DESIGN AND DEVELOPMENT OF EDUCATIONAL DIGITAL GAME IN LEARNING ARABIC VOCABULARY AND ITS IMPACT ON UNIVERSITY STUDENT ACHIEVEMENT, MOTIVATION, AND PERCEIVED ACCEPTANCE

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UNIVERSITI PENDIDIKAN SULTAN IDRIS

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ABSTRACT

This study aims to develop an educational digital game (eMufradat) for Arabic language vocabulary learning and examine its effectiveness on learning achievement. Besides, this study also aims to examine the influence between learning achievement, motivation and perceived acceptance. A quasi-experimental design pre and post-test is employed in this study. This study's population includes Arabic language proficiency course students in 18 public universities located in Peninsular Malaysia. A total of 611 non-native Arabic students were selected through a cluster sampling to participate in this study. The students were assigned to a control group consisting of 240 students and a treatment group comprising 371 students. The main data of this study were collected through pre-test and post-test; questionnaires and complimented by a semi- structured interview. The quantitative data were analysed using descriptive analysis, t- test, ANOVA test, and regression analysis, while the semi-structured interview was analysed descriptively and thematically. The result of the t-test indicated that the difference in learning achievement between the control and treatment group was significant (p=0.000). Furthermore, the finding of the ANOVA test revealed that the difference in learning achievement between genders was not significant (p=0.287). Another important finding from the regression analysis is that students' motivation and learning achievement significantly affect perceived acceptance (p=0.000). In the meantime, student's motivation also has a significant effect on their learning achievement (p=0.000). The analysis from the semi-structured interview conducted among 16 students found to support the result of inferential analyses. In conclusion, the use of educational digital game (eMufradat) increased student's achievement and motivation in learning Arabic vocabulary. This study has contributed theoretically in the form of design principles of the educational digital game and contributed practically by producing an effective digital game (eMufradat) for learning Arabic vocabulary as well as demonstrates the development of educational digital game practically.

REKA BENTUK DAN PEMBANGUNAN PERMAINAN PENDIDIKAN DIGITAL DALAM PEMBELAJARAN KOSA KATA BAHASA ARAB DAN KESANNYA TERHADAP PENCAPAIAN, MOTIVASI, DAN PERSEPSI PENERIMAAN PELAJAR UNIVERSITI

ABSTRAK

Kajian ini bertujuan membangunkan permainan pendidikan digital (eMufradat) untuk pembelajaran perbendaharaan kata bahasa Arab dan mengkaji keberkesanannya terhadap pencapaian pembelajaran. Selain itu, kajian ini juga mengkaji kesan pengaruh antara pencapaian pembelajaran, motivasi, dan persepsi penerimaan. Kajian ini menggunakan reka bentuk eksperimen kuasi praujian dan pascaujian. Populasi kajian ini merangkumi pelajar kursus kemahiran berbahasa Arab di 18 universiti awam yang terletak di Semenanjung Malaysia. Sebanyak 611 pelajar Arab bukan penutur jati dipilih melalui persampelan kelompok untuk dijadikan peserta dalam kajian ini. Seramai 240 orang pelajar ditempatkan di dalam kumpulan kawalan dan 371 orang pelajar ditempatkan di dalam kumpulan rawatan. Data utama kajian dikumpulkan melalui praujian dan pascaujian; soal selidik serta temu bual separa berstruktur. Data kuantitatif dianalisis dengan analisis deskriptif, ujian t, ujian ANOVA, dan analisis regrasi sementara temu bual separa berstruktur dianalisis secara deskriptif dan tematik. Hasil ujian t menunjukkan perbezaan pencapaian pembelajaran pelajar dalam kumpulan kawalan dan kumpulan rawatan adalah signifikan (p=0.000). Selanjutnya, hasil dari ujian ANOVA menunjukkan perbezaan pencapaian pembelajaran antara kumpulan jantina adalah tidak signifikan (p=0.287). Antara penemuan penting lain dari analisis regrasi ialah motivasi dan pencapaian pelajar mempunyai kesan pengaruh yang signifikan terhadap persepsi penerimaan (p=0.000). Sementara itu, motivasi pelajar juga mempunyai pengaruh yang signifikan terhadap pencapaian pembelajaran mereka (p=0.000). Analisis daripada temu bual separa berstruktur dalam kalangan 16 orang pelajar menyokong kesemua dapatan analisis inferensi. Kesimpulannya, penggunaan permainan digital (eMufradat) dapat meningkatkan pencapaian dan motivasi pelajar dalam pembelajaran perbendaharaan kata bahasa Arab. Kajian ini menyumbang secara teori dalam bentuk prinsip reka bentuk permainan pendidikan digital di samping memberikan sumbangan praktikal melalui penghasilan permainan digital yang berkesan (eMufradat) dalam pembelajaran perbendaharaan kata bahasa Arab serta menunjukkan perkembangan permainan pendidikan digital secara praktikal.

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LIST OF ABBREVIATIONS

A	*Attention*
ADDIE	*Analysis, Design, Develop, Implement and Evaluate*
ANOVA	*Analysis of Variance*
BI	*Behavioural Intention*
C	*Confidence*
CTML	*Cognitive Theory of Multimedia Learning*
DGBL	*Digital Game-based Learning*
EE	*Effort expectancy*
EFA	*Exploratory Factor Analysis*
FC	*Facilitating conditions*
GBL	*Game-based Learning*
KMO	*Kaiser-Meijer-Olkin*
ICT	*Information and Communication Technology*
IDT	*Innovation Diffusion Theory*
IIUM	*International Islamic University Malaysia*
PCA	*Principal Component Analysis*
PE	*Performance Expectancy*
R	*Relevance*
S	*Satisfaction*

