning tool between the two contexts (CX1 and CX2) of the study, were performance expectancy (PE) and effort expectancy (EE).

4.7.3.4 CX1(M: W):CX2(M:W) Effect of Gender as a Moderator on CX1: CX2

This part of the regression analysis deals with analysing the data to check the inter moderation of gender between the two contexts. The inter moderation attempts to observe the effect of Men and Women in both the contexts individually and analyse their effects.

CX1(M): The significant path coefficients (ranked according to their intensities) that affected behavioural intention among Men in CX1 were, performance expectancy (PE=0.317), effort expectancy (EE=0.289), facilitating conditions (FC=0.465) and Price (PR=-0.103). For the CX1 Men, the research model presented 86% of the variance in behavioural intention (BI). Social influence (SI) and hedonic motivation (HM) did not show any significance (see Figure 4.4).

CX1(W): To examine the effect of BI with females as the gender moderator, the effects of all the six constructs on behavioural intention were inspected. The path coefficients which showed significance with Women in CX1 were performance expectancy (PE=0.373) and effort expectancy (EE=0.606). The variance showed for BI in CX1 was 95%. Social influence (SI), hedonic motivation (HM), facilitating conditions (FC), and price (PR) did not show any significance. The common constructs which show the intention to use mobile application as an English language learning tool CX1 and CX2, moderated by gender, are performance expectancy (PE) and effort expectancy (EE).

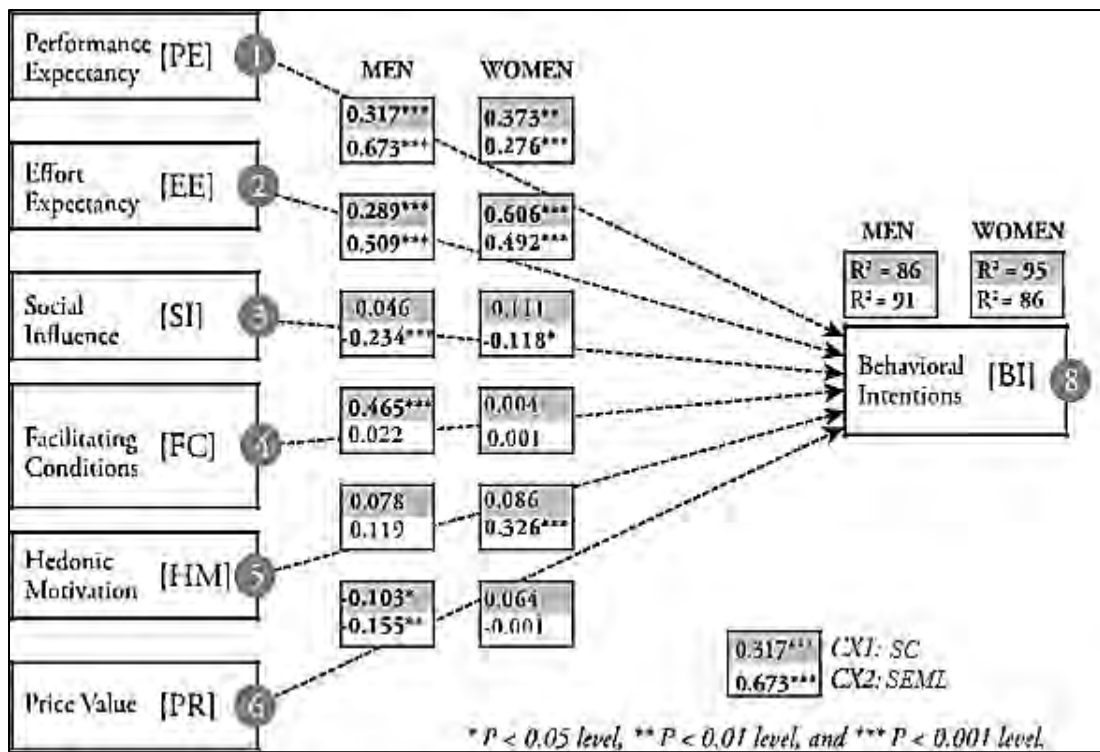


Figure 4.4 Regression Path Coefficients of CX1 and CX2 Moderated by Gender

CX2(M): In regard to CX2 Men, the path coefficients for performance expectancy (PE=0.673), effort expectancy (EE=0.509), social influence (SI=-0.234) and price (PR=-0.155) showed significant effects, and explained 91% of the variance in BI as indicated in Figure 4.5. Facilitating conditions (FC) and hedonic motivation (HM) did not show any significance.

CX2 (W): With regards to the CX2 Women, the path coefficients that showed significant positive effect on BI were performance expectancy (PE=0.276), effort expectancy (EE=0.492), social influence (SI=-0.118) and hedonic motivation (HM=0.326). The model explained 86% of the total variance presented for BI in CX2 as illustrated in Figure 4.5. Facilitating conditions (FC) and price (PR) did not show any significance.

As seen in Figure 4.5, the number of significant constructs of UTAUT2 and their respective intensities between Men and Women varied distinctly. For CX2 Men and

Women, performance expectancy (PE) and effort expectancy (EE) were the most significant constructs.

4.7.3.5 Gender Bias in CX1 and CX2

There are more Men than Women in CX1 (Men 77% and Women 23%) and more Women than Men in CX2 (Men 33% and Women 67%). This population sample reflects the current gender ratio of student enrolment in these two contexts. This could be taken as gender bias, or suggest that the large presence of Women in CX2 influenced an overall CX2 inclination towards the acceptance of mobile application as an English language learning tool. Gender was studied as a principal moderator in all of the research incorporating the UTAUT2 model (Alrawashdeh et al., 2012; Pahnla et al., 2011; Venkatesh et al., 2012; Xu, 2014; Yang, 2013).

This thesis investigated this bias and concluded that even though there were more Men in CX1 than Women, two highly significant constructs for Women, namely PE and EE, showed higher significant coefficients than Men. Consequently, a similar scenario was evident among the Men population of CX2 demonstrating four significant constructs: PE, EE, SI and PR. Only one construct for Women, namely HM, showed significant behavioural intention to use mobile application as English language learning tool. Gender as a bias in the data sample was ruled out as a result of these findings.

4.7.3.6 CX1(UG:PG):CX2(UG:PG) Effect of Educational Level as a Moderator

The significant path coefficients among CX1 undergraduates were performance expectancy (PE=0.325), effort expectancy (EE=0.438) and facilitating conditions (FC=0.309). The model displayed 77% (R^2 adjusted) of variances in explaining the

behavioural intention to use the mobile application as an English language learning tool for CX1 undergraduates, as shown in Figure 4.5.