SD	*Standard Deviation*
SE	*Standard Error*
SI	*Social Influence*
TAM	*Technology Acceptance Model*
TAM2	*Technology Acceptance Model 2*
TAM3	*Technology Acceptance Model 3*
TPB	*Theory of Planned Behaviour*
TRA	*Theory of Reason Action*
TTF	*Theory of Task-Technology Fit*
UB	*Usage Behaviour*
UiTM	*MARA University of Technology*
UKM	*National University of Malaysia*
UM	*University of Malaya*
UMK	*University of Malaysia, Kelantan*
UMP	*University of Malaysia, Pahang*
UMT	*University of Malaysia, Terengganu*
UPM	*Putra University Malaysia*
UPNM	*National Defense University of Malaysia*
UPSI	*Sultan Idris Education University*
UniMAP	*University of Malaysia, Perlis*
UniSZA	*Sultan Zainal Abidin University*
USIM	*Islamic Science University of Malaysia*
USM	*University of Science Malaysia*
UTAUT	*Unified Theory of Acceptance and Use of Technology*

UTAUT2	*Unified Theory of Acceptance and Use of Technology 2*
UTeM	*Technical University of Malaysia Malacca*
UTM	*University of Technology Malaysia*
UTHM	*Tun Hussein Onn University of Malaysia*
UUM	*Northern University of Malaysia*

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Introduction

Vocabulary comprises of words in a language that forms its lexical system. Vocabulary is known as a lexicon and is considered as the knowledge of basic words the speaker can use while navigating different language contexts. The acquisition of vocabulary is the first step in learning one's first, second or foreign language (Thornoury, 2002). In the context of Malaysia, Arabic is mostly recognised as an additional language or a foreign language (Ghazali et al., 2021; Airil Haimi, 2017). In this regard, vocabulary acquisition is essential in learning Arabic. This is because the lack of vocabulary knowledge will hinder communication and, subsequently, the acquisition of other language skills and grammar rules (Nathesan, 2011). The amount or quantity of words

owned by an individual is known as the vocabulary size (Abdul Razif & Mohd Zaki, 2017). Studies have found that for native speakers, all words have the same value and level of priority, while second language learners tend to focus on high-frequency words which they commonly used (MCKeown & Beck, 2004; Nation, 2001).

Vocabulary skill is an important skill for second language users to master as sentences may still be understood when the accurate lexical component is being used, even if they are constructed from poorly pronounced words (Mohamad Khaidir et al., 2020; Norhayati et al., 2017). In this light, using the wrong words may lead to misunderstanding (Tight, 2010). Several scholars emphasised that strong vocabulary knowledge is strongly correlated to strong high language skills (Abdul Razif & Mohd Zaki, 2017; Nadwah & Nadhilah, 2014; Gan, 2012; Nyikos & Fan, 2007; Bauman & Kame'enui, 2003). It was found that compared to students with smaller vocabulary size, students with larger vocabulary size tend to use specific strategies such as using images or pictures to memorise the vocabulary, simple conversation with native speakers, and use contextual clues to guess the words they do not understand (Nadilah & Kamarul Shukri, 2018; Kayaoglu, 2013; Sueraya et al., 2012; Nacera, 2010; Park, 2010; Kuen, 2010).

Studies reported that second and foreign language students need at least 2000 vocabulary high frequency to obtain an 80% understanding of the text. In this regard, in learning Arabic in a higher learning setting, acquiring 2000 vocabulary item is realistic and will help them understand the text given, communicate with the teachers and their peers and complete the tasks given to them (Zainur Rijal & Rosni, 2018; Abdul

Razif & Mohd Zaki, 2017; Nation, 2001; Schmitt, 2000). In this regard, lecturers and instructors suggested adopting digital game-based learning to improve their students' vocabulary size in an interactive way. Previous studies have shown that game-based learning could increase students' acquisition of second language vocabulary (Azman et al., 2018; Amna et al., 2017; Siti Nazleen & Zuliana, 2017; Fu, 2017; Ugyen et al., 2015; Wilfried et al., 2014), as well as their motivation to learn (Ghazali et al., 2021; Amna et al., 2017; Fu, 2017; Hamizul, & Nik Mohd Rahimi, 2015; Muhammad Sabri, 2011; Dickey, 2010; Papastergiou, 2009). Digital game-based learning is one of the educational approaches that have a positive impact on students' content knowledge as well as their engagement in the learning process (Siti Nazleen & Zuliana, 2017; Amna et al., 2017; Hamizul & Nik Mohd Rahimi, 2015; Chu & Hung, 2015; Wilfried et al., 2014; Li & Tsai, 2013; Muhammad Sabri, 2011; Kirikkaya et al., 2010; Baid & Lambert, 2010; Papastergiou, 2009; Alessi & Trollip, 1984). Thus, the use of digital games has great potential as a strategy for teaching digital natives. Moreover, studies found that digital games can be used to help students transition from the school learning environment into tertiary education.

The digital game has successfully combined multimedia elements with the learning process (Mayer, 2021) to help students memorise vocabulary meaning, pronounce new words and subsequently, enhance the learning outcomes (Ghazali et al., 2021; Amna et al., 2017; Fu, 2017; Ugyen et al., 2015; Wilfried et al., 2014; Marika et al., 2013). Past studies revealed that educational games could encourage higher-order thinking skills among the students, increase the feeling of enjoyment towards learning and stimulate active learning, rather than being bombarded by information given by

teachers (Hou et al., 2020; Siti Nazleen & Zuliana, 2017; Amna et al., 2017; Hamizul & Nik Mohd Rahimi, 2015; Chu & Hung, 2015; Wilfried et al., 2014; Li & Tsai, 2013; Muhammad Sabri, 2011; Kirikkaya et al., 2010; Baid & Lambert, 2010; Abu Riya, 2001; Alessi & Trollip, 1984). Lee and Hammer (2011) also argued that digital games in learning help students become more innovative and more willing to try new things. In this light, the digital game is a great tool to improve learning skills, develop a positive attitude towards learning, and reduce the amount of stress associated with the traditional learning process (Samir & Randa, 2012; Najdi & Shiekh, 2012). The use of digital games also encourages creativity and present an innovative and dynamic educational tool. The discussion above indicates the benefits of digital games as a learning tool. These have garnered the interest of schools and higher education institutions to adopt digital games as part of their teaching and learning tools.

While the use of interactive game-based learning in Malaysian universities still in its infancy stages (Hamizul & Nik Mohd Rahimi,2015; Muhammad Sabri,2011), especially in the teaching of the Arabic language, it is gaining more popularity and has garnered the attention of many researchers. It has slowly become a major focus among researchers due to the advancement of technologies and people's reliance on them. Digital game-based learning has presented a new tool and strategies in language learning and teaching. Besides, it also has the potential to increase learners' engagement and develop thinking skills as it is an interactive platform for second or foreign language learning.

1.2 Background

However, it has been recorded that due to a lack of vocabulary, students are hesitant to practise language skills (Mohd Zaki et al., 2016; Zhang & Li, 2011). The phenomenon of vocabulary acquisition has attracted teachers and researchers' interest in second language acquisition (SLA) (Gu, 2010). Due to this importance, researchers and practitioners have introduced different strategies for the effective teaching of vocabulary.

The current Arabic language teaching and learning process are still predominantly teacher-centred, where the chalk and talk approach is still broadly practised by Arabic teachers (Nur Najhah Akmar & Muhammad Sabri, 2020; Rosni, 2017). Moreover, they are still highly reliant on the use of dictionaries, direct translation and rote learning (Mohamad Khaidir et al., 2020; Nur Naimah Akmar & Harun, 2017; Rosni, 2017; Nik Hanan & Rabiatul Aribah, 2014; Alhashemi & Mahmoud, 2012; Muhammad Sabri, 2011; Rosni, 2009). SLA research has argued that these strategies take away students' opportunity to engage actively in the lessons. Students are often demotivated to study because they see Arabic as a burden (Norfaezah, 2019). The students believe that they are required to memorise Arabic words and that they only study Arabic as a subject and to pass the examination (Norfaezah, 2019; Janudin, 2017). In this regard, the dominance of rote learning and an exam-oriented system does not give the students the opportunity to master the language.

Many studies found that Malaysian students demonstrate low to moderate Arabic vocabulary acquisition (Izzah Syakirah & Rosni, 2020; Abdul Razif & Mohd Zaki, 2017; Zainur Rijal et al., 2016; Abdul Razif et al., 2016; Siti Aisyah & Zamri, 2016; Hasnurol, 2010; Saifudin, 2002). This could be due to the fact that Arabic is still taught using traditional strategies with fewer interactions and students' engagement in the class (Nur Najhah Akmal & Muhammad Sabri, 2020; Nur Naimah Akmar & Harun, 2017; Rosni, 2017; Nik Hanan & Rabiatul Aribah, 2014; Alhashemi & Mahmoud, 2012; Rosni, 2009). As a result, students feel demotivated to learn the language as they do not find enjoyment in learning Arabic. Therefore, in order to improve the learning environment, students should be taught in an interactive way (Nur Najhah Akmal & Muhammad Sabri, 2020; Zaid Arafat, 2016) through exposing to them digital materials for self-learning practices (Rosni, 2017), as well as to create excitement and enjoyment in learning Arabic (Ghazali et al., 2021; Hou et al., 2020).

Various new approaches to language teaching and learning have been adopted in this period of globalisation to replace conventional approaches. The advancement of technology has created infinite resources to support language teaching and learning inside and outside the classroom. Since the past two decades, technology advancement has enriched students' learning experience, including learning the Arabic language. The digital game is one of the effective tools with good potential to improve the learning of digital natives (Ghazali et al., 2021; Noor Azli et al., 2019). It has been recognised that digital game is a beneficial tool that could encourage the active engagement of learners in the classroom (Ghazali et al., 2021; Hamadallah et al., 2019; Azman et al., 2018; Siti Nazleen & Zuliana, 2017; Amna et al., 2017; Hamizul & Nik Mohd Rahimi, 2015; Chu

& Hung, 2015; Wilfried et al., 2014; Li & Tsai, 2013; Han & Gwo, 2013; Muhammad Sabri, 2011; Kirikkaya et al., 2010; Baid & Lambert, 2010; Alessi & Trollip, 1984). It could improve student's knowledge, develop an enjoyment environment in class, engaged student throughout the learning process, as well as develop soft skills, including critical thinking and leadership (Paiva et al., 2016; Sung & Hwang, 2013; Hwang et al., 2012; Najdi & Sheikh, 2012; Lee & Hammer, 2011; Yien et al., 2011; Papastergiou, 2009).

Based on the discussion above, there is a crucial need to improve Arabic vocabulary acquisition among Malaysian students. Since vocabulary knowledge is the most important component of language proficiency and learner vocabulary size has a direct connection to language skills, there is a need to increase language learners' vocabulary size in order to enhance students' language skills. In order to enrich students' vocabulary, an innovative learning strategy is needed, and it is believed that digital game is one of the most suitable vocabulary learning strategy to help the digital natives in the modern classroom. Digital game-based learning gives opportunities for students to engage actively in learning Arabic vocabulary lessons, contribute actively in the learning activities, develop higher-order thinking skills and decision-making as well as increasing their motivation to learn the Arabic language.

Therefore, this study aims to design and develop an educational digital game to improve Arabic vocabulary acquisition among non-native Arabic speakers. This study attempts to determine the effectiveness of the educational digital game in improving student achievement. Besides, this study examines how using educational digital game

affects students' achievement, motivation and acceptance towards the use of digital games in classrooms.

1.3 Problem Statement

In language learning, vocabulary is considered as the foremost aspect of proficiency, compared to other linguistics elements such as syntax and morphology (Norhayati et al., 2017). Consequently, students' lack of vocabulary could lead to difficulties communicating and writing in the target language (Nabihah et al., 2021; Makhoul & Sabah, 2019; Norhayati et al., 2017; Ramlan, 2016). Therefore, teachers need to find the best way to teach and improve student's vocabulary. Many Arabic learners in Malaysia still have limited Arabic proficiency even though they have been learning Arabic since they are in primary or secondary school (Ghazali et al., 2021). The student's inability to master the Arabic language has remained a prevailing debate among teachers (Makhoul & Sabah, 2019; Kamarul Shukri et al., 2009).