The data analysis shows that among CX1 postgraduates (Master or PhD degrees), performance expectancy (PE=0.296), effort expectancy (EE=0.261), facilitating conditions (FC=0.414), and hedonic motivation (HM=0.189) presented significant positive effects on behavioural intention to use mobile application as an English language learning tool. The model displayed 92% (R^2 adjusted) of the variances in explaining behavioural intention to use mobile application as an English language learning tool by CX1 postgraduate students (see Figure 4.5).

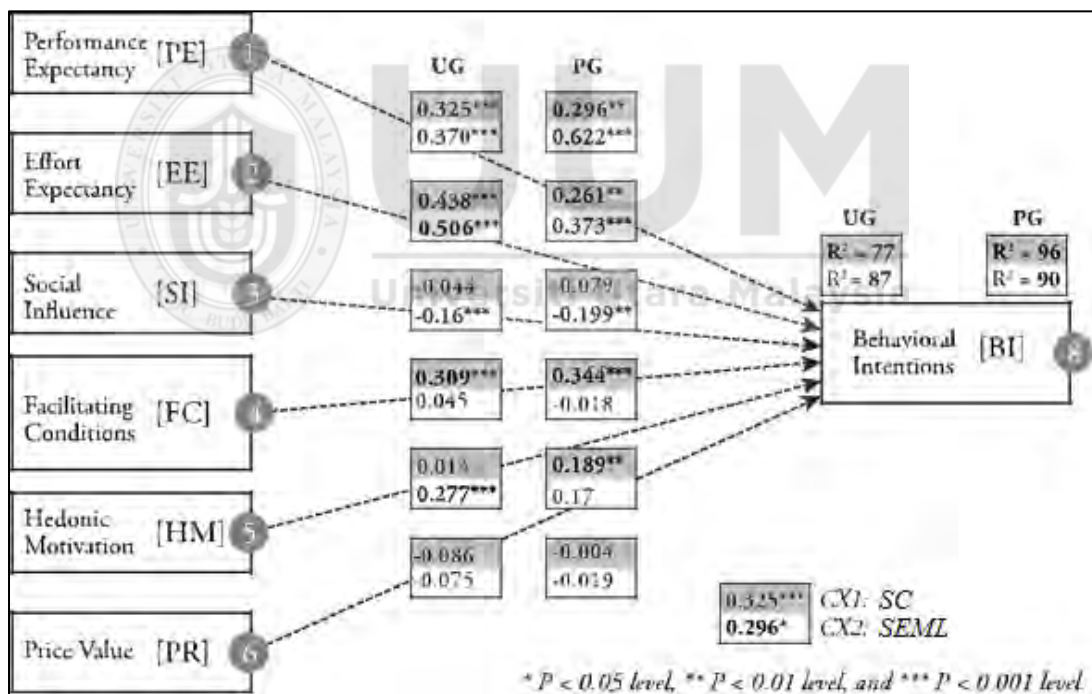


Figure 4.5 Path coefficients Moderated by Educational Level on CX1 and CX2

The relative comparison between the two educational levels (UG:PG) of CX1 shows that performance expectancy, effort expectancy and facilitating conditions presented the most common significant positive effects on behavioural intention to use mobile application as an English language learning tool.

The path coefficients of CX2 undergraduates showed the highest significant effect of behavioural intention, with performance expectancy (PE=0.370), effort expectancy (EE=0.506) and hedonic motivation (HM=0.277). Social influence (SI=-0.160) displayed a *negative* path coefficient. The model displayed 87% (R^2 adjusted) of the variances in explaining behavioural intention to use mobile application as an English language learning tool by CX1 undergraduate students.

In terms of CX2 postgraduate students, the significant path coefficients were performance expectancy (PE=0.622), effort expectancy (EE=0.506) and social influence (SI=-0.199). Social influence also exhibited significant negative path coefficients. The model displayed 90% of the total variances explained in behavioural intention. Comparison between the undergraduate and postgraduate students of CX2 reveal that performance expectancy, effort expectancy and social influence proved significant predictors of using mobile application as an English language learning tool. However, social influence demonstrated negative effects on behaviour intention (BI) as a dependent variable.

4.7.4 Regression Analysis: Hypotheses Set - IV

Intra Contextual Comparison: Effect of Men, Women, UG and PG between the Two Contexts (CX1 and CX2) (see Table 4.22 hypothesis sets)

1. Gender CX1(M):CX2(M)
2. Gender CX1(W):CX2(W)
3. Educational Level CX1(UG):CX2(UG)
4. Educational Level CX1(PG):CX2(PG)

Table 4.19

Research Hypotheses Set – IV: Intra Contextual Moderation

Constructs			Gender		Educational Level	
			CX1(M): CX2(M)	CX1(W): CX2(W)	CX1(UG): CX2(UG)	CX1(PG): CX2(PG)
BIN	←	PE	H22a	H22b	H22c	H22d
BIN	←	EE	H23a	H23b	H23c	H23d
BIN	←	SI	H24a	H24b	H24c	H24d
BIN	←	FC	H25a	H25b	H25c	H25d
BIN	←	HM	H26a	H26b	H26c	H26d
BIN	←	PR	H27a	H27b	H27c	H27d
BIN	←	HA	H28a	H28b	H28c	H28d

Regression analysis was used to examine the intra moderator effect between the two contexts of this study. At first, regression coefficients of CX1 Men were compared with CX2 Men. Regression coefficients of gender, CX1 Women were compared with CX2 Women. Accordingly for the second moderator, educational level, CX1 undergraduate students were compared with CX2 undergraduates. CX1 postgraduate regression values were compared with CX2.

4.7.4.1 Effect of Gender on CX1 and CX2: Men

For CX1 Men, the research model presented 86% variance in behavioural intention, and the path coefficients which showed significant positive effects for CX1 are performance expectancy (PE=0.317), effort expectancy (EE=0.289), facilitating conditions (FC=0.465), and price (PR=-0.103) (see Table 4.23).

Table 4.20
Path Coefficients Moderated by Men on CX1 and CX2

Constructs		CX1-Men		CX2-Men	
		Path Coefficient	P	Path Coefficient	P
BIN	← PE	0.317	***	0.673	***
BIN	← EE	0.289	***	0.509	***
BIN	← SI	-0.046	NS	-0.234	***
BIN	← FC	0.465	***	0.022	NS
BIN	← HM	0.078	NS	0.119	NS
BIN	← PR	-0.103	*	-0.155	**

The path coefficients for performance expectancy (PE=0.673), effort expectancy (EE=0.507), social influence (SI=-0.234), and price (PR=-0.155) showed significant positive effect in Men CX2, demonstrating 91% of the variance in behavioural intention as seen in Table 4.23. For CX2, the path coefficients for PR–BI and HD–BI were 0.16 and 0.55 respectively. Performance expectancy and effort expectancy (EE=0.490) were common contributing influences for accepting mobile application, while price (PR) showed a negative influence.

4.7.4.2 Effect of Gender on CX1 and CX2: Women

To examine the effect of Women as a gender influence, we proceeded to inspect the effects of all of the six constructs on behavioural intention. The results of the analyses are shown in Table 4.24. The path coefficients which showed significance with Women in CX1 include performance expectancy (PE=0.373) and effort expectancy (EE=0.606). The model showed 95% of the variance in behavioural intention.

Table 4.21
Path Coefficients Moderated by Women in CX1 and CX2

Constructs		CX1-Women		CX2-Women	
		Path Coefficient	P	Path Coefficient	P
BIN	← PE	0.373	***	0.276	***
BIN	← EE	0.606	***	0.492	***
BIN	← SI	-0.111	NS	-0.118	*
BIN	← FC	0.004	NS	0.001	NS
BIN	← HM	0.086	NS	0.326	***
BIN	← PR	0.064	NS	-0.001	NS

The School of Education and Modern Languages context was examined against the effect of Women as a gender influence on behavioural intention. The path coefficients which showed significance with CX1 Women include performance expectancy (PE=0.276), effort expectancy (EE=0.492) and social influence (SI=-0.118). The model showed 86% of the variance in behaviour intention. Performance expectancy (PE) and effort expectancy (EE) were the most common contributing influences in accepting mobile applications, while price (PR) showed a significant negative influence, as seen in the above Table 4.24.

4.7.4.3 Effect of Same Education Level on CX1 and CX2: Undergraduates

The comparison shows that among CX1 undergraduate students, performance expectancy (BI-PE, 0.325), effort expectancy (BI-EE, 0.438) and facilitating conditions (BI-FC, 0.309) presented significant positive effects on behaviour intention to use mobile application as an English language learning tool (see Table 4.25). The model displayed 92% (R2 adjusted) of variances in explaining behaviour intention to use the mobile application for UGs in CX1.

CX2 undergraduates showed significant positive effects in relation to performance expectancy (BI-PE, 0.370), effort expectancy (BI-EE, 0.506), facilitating conditions (BI-FC, -0.160) and hedonic motivation (BI-HM, 0.277) on BI (see Table 4.25). The model displayed 91% (R² adjusted) of the total variances explained in behavioural intention.

Table 4.22

Path Coefficients Moderated by Undergraduates (UG) of CX1 and CX2

Constructs		CX1-UG		CX2-UG	
		Path Coefficient	P	Path Coefficient	P
BIN	← PE	0.325	***	0.370	***
BIN	← EE	0.438	***	0.506	***
BIN	← SI	-0.044	NS	-0.160	***
BIN	← FC	0.309	***	0.045	NS
BIN	← HM	0.014	NS	0.277	***
BIN	← PR	-0.086	NS	-0.075	NS

4.7.4.4 Effect of Same Education Level on CX1 and CX2: Postgraduates

The data analysis shows that among the CX1 students who were pursuing their postgraduate degrees, performance expectancy (BI-PE, 0.296), effort expectancy (BI-EE, 0.261), facilitative conditions (BI-FC, 0.344) and hedonic motivation (BI-HD, 0.189) presented significant positive effect on behavioural intention to use mobile application as an English language learning tool. The model displayed 93% (R² adjusted) of the variances in explaining the behavioural intention to use mobile application by PG students in CX1 as seen in Table 4.26.

Table 4.23

Path Coefficients Moderated by Undergraduates (UG) of CX1 and CX2

		CX1-PG		CX2-PG	
Constructs		Path Coefficient	P	Path Coefficient	P
BIN	← PE	0.296	**	0.622	***
BIN	← EE	0.261	**	0.373	***
BIN	← SI	-0.079	NS	-0.199	**
BIN	← FC	0.344	***	-0.018	NS
BIN	← HM	0.189	**	0.170	NS
BIN	← PR	-0.004	NS	-0.019	NS

CX2 postgraduate students showed significant positive effects of performance expectancy (BI-PE, 0.622), effort expectancy (BI-EE, 0.373) and facilitating conditions (BI-FC, - 0.199) on BI and the model displayed 95% (R² adjusted) of the total variances explained in behavioural intention as illustrated in Table 4.26.

4.8 Qualitative Findings

The questionnaire's results corresponded with the researchers' synthesised interview results. Prior to anything else, the benefits that the students listed on the questionnaire and in the interviews were comparable. For example, the majority of students thought that mobile application had a favourable effect on supporting and retaining information. Furthermore, according to seven students who participated in interviews, the applications often motivate them to access the material and data; the questionnaire reflected these similar views. Additionally, the statement "using mobile phone applications help the student remember and call data" was made in both the questionnaire and the interviews. According to some students who were questioned, they often utilise the apps to communicate with one another (Lai & Hashim, 2021).

Furthermore, the outcomes of the interviews aligned with the points raised in the literature review. One respondent did, however, indicate that the applications facilitate her social interactions with other people (Li et al., 2024). Likewise, every student stated that these apps enable them to access any kind of material. Consequently, the researchers discovered that other researchers, including Huang et al. (2010) and Ferry (2008), have cited these results in the literature review.

The results of this study show that there are significant benefits to employing mobile applications. This is consistent with another research. For instance, Prensky (2004), Cui and Wang (2008), Kizito (2012), and Wang (2017) claim that the use of mobile applications in education offers helpful concepts and advantages that inspire students to study and comprehend more fully. Cui and Wang (2008) proposed that mobile applications enable teachers interact and communicate with their students as well as aid students learn foreign languages.

The findings derived from both quantitative and qualitative data suggest that mobile applications can facilitate information gathering, content access, communication, and collaboration between instructors and students. This is consistent with the research conducted by Ferry (2008), Cheung (2008), and Cui and Wang (2008). Interactive class experiments are motivated by such environments, according to Cheung's (2008) findings.

Similarly, Moura (2008) discovered that activities utilising mobile devices foster learning and encourage teamwork. In a similar vein, Cui and Wang (2008) found that mobile phones improve the effectiveness and convenience of teaching and learning. Lastly, the results above concur with those of Mtega (2012) and Khaddage (2012), who

hypothesised that these kinds of mobile apps may be just as entertaining, fascinating, and engaging (Masadeh et al., 2024).

4.9 Chapter summary

The five out of seven constructs hypothesized in the Unified Theory of Acceptance and Use of Technology 2 model are supported by this study. Hence the UTAUT2 model constructs were confirmed to be significant predictors of mobile applications technology acceptance.