Vocabulary acquisition is one of the most challenging tasks for students (Nabihah et al., 2021). A majority of Malaysian students do not reach a satisfactory level of vocabulary acquisition in Arabic. Several studies measured student' mastery of vocabulary and found that they have limited vocabulary (Izzah Syakirah & Rosni, 2020; Abdul Razif & Mohd Zaki, 2017; Rahim, 2009; Zawawi et al., 2004; Saifuddin, 2002). Moreover, students have low confidence to use Arabic in class and their everyday conversation (Nur Najhah Akmal & Muhammad Sabri, 2020; Zainur Rijal et al., 2016;

Abdul Razif et al., 2016; Siti Aisyah & Zamri, 2016; Nadwah & Nadhilah, 2014; Noor Anida et al., 2013; Gan, 2012). This shows that students have limited vocabulary despite learning the Arabic language in primary and secondary school. Hence, the teaching of Arabic language subject has yet to establish a satisfying result (Hassan Basri & Zamri, 2012; Wan Abdul Hayyi et al., 2012). Based on Ghazali et al. (2021), Abdul Razif and Mohd Zaki (2017), Alobaydi et al. (2017), Nadwah and Nadhilah (2014), Gan (2012), Nyikos and Fan (2007), it could be argued that the lack of vocabulary has contributed to students' ability to achieve high Arabic language proficiency. This has also hindered students from becoming good Arabic speakers (Ghazali et al., 2021; Nadwah & Nadhilah, 2014; Nik Murshidah et al., 2014), as well as demonstrating proficiency in other language skills (Ghazali et al., 2021; Norhayati et al., 2017).

Moreover, previous studies reported that Malaysian primary and secondary school students have moderate or little knowledge of Arabic vocabulary, and it has yet reached a satisfactory level (Izzah Syakirah & Rosni, 2020; Zaid Arafat et al., 2016; Abdul Razif & Mohd Zaki, 2017). This creates a negative impact on the student's academic achievement in schools and higher learning (Zaid Arafat et al., 2016) and subsequently affect their language proficiency skills (Norhayati et al., 2017; Nadwah & Nadhilah et al., 2014). A similar trend has been observed among Arabic language learners in higher institutions (Zainur Rijal & Rosni, 2018; Sumaiyah et al., 2018; Siti Aisyah & Zamri, 2016). This problem is due to a lack of motivation to use Arabic vocabulary and use the language, indicating that the Arabic language course offered have less than satisfactory results (Muhammad Sabri, 2011). It was also observed an

average university student has moderate or small vocabulary size, which is still below the desired level (Abdul Razif et al., 2016; Siti Aisyah & Zamri, 2016).

Previous studies have revealed that most Arabic language teachers still use the traditional teacher-centred approach (Nur Najhah Akmal & Muhammad Sabri, 2020). The teacher merely lists words for students to memorise and finding the meaning of words using a dictionary (Rosni, 2017; Rosni, 2009). In some classes, students are only merely copying down the meaning of new words in their notebook (Schmitt, 2000). The words on this list will then be memorised and checked for possible use. Students are only exposed to the prescribed vocabulary that they learned in class. The practise of rote learning forces students to remember the vocabulary rather than understanding the meaning of the words and how to use it in context (Nur Najhah Akmal & Muhammad Sabri, 2020; Mohd Yusri et al., 2016; Maimun Aqsha, 2009). Such practice is considered as the major hindrance of students' development of Arab language proficiency and the mastery of Arabic language skills (Nur Najhah Akmal & Muhammad Sabri, 2020; Norhayati et al., 2017; Siti Aisyah & Zamri, 2016; Rahimi et al., 2014; Nadwah & Nadhilah, 2014). Furthermore, studies argued that students have negative perceptions of learning Arabic and are always reliant on their friends and teacher (Norfaezah, 2019; Sumaiyah et al., 2018). They are also demotivated to do any self-learning such as revision, reinforcement and exercise to increase Arabic vocabulary (Zaid Arafat et al., 2016).

Language teachers tend to use the translation method as it is considered as the fastest way to help students remember a new word (Harmer, 2015; Maimun Aqsha, 2009). Over the years, this method has drawn criticism as it does not allow students to learn the words meaningfully and use the new words according to contexts. In this light, the language teacher plays an important role to provide comprehensible inputs to decrease students' anxiety in learning a foreign word (Krashen, 1987). Thus, it could be argued that teachers' use of direct translation restricts the students from using their knowledge in the actual situation (Maimun Aqsha, 2009), leaving them feeling demotivated (Dornyei, 2001) to learn and use the language. Students also feel demotivated as they hardly use the language skills and words taught in real life (Arefinezhad & Golaghaei, 2014; Ashinida, 2013; Nation, 2001). Hence, teachers should improvise their teaching style by adopting the current and innovative approach to vocabulary learning. Due to the rapid advances in technology, students are more interested in lessons that engage them personally and collaboratively. Thus, there is a need for teachers to use digital tools to complement the teaching practices and make the classes more attractive (Izzah Syakirah & Rosni, 2020; Nur Najhah Akmal & Muhammad Sabri, 2020; Muhamad Khairul et al., 2019; Wu, 2018; Irma Martiny et al., 2016; Zaid Arafat et al., 2016; Mohammad Amir et al., 2015).

The use of technology affects all facets of digital natives born during this technological period. In the twenty-first century, technological innovation has altered how people, particularly the younger generation, interact and socialise with one another, as well as how they learn, acquire, and process knowledge. (Helsper & Eynon, 2009). In this regard, the notion of learning has changed and there is a concern that the

current education system is still dominated by traditional teaching method (Prensky, 2001b). The younger generation is defined by Prensky (2001b) as digital natives as they are the "native" generation that is born in the era where the use of digital tools and technology, particularly the internet, prevails. It was argued that the newer generation who are born in the late 90s and 2000s have different ways of thinking and process information compared to those born in the earlier decade (Prensky, 2001b; Prensky, 2001c). Prensky (2001b) further described that the digital natives are used to receive information in real-time and are able to multi-task more effectively. These learners are considered more graphic learners and gameplay than the use of text and more tedious studying.