To conclude, UTAUT2 is a useful model to predict the use of mobile applications as English language learning tools. Gender was a strong moderator followed by the context which is a significant moderator. At the same time, the educational level was not a significant moderator in predicting behaviour intention to use mobile applications as English learning tools. Lastly, the inter and intra context moderation proved significant by this research. The next chapter of this research will present a detailed discussion concerning the outcome of these hypotheses. It will also look into the implications of the findings of this research and subsequently conclude with suggestions for future research.

In conclusion, the use of mobile applications and technology resources in language classrooms allows students to have a wider perspective on the learning process since they accelerate the development of a multidisciplinary mindset and present new learning possibilities.

CHAPTER FIVE

DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter's goal is to drive over the relevance of the research and the consequences of its results. It restates the hypotheses found in the literature review, which served as the foundation for this research investigation. The chapter ends with a discussion of the consequences of the study and a summary of future research directions and potential constraints.

This study adds to the body of information on mobile applications as a tool for the acceptance of mobile applications in language classroom among English language learners in Malaysian university based on a unified theory of acceptable (UTAUT) model. This research aims to make a substantial addition to the field of higher education, as mentioned in the methodology chapter. Specifically, it measures the contextual acceptability of Universiti Utara Malaysia students using mobile applications as a tool for English language acquisition. The Unified Theory of Acceptance and the Use of Technology (UTAUT2) model was used to gauge how well the mobile application was received as an aid for learning English (Venkatesh et al., 2012).

5.2 Research Contribution

This thesis contributes to existing bodies of knowledge by providing information about the acceptance of mobile application-based English language learning. The following list highlights the significant contributions to knowledge made by this research:

1. Significant mobile application acceptance parameters for English language learning were identified.
2. A better predictability of the mobile application for English language learning was established.
3. Significant Moderators that influence mobile application acceptance for English language learning were identified.

This research study extends theoretical studies in the field of technology acceptance. The statistical analysis technique presented in this thesis has provided new ways (by comparing Inter and Intra moderator groups) of looking at the acceptance of mobile application technologies in university education. The significant achievements are further discussed in length in the remaining part of this section.

By offering information regarding the acceptance of mobile applications as a tool for the acceptance of mobile applications in language classroom among English language learners in Malaysian university based on a unified theory of acceptable (UTAUT) model, this thesis adds to the body of current research. The research has produced major contributions to knowledge, which are highlighted in the following list:

1. Important approval criteria for mobile applications for learning English were found.
2. It was determined that the mobile application for learning English was more predictable.
3. Important moderators that affect the uptake of mobile applications for learning English were found.

The theoretical research in the area of technological acceptability is expanded upon by this study. By comparing Inter and Intra moderator groups, the statistical analytic

approach proposed in this thesis has opened up new perspectives on how mobile application technologies are accepted in higher education. The following portion of this section goes into additional detail about the noteworthy accomplishments.

5.2.1 UTAUT2 Model Significance

This thesis tested the UTAUT2 model in an academic environment to determine its viability. This thesis examines how students utilise mobile applications and if they are prepared to accept them as resources for learning English. To do this, it has expanded the original UTAUT2 model by adding new moderators and changing the constructions that were already there. It is one of the first studies to compare the aim of utilising a mobile application as a tool for English language acquisition with an investigation into its use in a university context using this approach. As such, it could serve as a basis for further studies in this field.

5.2.2 Context Comparison

The comprehension of technology integration is improved by comparing two educational environments. The contextual comparison has shown that various universities have distinct policies regarding the acceptance of educational technology. As far as the researcher is aware, contextual comparisons which take into account various categories, including age, gender, and educational background offer a thorough understanding of how mobile applications are used in various settings. To evaluate the factors influencing the adoption of mobile applications in academic settings, a comparison analysis of these two scenarios may be made using similar cohorts of students. Confirming the role of context as a moderator in the adaption of the mobile application as an English language learning tool was one of the study's main contributions. According to Wu et al. (2008), there are three distinct meanings of

context in academic contexts. First, in academic contexts, a group of students who have received the same education are referred to as being in the same context. The second meaning of context in mobile devices is the location or unique space; the third meaning of context in mobile devices also refers to the operating system, screen size, and processing power of smartphones. This study distinguishes the two groups from the School of Computing as (CX1) and the School of Education and Modern Languages as (CX2) acknowledges the first meaning of context.

Because learning environments differ, there are chances to take advantage of variances in the environment, curriculum, programme, content, and student communication and interaction in different academic situations. Developers of mobile learning content are forced by these dynamics to create new categories of learning materials, mobile apps, multimedia, and evaluation techniques. By demonstrating the importance of academic context as crucial requirements for wearable technology, mobile learning environments, and context-aware cognitive computing in education, this work serves as a stepping stone.

In the past, the design of textbooks and other printed educational materials was predicated on the idea that all students were similar and had similar learning preferences. This idea was challenged with the introduction of e-learning technology, as learning materials were created with voiceovers, multimedia, and interactive elements to accommodate a variety of learning preferences. Computers and laptops were used as the delivery devices for these online courses. Since mobile applications may be contextualised, tailored, and personalised unlike their predecessors, material for English language learning must be rethought again. English language learning with mobile applications is a synthesis of several technologies, including wireless file

sharing, computation, embedded sensors, GPS, and translators. According to Kearney, Schuck, Burden, and Aubusson (2012), the amalgamation of several technologies into Smartphones presents an array of opportunities for context-based learning content creation, as seen in Table 5.1.

Table 5.1
Mobile applications offered for contextual learning environments

Mobile Applications	Contextual Learning Opportunities
Personal	gives customisable autonomy
User centred	caters to personal learning style and pace
Mobility	gives learning anytime anywhere flexibility
Network	aids in creating collaborative environment
Ubiquitous	available with every learner
Durable	for formal, informal and lifelong learning
Applications and Sensors	provides immense productivity tools and aids

Source: adopted from Kearney et al. (2012)

5.2.3 New adaptation in construct

As stated in the research's Methodology chapter, this study reinterprets the two original UTAUT2 components, social influence and facilitating circumstances, to ensure their continued applicability within its purview. The social ties that a normal student has with his or her friends, classmates, and teachers are represented by the revised Social Influence concept. Students who use mobile applications to learn English are required to have social support from these three kinds of people. In the UTAUT2 paradigm, social influence was once thought to refer to the impact of friends and family.

Receiving educational help via smartphone connections and communication was also reinterpreted as the second construct, enabling circumstances. The supply of helpdesks, appropriate infrastructure, software and hardware support, and the acquisition of technical assistance are all considered "Facilitating Conditions" in the original

UTAUT2 paradigm. Since smartphones are self-owned devices with preloaded apps, these facilitating factors are meaningless when it comes to mobile applications. Furthermore, users of mobile applications are proficient with their gadgets and don't need assistance from technical staff. This study accepted the connectivist hypothesis, which states that information is dispersed in digital formats across communication networks (Siemens, 2015). As a result, the concept of the "facilitating conditions" was essentially superseded by the idea of connecting with friends, classmates, and other groups via mobile applications in order to facilitate English language acquisition. The applicability of connectivist learning theory in the age of digital communication devices has an impact on this.