Helsper & Eynon (2009) argued that the current educational practice might not be able to accommodate the needs of the younger generation as they have the different inclination and different ways of information use and processing. Thus, there is a need for current pedagogies to be transformed to fulfil the current needs of the digital natives. Teachers can no longer use traditional pedagogies, and there is a need for them to communicate and reach out to the digital native students (Prensky, 2001b). In this regard, teachers need to revamp their pedagogical practices in order to provide a less restricting, more active and faster pace of learning to fit the needs of digital natives. Prensky (2001b) also advocates the integration of digital tools like computer games that are familiar to the digital natives. The use of these tools could offer an engaging learning experience and increased motivation to sustain the learning process. Furthermore, the students will be able to develop soft skills, higher-order thinking skills and allow them

to practice self-learning (Mohammad Taufiq et al., 2019; Paiva et al., 2016; Sung & Hwang, 2013).

The inclusion of technology in education, especially in learning the Arabic language, is still in its infancy. Mohd Feham (2006) critiqued that teachers incorporate technology into Arabic language practices based on the trend of instructional technology rather than based on the spirit of innovation. It can also be observed that at presents, the teacher-centred approach and rote learning are still practised in Malaysia (Nur Najhah Akmar & Muhammad Sabri, 2020; Nur Naimah Akmar & Harun, 2017; Nik Hanan & Rabiatul Aribah, 2014; Alhashemi & Mahmoud, 2012; Muhammad Sabri, 2011; Rosni, 2009). Ismail (2008) reported that instructional technologies such as web-based learning, digital games and computer-assisted language learning are yet to take centre stage in Arabic language classrooms in schools, as well as in higher education (Nurkhamimi & Muhammad Sabri, 2015). This could be due to education software limitations for learning Arabic (Mohd Feham, 2006). These include the fact that most digital learning tools are based on the Latin-based writing system rather than the right-to-left writing system in Arabic. Subsequently, this creates a technical challenge for developers when there is a limited number of coding system and authoring packages compatible with coding Arabic characters (Nurkhamimi & Muhammad Sabri, 2015). Moreover, the amount of Arabic language materials in the market is still limited. This has caused teachers to use the traditional pen and paper approach, which does not require extra time and efforts to prepare digital teaching aids (Muhammad Sabri et al., 2013).

A more interactive and engaging learning strategy should be implemented to encourage students to learn Arabic vocabulary (Nabihah et al., 2021; Muhamad Khairul et al., 2019; Wu, 2018; Irma Martiny et al., 2016; Zaid Arafat et al., 2016), as well as to encourage them to learn independently and actively using electronic materials available to them (Rosni, 2017). The Digital game-based learning approach is the most suitable approach (Noor Azli et al., 2019; Amna et al., 2017; Fu, 2017; Khaleel et al., 2016; Muhammad Sabri, 2011; Hamizul & Nik Mohd Rahimi, 2015; Prensky, 2001b) as it benefits the students by improving their attitude towards learning, enhance motivation and improves their achievement (Ghazali et al., 2021; Hamadallah et al., 2019; Azman et al., 2018; Siti Nazleen & Zuliana, 2017; Amna et al., 2017; Hamizul & Nik Mohd Rahimi, 2015; Chu & Hung, 2015; Wilfried et al., 2014; Li & Tsai, 2013; Han & Gwo, 2013; Muhammad Sabri, 2011; Kirikkaya et al., 2010; Baid & Lambert, 2010; Alessi & Trollip, 1984). Moreover, the inclusion of digital games and the various multimedia elements could help students memorise the meanings and pronunciation of new foreign words (Kalyuga et al., 2013; Agca et al., 2013). These elements will enrich the students' learning experience and provide more meaningful listening and pronunciation practices (Ramlan, 2016).

Studies on digital game-based learning have addressed the substantial difference between male and female students. In general, male students have greater involvement, experience, knowledge and skill in digital gameplay compared to female students (Zhonggen, 2018; Sundqvist & Wikstrom, 2015). Hence, it may not be equally effective for male and female as their digital game preference might differ (Wohn et al., 2020; Admiraal et al., 2014; Arnup et al., 2013). In addition, students from different

genders have a different level of motivation (Wohn et al., 2020; Andreas & Michaela, 2018; Amna et al., 2017; Wilfried et al., 2014), enjoyment (Houe et al., 2020), and engagement (Andreas & Michaela, 2018; Amna et al., 2017) towards the digital game. All of these could lead to different outcomes among players. On the other hand, other studies revealed that digital game-based learning equally motivates and improves student achievement regardless of their gender (Ascension et al., 2020; Artym & Carbonaro, 2019; Yang & Quadir, 2018; Chung & Chang, 2017; Yien et al., 2011; Yang & Chen, 2010; Papastergiou, 2009) and has a positive impact on the achievement of students from both genders (Chung & Chang, 2017; Ugyen et al., 2015; Lester et al., 2014) and equitable for all students regardless of their gender (Artym & Carbonaro, 2019; Chung & Chang, 2017; Philip et al., 2015).

Digital game-based learning is a promising approach that could positively impact students' achievement and motivation. Research has also shown that the use of digital game-based learning has great potential in improving aspects like student engagement throughout the learning process and their attitude towards learning (Azman et al., 2018). However, there is still limited studies on how students' perspective and acceptance towards the use of technological tools for Arabic language learning. Users' acceptance reflects their willingness to employ the information system for the tasks it is designed to support (Dillon & Morris, 1996). As a consequence, it is important to construct a commonly recognised digital game for learning purposes. In this light, determining students' acceptance will gauge whether they accept a program or how they perceive a particular system to provide a better understanding of the target users. Designers can use this information to design and produce a system based on the target

users' needs and wants. Ibrahim et al. (2017) further mentioned that a highly user-friendly program would not guarantee users' acceptance if they find that the system is not useful and has no benefits for them. However, systems that are not that friendly might be used by the users as they hight regard its usefulness. These are the two most important factors regarding user acceptance of information system (Davis, 1989).