5.2.4 Incorporating New Moderators

Educational Context: This study made use of context, education level, and a creative set of moderators. The results draw attention to the several elements that either facilitate or impede the adoption of mobile application-based English language instruction in a university setting. This thesis looked at the School of Computing (CX1) and the School of Education and Modern Languages (CX2), two distinct settings within a same institution. This thesis describes the main variations between their curricula, instructional methodologies, student aptitudes, necessary skills, and study durations.

Educational Level: In place of age, this study used educational level as a new moderator in the UTUAT2 model. This was carried out following the completion of the literature review, which revealed that the respondent's educational attainment was a more effective moderator than age.

Inter and Intra moderator comparison technique:

A method of group comparison along the characteristics of the numerous intra- and inter-moderators was employed in this study. The main goal of this research was to evaluate the impact of three moderators: gender, context, and educational attainment. These multilevel moderator comparisons assisted in doing so. A far better comprehension of the moderators' impacts, intensities, and significance levels was made possible by this novel method. The findings showed that comprehending the behavioural purpose behind embracing the mobile applications as a tool for learning English might be aided by comparing the moderators' groups within and across groups. It is anticipated that this methodology would establish a standard in research on technology adoption for upcoming mobile and similar developing technologies.

5.2.5 New Malaysian Context

The research's conclusions are extremely pertinent to the situation in Malaysia. In order to guarantee the effective integration of mobile application technology in universities in Malaysia and, ideally, other countries, this research will assist universities and comparable establishments in developing tailored programmes.

5.2.6 Meta-Analysis for selection of research methodology, tools and techniques

This study's meta analyses compiled and examined specific quantitative studies on technology adoption in the domains of mobile learning. The approach of systematic review of literature and meta-analysis employed in this thesis was not previously tried in any research on acceptability of mobile apps technology. This method also aids in identifying the software/tools, statistical methods, population sample selection, and instrument adoption used in these investigations. Thus, this thesis offers a template for

those wishing to carry out related research; it may be utilised to assist in choosing suitable software programmes, survey tools, and research techniques.

5.3 Research Implications

The study results that are offered here might have a number of scholarly, managerial, strategic, and educational ramifications. First, with variable degrees of explanatory power, the technological acceptance model (UTAUT2 model) utilised in this study may be generalised to both western and non-western nations. Using the best set factor extraction methodology, data clustering, validating, and reliability testing procedures, the instrument was empirically verified.

Researchers, scholars, and educators will benefit from this study's identification of the essential elements of technological adoption. The study model included behavioural intention as the dependent variable and performance expectancy, effort expectancy, social influence, enabling circumstances, hedonic incentive, and price as the independent variables. Every context and moderator agreed that performance expectancy and effort expectancy were essential elements of behavioural purpose. It doesn't seem that hedonic incentive, social influence, or favourable circumstances have an impact on behavioural intention. These variables, however, should also be taken into account as they establish the thin boundary of technological adoption and have been demonstrated to have distinct effects on each of the social groups.

The results of the group difference hypothesis give decision makers, educators, and academic institutions a better understanding of how to integrate mobile applications as a tool for English language learning as well as the factors that support this implementation. This study gives key information to stakeholders on the acceptance of

mobile learning, allowing them to take these elements into account during the design and implementation stages.

The effective integration, creation, and use of mobile applications as instruments for English language acquisition in academic settings may be affected by the findings of this research project. The contextual and customised nature of mobile application usability served as the foundation for this thesis. As a result, the technique used was created to compare the intended behaviours of two schools using a sample of the local population. In the area of higher education, this study also aimed to investigate the moderating effects of gender and educational attainment.

5.3.1 Potential Implications for University Education

When evaluating the behaviour intention to use the mobile applications as an aid for English language acquisition, five of the seven UTAUT2 components showed significant results. As a result, this study has shown that the UTAUT2 technology model is useful for evaluating behaviour intentions about the use of mobile applications as a tool for English language acquisition in the two university environments. A theoretical grasp of the variables, frameworks, and moderators influencing this technology's acceptability was also made possible by the research. This study offers a thorough grasp of the function of educational background, gender, and educational attainment in connection to intra- and inter-personal interactions in a university setting.

The Unified Theory of Acceptance and Use of Technology and the Technology Acceptance Models (TAMs) have been heavily utilised in prior research, however it has not adequately addressed the intricate aspects of evaluating the contextual integration of mobile technology. Since these models were created for general

technological acceptability assessments, they are unable to successfully examine the viability of mobile apps in various scenarios. Using the UTAUT2 paradigm, this thesis evaluates the acceptability of the mobile application as an aid for learning English. It makes the case that the current study adds to the body of literature by giving the UTAUT2 a fresh viewpoint and by creating novel techniques for intra- and inter-moderation comparisons.

5.3.2 Mobile Application-based English Language Learning

The study's findings demonstrate that students in both situations think adopting mobile applications will help them become more fluent in English. These findings imply that mobile applications can be used in educational settings as a tool for teaching English. According to Adhikari, Mathrani, and Parsons (2016), the need for digital literacy has grown along with the quick spread of digital devices in people's everyday lives. Customised learning, situational learning, learner-centered learning, cooperation, ubiquitous learning, lifelong learning, just-in-time learning, microlearning, rich media learning, interactive and immersive learning, synchronous learning, and asynchronous learning are all made possible by mobile learning.

This research, which focuses on English language acquisition, has ramifications for other fields as well, particularly those like computer sciences, engineering, medicine, health sciences, nursing, and other fields where English is the regular or standard language of teaching. In these types of specialisations, university students are typically overburdened and under pressure from the material itself as well as from having to use their English language proficiency to get through the language learning process. English is the language of instruction in non-English contexts, so adjusting to it successfully is a big challenge. However, once it is done, it ensures that graduates can

compete globally, and that staff can participate more widely in the development of their subject areas through academic research and publications. The use of mobile technology in the English language classroom will improve and progress the teaching and learning of English to speakers of other languages. It will also shape the way that university courses are taught in the future.

When Fareh (2016) investigated the difficulties Arab World countries faced when learning English, he noted that two major issues that contributed to the failure of many English language learning programmes were students' limited exposure to real English and the teacher-centered nature of the teaching process. Oberg and Daniels (2013) conducted experimental research to investigate the benefits of using mobile applications in conjunction with a student-centered teaching approach for English language acquisition in higher education. The study's findings showed that students in the experimental group, which used a student-centered educational approach using personal mobile devices, consistently and significantly outperformed those in the control group in terms of grades.