Based on the discussion above, this research study tries to design and develop an educational digital game to help students learn Arabic vocabulary. These educational digital game contents and activities implement student-centred and constructive approaches to enhance student motivation and sustain their engagement throughout the learning process. This game also incorporates multimedia elements such as text, picture and graphic, as well as an audio clip of word pronunciation to improve their vocabulary acquisition. This study will identify the educational digital game's effectiveness in improving student achievement in learning Arabic vocabulary. This study will also examine students' motivation and their acceptance of the use of the digital game.

1.4 Research Objectives

Based on the problems faced by the learners in learning Arabic vocabulary, this study presents the design and development of a novel educational digital game to overcome problems in learning Arabic. The research objectives are:

1. To identify the student's needs that should be considered in developing an educational digital game to support the learning of Arabic vocabulary.
2. To identify the difference in the effectiveness of educational digital game across different pedagogical practices.
3. To identify the difference in the effectiveness of educational digital game across different gender.
4. To identify the difference in the effectiveness of educational digital game across different language background.
5. To identify the effect of motivation and achievement towards users' acceptance of using the educational digital game in learning Arabic vocabulary.
6. To identify the effect of motivation towards students' achievement in using the educational digital game in learning Arabic vocabulary.
7. To explore students' opinion towards the use of the educational digital game in the Arabic language classroom.

1.5 Research Questions

As stated in the problem statement, the research questions of this study are:

1. What are the student's needs that should be considered in developing an educational digital game to support the learning of Arabic vocabulary?
2. What is the significant difference in student's achievement across the type of pedagogical practices?

3. What is the significant difference in the student's achievement across different gender?
4. What is the significant difference in the student's achievement across different language background?
5. What is the effect of motivation and achievement towards user acceptance in using the educational digital game for learning Arabic vocabulary?
6. What is the effect of motivation towards achievement in using the educational digital game for learning Arabic vocabulary?
7. What are the students' opinion towards the use of the educational digital game in the Arabic language classroom?

1.6 Research Hypothesis

The hypotheses for this study are as follow:

These hypotheses below state the difference between the students achievement in the control group and treatment group, as reflected through their pre and post-test scores.

H_{01}: There is no significant difference between the pre-test score of the students in the control group and the treatment group.

H_{02}: There is no significant difference between the pre-test score and post-test score of the students in the treatment group.

H_{03}: There is no significant difference between the pre-test score and post-test score of the students in the control group.

H_{04}: There is no significant difference between the post-test score of the students in the control group and the treatment group.

The hypothesis below state the difference between the achievement between male and female students, as reflected through their post-test scores.

H_{05}: There is no significant difference in student's achievement between male treatment group, female treatment group, and control group.

The hypothesis below state the difference between the achievement of students with Arabic language background and those without Arabic language background, as reflected through their post-test scores.

H_{06}: There is no significant difference in students' achievement between student with Arabic language background group, student without Arabic language background group and the control group.

The hypotheses below state the effect of digital game-based learning on students' achievement, motivation and their acceptance towards its use in supporting the learning of Arabic vocabulary.

H_{07}: Motivation has no significant effect on students' acceptance towards the use of educational digital games to learn Arabic vocabulary.

H_{08}: Students' achievement has no significant effect on user acceptance towards the use of educational digital games in learning Arabic vocabulary.

H_{09}: Motivation has no significant effect on students' achievement in using the educational digital game in learning Arabic vocabulary.

1.7 Significance of Study

Numerous studies have shown that the digital game-based learning approach has a positive impact on education, language acquisition, students' motivation and academic achievement. The advancement of technologies has brought great opportunities to enhance the teaching and learning process. Thus, this research study aims to develop an educational digital game to support the learning of Arabic vocabulary. This study builds upon previous research on advanced digital game-based learning to examine how its use affects students' achievement and motivation in learning Arabic vocabulary, as well as students' acceptance of the incorporation of digital games into education. This study highlights the issues that have not been previously addressed in Arabic language learning, specifically in the use of the digital game in learning Arabic. Issues faced by Arabic students have been investigated by previous studies (Zaid Arafat et al., 2016; Hamizul & Nik Mohd Rahimi et al., 2015; Muhammad Sabri, 2011; Zawawi et al. 2004), and this study tries to explain the major problem they faced in learning in the virtual environment which incorporated elements of fun and enjoyment. Due to the broad potential of this new learning and teaching approach, this study is important in order to engage the students in the classroom's learning environment beyond the use of technology they already possessed and frequently use.

During the development phase of the educational digital game, this study examines the implementation of digital game-based learning among non-native Arabic speakers at the university level. This will demonstrate whether digital games are useful and whether it could be effective for other courses. In addition, the educational digital game also gives opportunities to the students to explore the new learning setting and the environment without time and place restriction. This study also presents a multimedia-based educational digital game that can attract the students' attention, improve their engagement and increase their motivation in learning Arabic. This game can also help students to acquire vocabulary more quickly and effectively. In addition, this study is significant for Arabic teachers and researchers as it presents an effective learning tool to facilitate students' learning of Arabic vocabulary.

This study is also important to the field of Arabic education. This study provides empirical evidence on how educational digital games can positively impact students' achievement in the Arabic language. This educational digital game is designed by considering aspects of students' gender and their language background. The empirical data obtained in this study could provide an explanation of the significant effects of digital games on students' achievement and motivation to learn the Arabic language, as well as their acceptance towards the use of the educational digital game in learning Arabic.

1.8 Research Limitation

1. The educational digital game is only used for teaching and learning Arabic vocabulary among non-native Arabic speakers.
2. The educational digital game is limited to the Android 7.0 Nougat (API24) mobile operating system and above.
3. The educational digital game developed using Framework7 and jQuery UI software.
4. The research population is limited to Arabic language proficiency course students in public universities in Peninsular Malaysia.
5. The research frame is limited to elementary-level Arabic language proficiency course students.
6. The educational digital game contents are chosen from the course outline of the Arabic language proficiency course.