Furthermore, the 185 experimental group's responses to a post-treatment survey revealed very favourable sentiments among students regarding the usage of mobile applications to support a student-centered approach. Therefore, it makes sense for academic teaching staff and university administrators to give the integration of mobile applications into the English language learning process much more thought if the use of these tools to support a student-centered approach to the language is successful. Furthermore, students' exposure to actual English language information would have a greater learning impact if these mobile applications were used in conjunction with Internet access and supervision.

By being aware of how mobile applications are used, educators will be able to incorporate this technology more effectively. Universities, educational material creators, and government-run educational establishments will gain from this study's understanding of the cutting-edge features and sensors that maximise the usage of mobile applications for English language learning. The ability to conduct research on the internet, access email, snap a photo of the day's homework assignment scrawled on the whiteboard, or record a quick video of a crucial lecture moment are among the other really helpful functions. Mobile applications may be used to take notes during lectures in real time, act as student response systems, record lectures with voice recordings, and scan QR codes to instantly access pertinent websites. They can also be modified to serve as "clickers" in the classroom and for scheduling purposes. Education may be revolutionised with the help of the aforementioned advantages.

5.3.3 Next Generation Mobile Applications

Wearable technology is becoming more and more linked with mobile applications. Smart wearable technologies known as wearables are combined with mobile applications to interface with sensors and facilitate data sharing. Typically, these gadgets are worn as arm bands, wristwatches, or eyewear. They are typically combined with smartphone apps, which help and enable hands-free interaction between users. Mobile applications give users instant access to data and information that is relevant to their particular situation. Future technology integration may be accomplished successfully and seamlessly with a solid grasp of mobile application integration. The "Internet of Things" is a network that will include 12 billion interconnected devices by 2020, according to estimates. The proliferation of this connectedness will provide exponential opportunities for learning English. The results of this study can serve as

models or guides for investigating and investigating new educational technology in the future. Therefore, the results of this research may also be used to evaluate how well mobile applications are integrated for usage by English language learners.

5.3.4 The Malaysia Advantage

By 2020, there will be over two billion smartphones in use. To put it briefly, one in three people on the planet will possess a smartphone. According to the same study, there are 700,000 mobile applications for Android-based operating systems and 800,000 for Apple iPhones (Yip, Tan, Geh, & Ting, 2017). A recent survey (A-Qader, Omar, & Rubel, 2017) claimed that 70% of adults in Malaysia own smartphones. According to Sullivan's (2013) research, 90% of Malaysians would possess a smartphone by the year 2018. By 2016, 99.9 percent of pupils and 97.7 percent of schools in Malaysia are expected to have access to ultrafast wireless internet (Van der Wee & Beltrán, 2015). Given the anticipated increase in smartphone ownership in Malaysia, this thesis is extremely important, and the research's conclusions can help clarify the integration of mobile apps in the context of learning English as a Malaysian language.

5.3.5 Bring Your Own Device (BYOD)

The fact that effort expectation has been accepted by everybody shows that using mobile applications to facilitate English language learning at any time or location is clearly convenient for students. Academic institutions do not have to spend large sums of money on equipment purchases. The nature of education and learning will alter as a result of this device's 97% penetration and use, which is gradually displacing personal computers. The study's conclusions provide light on the degrees to which informal and formal English language learners use mobile applications.

5.3.6 Contextual Learning

Mobile apps get inspiration from user data, the user's surroundings, and their interactions with the operating system. The requirements of English language learners can be met via mobile applications. With the use of embedded GPS sensors, accelerometers, and gyroscopes, mobile applications may collect and make use of sensor data to improve the experience of English language learners. Nowadays, a lot of well-known content providers including Google, Wikipedia, and well-known online English language learning repositories combine user data with location to offer contextually relevant material. Contextual awareness is made possible by location data and helps decide just in time content, privacy, and usability.

The most recent versions of mobile applications can function as a personal assistant by anticipating an English language learner's next move and tracking their development. Mobile apps may enhance personalised instructions, retain locations and services, and provide features that align with a learner's schedule and location.

5.3.7 Connectivism

According to Siemens' (2004) theory, learning arises via the formation of networks of connections. According to connectivism's tenets, linking specialist nodes and information sources is the process of learning. The desire to learn more drives a learner's pursuit of information, not what they already know. The goal of learning current knowledge or information is what motivates connectivism (Siemens, 2014). The prevalence of connectivist theory (Prensky, 2001) has increased since the 1980s as digital technologies have grown in popularity. One term used to describe children born in this era is "digital natives." It is important to comprehend the ways in which "digital

natives" communicate using mobile applications to create programmes that successfully cater to their demands.

Danaher, Moriarty, and Danaher (2009) emphasise how crucial it is to use learning technology to include learning communities. According to this research, a student's inclination to utilise mobile applications for English language learning may be significantly predicted by the new enabling circumstances construct, which was founded on connectivism theory.

5.4 Suggestions for Future Research

While many sectors have studied how people embrace technology, there hasn't been much research done on how people adopt mobile applications for learning English. To further our understanding in this field, more study is required. Technology acceptance is a relatively new topic with lots of research opportunities.

5.4.1 Study Replication

This thesis only looked at one university's computer and education students. Research that looks at data obtained similarly to this study might be replicated in other academic situations in the future. The findings of this study make it clear that although academic environments vary among universities, so does their adoption of mobile applications for English language instruction. According to Cochrane (2014), the majority of studies done on mobile learning have concentrated on using them for learning material delivery, communication, and information search. Therefore, it is imperative to carry out longitudinal research in various settings.

5.4.2 Effort Expectancy

This research suggests more research on the link between the behaviour intention and effort expectation dimensions. Xu (2014) contends that the perceived ease of use of any technology may be explained by effort expectation. This thesis has validated the findings of Yoon and Kim (2007), who found that in the presence of behaviour intention construct, users' perceptions of the ease of use of any technology tend to decline when it is effectively incorporated into the mainstream.

This thesis contends that when users gain expertise via ongoing usage, the effort expectation construct tends to lose its impact on behaviour intending to use any technology. According to Hackbarth et al. (2003), a user gains proficiency with a gadget after spending a significant amount of time using it. The effect of effort expectancy tends to decrease in the presence of performance expectations. According to Kumar and Owston (2016), there aren't many research papers that have examined the usability of e-learning materials for higher education. Accordingly, this thesis proposes that user experience and usability ought to take the place of effort expectation as the primary construct. Therefore, future studies should evaluate how well the mobile applications work as a tool for teaching English by concentrating on how users engage with the apps. Future questionnaires may, for instance, ask about screen size in order to gauge usability. Similarly, it is important to assess if questions about user interfaces are suitable for gauging people's opinions regarding usability.