1.9 Conceptual Research Framework

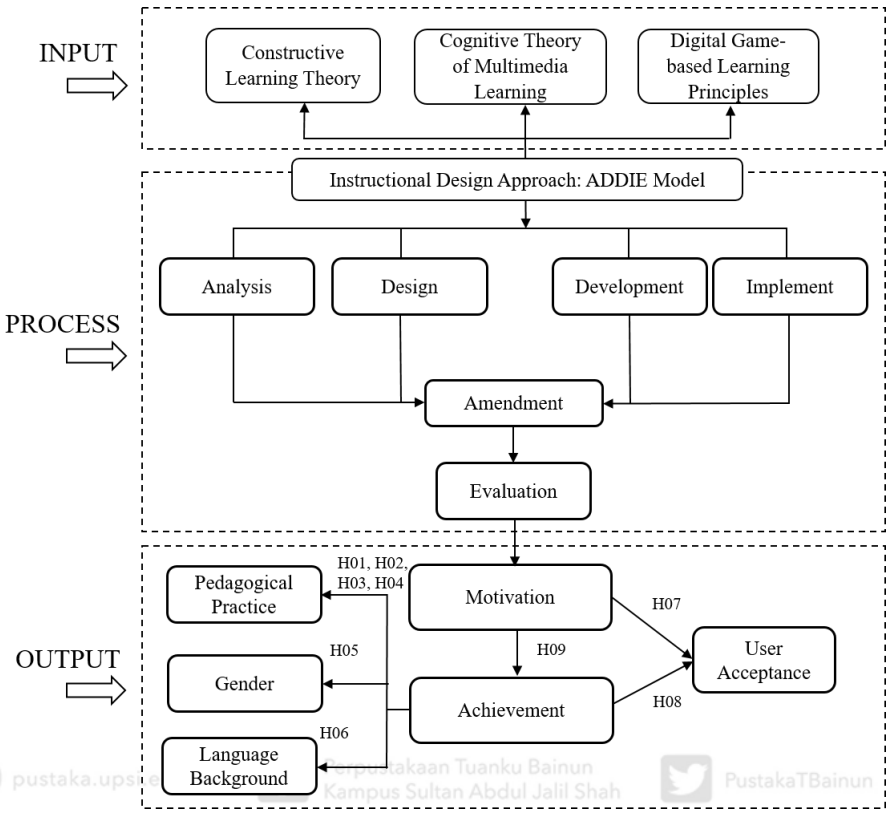

Figure 1.1. Conceptual Framework

The figure above illustrates the conceptual research framework for this research study. The aim of this study is to develop an educational digital game and determine the effectiveness of it on the students' acquisition of Arabic vocabulary. It is also aimed to determine whether the digital game could increase students' motivation to learn Arabic and whether they accept the use of digital games. The development process of the educational digital game several a number of steps that researcher has taken to ensure the accuracy of data analysis on its effectiveness. These processes aim to ensure the study is valid, reliable, and significantly contributes to Arabic language teaching.

This conceptual framework presents the research topics, theories, and instructional model that established the background of this study. It also covers on research procedure, and finally, the hypothesis testing. As illustrated in the figure above, this study comprises three main stages: input, process, and output. The input stage involves conducting an initial study of research topics and selecting appropriate theories related to the study's nature. The researcher has chosen the constructive learning theory by Jean Piaget (1977), cognitive theory of multimedia learning by Mayer (2001) and digital game-based learning principles by Bober (2010). The development of the digital game is underpinning these three main theories. In the field of education, multimedia applications are being used widely as a source of information and delivering learning resources for students. It is also used to enrich the learning process and sustain the engagement and student-teacher interactions in the learning process. The Digital game-based learning approach is drawn based on the constructive learning theory, which has great potential to improve students' achievement and motivation. Over the years, researchers have proposed many theories and principles, and in this study, the digital game principles proposed by Bober (2010) was chosen as it has comprehensive elements and suitable to be adopted in this context.

After selecting the theories, the researcher proceeds to the second stage, which is the process stage. The researcher used the ADDIE model (Analysis, Design, Develop, Implement, and Evaluate) in this phase, which is widely used for developing instructional materials (Budoya et al., 2019; Hess & Greer, 2016; Aldoobie, 2015). The ADDIE model is a non-linear model. In this regard, the designers are not confined by following each stage sequentially. Instead, the researcher is allowed to implement each

stage flexibly based on the research needs, rather than being tied to follow a sequential process. All of these steps are interlinked with each other. In this regard, a formative evaluation phase will help researchers to evaluate the effectiveness of each stage, and each stage plays a significant role in the whole process (Jasa et al., 2018). The model places high emphasis on evaluation as the researcher is required to conduct formative assessments in each stage prior to entering the next stage (Karmila Rafiqah et al., 2019). Moreover, summative assessment is conducted in the evaluation stage at the end of the ADDIE model. The interactive ADDIE model provides an excellent structure and gives designers opportunities to be creative in designing instructions and improving the validity and reliability of each stage.

The stages start with the analysis phase, where data on students' needs, opinions, and suggestions for learning Arabic vocabulary through the educational digital game are collected. Subsequently, the data will be considered in designing and developing the prototype. In this stage, a set of needs analysis questionnaires are distributed to the respondents. The respondents comprise of public university students who are enrolled in an Arabic language course as the digital game prototype focuses on Arabic language vocabulary.

The next phase of the ADDIE model is designing the educational digital game prototype based on related theories in the input stage and the findings from the need analysis phase. In this phase, several main components are taken into account in designing the educational digital game, including the objective and content, learning

tool selected, design digital game principles, employ the ARCS model, selected subject matter experts, draft the tests, game flow chart, the storyboard, and the game design.

Then, the researcher proceeds to the next step, which is the development phase. The development stage is grounded on the input from the design phase. The researcher chooses several types of software and hardware to be used for prototype development, including Framework7, Adobe Illustrator, Audacity, Snipping Tool, external hard disk, USB headset, and USB microphone. The researcher also designs multimedia presentations for content delivery. Several elements have been included in the educational digital game, such as text, audio, pictures, and graphics. In addition, the researcher developed the visible and invisible interaction of the digital game.