5.4.3 Social Influence

The impact that friends and peers have on a student in his immediate social circle is referred to as the social influence construct in the UTAT2 model. Future studies ought to look at social media's impact as a component of social influence. According to earlier

studies, societal impact gradually decreases as a technology becomes more widely used (Margaryan et al., 2011). Considering this, in order to demonstrate changes in the newly suggested two social influence components, future research examining the impact of social influence on the usage of mobile applications should employ a longitudinal approach. More longitudinal and panel studies are required since there is a dearth of information on how peers' and faculty's influence affects students' adoption of technology over time.

5.4.4 Habit

In situations where individuals are self-motivated, including those involving regular and informal usage, habit does not appear to have a crucial mediating effect. As was already said, the involuntary use of technology does not highlight ingrained habits. Wilson et al. (2010) believe that habit is a secondary factor in determining the likelihood of continuing usage frequency. According to earlier research, habits that are formed by repeated behaviour are frequently reinforced (Venkatesh & Davis, 2000). According to Kim, Malhotra, and Narasimhan (2005), habits are established by strong correlations between past mandated usage frequency and this attitude towards obvious conduct and/or the conditions in which this behaviour happens.

Subsequent investigations may examine the significance of the habit construct by examining circumstances such as the self-motivated ones mentioned above where technology use is optional. For instance, the validity of the content and the dependability of the instructional materials utilised in the educational setting may have an impact on how frequently they are used. Wilson et al. (2010) attest that the required initial use cycle is when information technology usage patterns are formed. Examining

the intensity of habit in situations when technology use is optional might help us better understand how habit affects behaviour intention.

5.4.5 Price

According to this thesis, the majority of the moderator groups evaluated in this study do not find price to be relevant. This thesis contends that the primary relationship between the cost and ownership of mobile applications is their utility. Beyond utilising the smartphone to study English, this usage includes regular conversation, entertainment, internet access, and other activities. Additionally, the productivity features on the mobile applications such as the grammar, translator, and dictionary are also utilised. The educational benefits of a mobile application are not the only thing that students consider when evaluating its pricing. Under the pricing construct, more research on the direct costs of mobile application based English language learning services offered by academic institutions, universities, or outside providers might be done. Contextual Comparisons

By examining the subgroups within each setting, future research might evaluate the contextual comparability of technological acceptance even more thoroughly. Information technologies, computer sciences, information and communication technologies, and intelligent systems are just a few of the numerous fields that comprise the School of Computing. Subsequent research can evaluate the group differences or similarities in the use of mobile applications as English language learning aids by comparing and contrasting these sublevels. The aim of the two sets of students the computer students and the education students to utilise mobile applications as instruments for learning English is statistically different, as this thesis demonstrates.

These evaluations should provide a more thorough grasp of the learner's acceptance of mobile apps, which can help with the effective integration of the intended technology.

5.4.6 Updated Construct

Research on newer moderators for assessing usage behaviour in discretionary situations is becoming more and more necessary due to the ongoing evolution and progress of mobile application technology, which provide newer and more sophisticated capabilities. Examining the variety of newly developing elements that influence technology acceptance behaviour also need more research. The present generation of users is extremely linked due to the rapid proliferation of communication tools, methods, and approaches. According to Kittl, Edegger, and Petrovic (2009), mobile phones are the primary means of communication for today's younger population, hence it makes sense to employ them as creative teaching tools. Subsequent research endeavours might evaluate the impact of communication channels as an innovative concept on the adoption of mobile applications intended for English language acquisition. The majority of studies on technology adoption that have been done so far have been on elderly people or the workplace. Younger users should be the focus of future study, since this will yield important insights into the most effective ways to incorporate mobile application technology.

5.4.7 New Moderators, Educational Level

The moderator's age was substituted with their educational attainment in order to look at the acceptability of English language learning using mobile applications. This study, however, did not discover any evidence that the undergraduate and postgraduate groups' intentions to use mobile applications for English language learning were significantly influenced by their educational level (as a moderator). Given that earlier research has

linked age to technological adoption (Venkatesh et al., 2003), it would be worthwhile to look at the impact on graduate, junior, senior, and sophomore student levels.

5.5 Conclusion

In summary, UTAUT2 is a valuable model for forecasting the utilisation of mobile applications as instruments for English language acquisition. The context, another important moderator, came in second to gender as a powerful moderator. Simultaneously, the degree of education did not significantly influence the behaviour intention to use mobile applications as instruments for learning English. Finally, our research demonstrated the importance of both intra- and inter-context moderation.

Regarding the impact of various technological acceptance models on English language learning, the study also offers methodological, theoretical, and practical insights. A number of recommendations for further investigation are indicated in light of the study's limitations. In summary, this research has made significant contributions to the literature on technology adoption in higher education from a practical, theoretical, and methodological standpoint. Lately, mobile aided learning has gained popularity among educators, particularly in higher education, where technology is becoming essential for social advancement and economic competitiveness.

In the same manner the interviews from SOC and SEML students revealed that students were using mobile learning applications with great enthusiasm even though they were having trouble with an unreliable internet connection. Through the use of mobile learning applications, technology may help both teachers and students enhance the quality of their instruction. By choosing the proper mobile learning apps, it may be used for any topic.

The majority of technology used in education used to be computer-based learning, but as more individuals acquire mobile devices with internet access, computer-based learning is giving way to mobile-aided learning. It offers flexible, on-the-go personal learning that may be used both inside and outside of the classroom. The research's implications concern the potential of technology and the necessity for technology education for instructors, particularly with regard to practical technology use that might shape students' cultural ideas and be used in particular learning contexts. The learning environment, policy makers, infrastructures, and the actual process of learning all have additional ramifications.

Technology aids in language acquisition by giving students access to resources, allowing them to practise speaking, and facilitating direct communication with native speakers. Through learning applications, one may study language abilities including speaking, listening, reading, and writing. By practicing the language both within and outside of the classroom, the students develop their ability to learn on their own. Teacher-centered has already replaced Learner-centered thinking.