The next phase in the ADDIE model is implementation. The researcher starts the process by providing the download link of the prototype (prototype I) to the experts and students. The subject-matter experts and selected students will review and give comments, opinions, and suggestions for improvement. The participants will evaluate prototype I in terms of its course content, instructional design, and technical aspects. The digital game will be improved based on the input from the first phase. Afterwards, the second digital game prototype (prototype II) is developed and distributed among the targeted respondents of the study. As a quasi-experimental study, the effectiveness of the digital game prototype in supporting the learning of Arabic vocabulary is assessed by giving a pre-test and post-test to the respondents. The respondents are divided into two groups, a treatment group and a control group.

The last phase is a crucial phase where the prototype is evaluated for its effectiveness. In this phase, the researcher conducts a summative evaluation by distributing the pre-test to measure the respondents' existing knowledge. Meanwhile, a post-test will be given after four weeks of the intervention to measure whether digital game-based learning effectively supports the acquisition of Arabic vocabulary. Then, the summative evaluation continues by administering two sets of questionnaires to gauge the respondents' level of motivation and user acceptance in the treatment group. The researcher will also conduct a semi-structured interview with the respondents. The quantitative data will be interpreted inferentially to measure the effect of motivation and achievement towards user acceptance. In contrast, the descriptive and thematic method will be used to analyse the qualitative data.

1.10 Definition of Terms

1. Educational Digital Game

   The educational digital game is a game-like rule system, player experiences, and cultural roles to shape students' behaviour (Chung & Ching, 2013). For this research study, the educational digital game is referred to as a digital game application developed using Framework7 and jQuery UI software. This educational digital game runs on the Android 7.0 Nougat (API24) mobile operating system and above. This tool is employed during Arabic language teaching and learning session.

2. Digital Game-based Learning

Game-based learning refers to the use of any form of games, including the digital version, as a learning tool (Prensky, 2001a). Kim et al. (2009) defined game-based learning as a learning strategy that focused on achieving the particular objectives of given educational content through gameplay. For this research, digital game-based learning was adopted as a learning and instructional strategy in teaching Arabic vocabulary to university students. This study employed five main digital game-based learning principles suggested by Bober (2010): goal, challenge, feedback, narrative/ fantasy, and sensory stimuli.

3. Traditional Learning Practices

Traditional learning refers to face-to-face, classroom-based teaching. In this light, inter-students, student-teacher, student-content, and teacher-content interactions and communication usually is one-sided (Alharbi, 2012). In this study, students in the control group will undergo traditional Arabic language lessons and vocabulary learning.

4. Arabic Vocabulary

Vocabulary comprises of the lexical items in a language that plays an essential role in forming a linguistic system. The mastery of the target language, in this case, Arabic, vocabulary is an essential basis of language learning, and students must obtain and acquired to master the language skills. For this research, the educational digital game will be focused on a set of Arabic vocabulary was

chosen from the syllabus from the course outline provided by Arabic programme coordinators in Malaysian public universities.

5. Multimedia

Multimedia refers to a combination of digitally manipulated elements such as texts, photographs, graphic arts, sound, animation, and video (Vaughan, 2011). Mayer (2021) defined the term "multimedia" as the presentation of materials using both words (verbal) and pictures (pictorial). In this research, multimedia elements, including texts, audio files, images, and graphics, are incorporated into the educational digital game. In this regard, educational digital games' development also follows several multimedia principles, including coherence, redundancy, contiguity, modality, personalisation, and multimedia principles.

6. Achievement

Academic achievement refers to the students' knowledge and skills of an assessment, such as tests. According to Parker (2007), a student's learning achievement is measured through the semester grades, grade point average, scores on standardised exams or marks in individual assignment. In this study, the student's achievement is measured through the differences of scores between pre-test and post-test scores.

7. Motivation

Motivation can be defined broadly as what people desire, what they choose to do, and what they commit to do (Keller, 2010). Motivation is identified as a fundamental aspect of learning (Brewer & Burgess, 2005). It is also linked to

how a person is engaged in doing something (Ryan & Deci, 2000) because motivation controls behaviour. In other words, motivation energises, directs, and sustains behaviour. This study used the ARCS motivational model designed by Keller (1987a), where students' motivation in learning Arabic vocabulary is sustained through using the educational digital game. This model comprises of four constructs, which are attention (A), relevance (R), confidence (C), and satisfaction (S).

8. User Acceptance

The user acceptance test helps to assess the extent to which the end-user accepts the software prior to moving it into the production environment. In this stage, user acceptance of the Arabic language learning educational digital game is assessed using the Unified Theory of Acceptance and Use of Technology model (UTAUT) suggested by Venkatesh et al. (2003). In general, the model has six constructs; effort expectancy (EE), behavioural intention (BI), performance expectancy (PE), facilitating conditions (FC), social influence (SI), and usage behaviour (UB).

9. Language Background

In this study, language background refers to students' current Arabic language proficiency and their experiences in learning the language. In Malaysia, Arabic is considered as an important foreign or additional language (Ghazali et al., 2021; Airil Haimi, 2017). Several students in this study have experienced learning the Arabic language in secondary school for three to five years before enrolling in their respective universities. These students are labelled as a student

with an Arabic language background, while those who have do not have any experience learning Arabic language before enrolling into university are labelled as a student without Arabic language background.

1.11 Summary

Students demonstrated negative perception and considered Arabic as a difficult subject. This negative perception has demotivated students from learning and using the Arabic language. The use of traditional teaching methods, such as memorising and rote learning, has made students feel bored and less-interested in learning Arabic and acquire its vocabulary. Subsequently, students have a bad learning experience, and the lessons are not meaningful. Such practice has a negative impact on their academic achievement and motivation. Over the year, education technology has path the way for the development of innovative and interactive digital educational tools. In this regard, the digital game-based learning approach has a great potential to overcome the current problem in teaching the Arabic language along. The use of game-based learning can be supplemented by including multimedia elements such as text, audio, graphics, and animation into the teaching materials. Thus, this study designs and develops an educational Arabic-based digital educational game to increase students' Arabic vocabulary and motivation to learn Arabic. This chapter has presented the study's introduction, background, problem statement, research objectives, research questions, research hypothesis, the significance of the study, research limitation, conceptual research framework, definition of terms, and summary of the discussions.