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Appendix A

Meta-Analysis Scale Evaluation

S.No.	Research	Usability		Reliability			Validity				
		Content Design	Visual Design	Test-Retest Reliability	Alternate Forms Reliability	Internal Consistency C-Alpha	Content Validity	Criterion Validity	Construct Validity		
									Convergent	Discriminant	Nomological
1	Pahnila et al., 2011					x	x		x	x	
2	Xu, 2014					x	x		x	x	
3	Yang, 2013					x	x		x	x	
4	Raman et al., 2013					x			x	x	
5	Raman & Don, 2013			x		x	x		x	x	
6	Alrawashdeh et al., 2012					x					
7	Pheeraphuttharangkoon et al., 2014					x				x	
8	Shin et al., 2011					x					x
9	Luan et al., 2008										
10	Yu, 2012					x					
11	Wang et al., 2009					x	x		x	x	
12	Jairak et al., 2009					x	x				
13	Venkatesh et al., 2012								x	x	
14	Park et al., 2012						x				
15	Admiraal et al., 2013								x		
16	Raman & Don, 2013					x			x	x	
17	Admiraal et al., 2013					x	x		x	x	
18	Chesney, 2006					x					
19	Fehrenbacher, 2013						x		x		
20	Leong et al., 2013			x		x	x		x	x	
21	Leong et al., 2013										
22	Abu-Al-Aish et al., 2013					x			x	x	
23	Oshlyansky et al., 2007										
24	Adell, 2010						x				
25	Oshlyansky et al., 2007										
26	Jairak et al., 2009					x					
27	Sundaravej, 2010					x			x	x	
28	Bandyopadhyay et al., 2007						x		x	x	
29	Jambulingam, 2013					x			x	x	
30	Moran et al., 2010					x			x	x	
31	Yu, 2012					x			x	x	
32	Martins, 2013					x	x		x	x	
33	Wang et al., 2009					x			x	x	
34	Nassuora, 2012					x					
35	Carlsson et al., 2006					x					
36	Williams et al., 2012										
37	Y.-L. Wu et al., 2008					x					
38	Weiwei SHI, 2007					x			x		
39	Liu, 2008					x					
40	Lederer et al., 2000					x	x				
41	Chen et al., 2009					x			x	x	
42	M.-Y. Wu et al., 2012	x				x					
43	Abdulwahab et al., 2012					x	x		x	x	
TOTAL		1	0	2	0	33	16	0	24	22	1

Appendix A

Questionnaire

Dear Respondent,

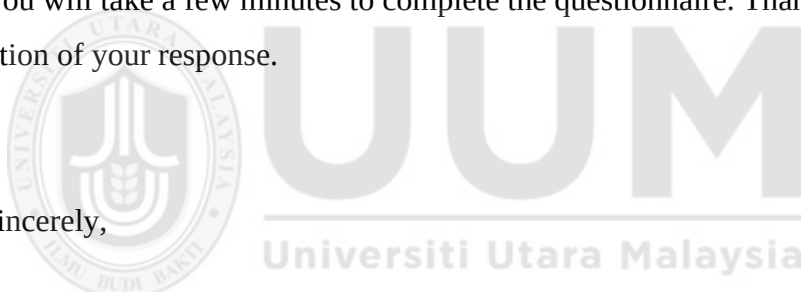
TO WHOM IT MAY CONCERN MEKHZOUMI OUALIEDDINE

I am student at Awang Had Salleh Graduate School - UUM who conducting a survey over technology acceptance behaviour for English language learning. Through your participation, I eventually hope to understand the acceptance level of mobile applications for English language learning.

Enclosed with this letter is a brief questionnaire that asks variety of questions to analyse the behaviour intention towards Mobile applications for English language learning. If you choose to participate, do not write your name on the questionnaire. Your responses will not be recognised with you personally, nor will anyone be able to determine which country you belong.

I hope you will take a few minutes to complete the questionnaire. Thanking you in anticipation of your response.

Yours sincerely,



MEKHZOUMI OUALIEDDINE

Dr. Mohd Hilmi bin Hamzah
Main Supervisors

Dr. Hariharan a/l N. Krishnasamy
Co-supervisor

Part I: DEMOGRAPHIC QUESTIONS

Respondent Background

1 Respondent's gender

1. Female
2. Male

2 **Age (years)**

1. Below 20.....
2. 21-25.....
3. 26-30.....
4. 31-40.....
5. 40 above.....

3 **Respondent's educational level**

1. Post graduate
2. Undergraduate
3. Ph.D.

4 **Respondent's current year in UUM**

1. First
2. Second
3. Third
4. Fourth

5 **Respondent devices for English language learning**

1. Smartphone.....
2. Tablet.....
3. Both.....

6 **Respondent skills in using mobile application**

1. Expert user.....
2. Good user.....
3. Limited user.....

7 **I am aware of the following Mobile Application for ELL**

1. Duolingo
2. Memrise.....
3. Busuu
4. FluentU
5. Mosalingua
6. Rosetta stone
7. MindSnacks.....
8. None.....

Part II

Please review each of the following statements and tick the item that best represents your response. “Strongly agree” (1), “agree” (2), “disagree” (3) and “strongly disagree” (4) and “neutral” (0).

Construct	No	Item	Statements	1	2	3	4	0
Performance Expectancy	1	PE1	Using mobile applications is useful for English language learning.					
	2	PE2	Using mobile application for English language learning increases my chances of achieving things that are important to me.					
	3	PE3	Using mobile application helps me to learn English language more quickly.					
	4	PE4	Using mobile application increases my productivity in English language learning.					
Effort Expectancy	5	EE1	Learning how to use mobile application for English language learning is easy for me.					
	6	EE2	My interaction with mobile application for English language learning is clear and understandable.					
	7	EE3	Mobile application for English language learning is easy to use.					
	8	EE4	It is easy for me to become skilful in mobile application for English language learning.					
Social Influence	9	S11	People who are important to me think that I should use mobile application for English language learning.					
	10	S12	People who influence my behaviour think that I should use mobile application for English language learning.					
	11	S13	People whose opinions that I value prefer that I use mobile application for English language learning.					
Facilitating Conditions	12	FC1	I have resources to use mobile application for English language learning.					
	13	FC2	I have knowledge to use mobile application for English language learning.					
	14	FC3	Mobile application is compatible with other technologies I use for English language learning.					

	15	FC4	I can get help from others when I have difficulties using mobile applications for English language learning.
Hedonic Motivation	16	HM 1	Using mobile application for English language learning is fun.
	17	HM 2	Using mobile application for English language learning is enjoyable.
	18	HM 3	Using mobile application for English language learning is entertaining.
Price Value	19	PV1	Mobile application for English language learning is reasonably priced.
	20	PV2	Mobile application for English language learning is a good value for the money.
	21	PV3	At the current price, a mobile application for English language learning provides a good value.
Habit	22	H1	The use of mobile application for English language learning has become a habit for me.
	23	H2	I am addicted to using mobile application for English language learning.
	24	H3	I must use mobile application for English language learning.
	25	H4	Using mobile application for English language learning has become natural to me.
Behavioural Intention	26	BI1	I intend to continue using mobile application for English language learning in the future.
	27	BI2	I will always try to use mobile application for English language learning in my daily life.
	28	BI3	I plan to continue to use mobile application for English language learning.
