

APPLICATION OF GAME-BASED LEARNING IN
DEVELOPING METACOGNITION FOR FACILITATING
ENGLISH FOR SPECIFIC PURPOSE (ESP)
VOCABULARY ACQUISITION: A CASE STUDY

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By

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ABSTRACT

APPLICATION OF GAME-BASED LEARNING IN DEVELOPING METACOGNITION FOR FACILITATING ENGLISH FOR SPECIFIC PURPOSE (ESP) VOCABULARY ACQUISITION: A CASE STUDY

Tan Wilson

Insufficient vocabulary knowledge among business undergraduates often leads to problems in both written and spoken communication. Improving vocabulary is a conscious effort requiring metacognitive awareness, which refers to the ability of an individual to reflect, understand and control their learning. This study investigated the effect of game-based learning on ESP learners' metacognitive awareness and vocabulary acquisition through a mixed-method approach. A total of 65 participants were involved in this study. The quantitative data were gathered through pre- and post-vocabulary tests and the adapted Metacognitive Awareness Inventory (MAI). The results showed there was a significant improvement in learners' conditional knowledge and comprehension monitoring. Focus group interviews and a questionnaire were used to analyse the perception of the usefulness of game-based learning in developing metacognitive awareness and facilitating vocabulary acquisition. The findings from the qualitative data showed that game-based learning is effective in vocabulary acquisition as well as developing metacognitive awareness. These findings can help ESP practitioners, and course and syllabus designers

incorporate game-based learning as a tool of learning to better allow students to learn the contents being taught.

Keywords: Game-based learning, Metacognitive Awareness Inventory, The Sims 4 Get to Work, English for Specific Purpose, vocabulary acquisition.

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Tan Wilson

APPROVAL SHEET

This dissertation entitled “**APPLICATION OF GAME-BASED LEARNING IN DEVELOPING METACOGNITION FOR FACILITATING ENGLISH FOR SPECIFIC PURPOSE (ESP) VOCABULARY ACQUISITION: A CASE STUDY**” was prepared by TAN WILSON and submitted as partial fulfilment of the requirements for the degree of Master of Philosophy (Social Science) in Faculty of Arts and Social Science at Universiti Tunku Abdul Rahman.

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SUBMISSION OF DISSERTATION

It is hereby certified that Tan Wilson (ID No:20AAM00744) has completed this dissertation entitled “**APPLICATION OF GAME-BASED LEARNING IN DEVELOPING METACOGNITION FOR FACILITATING ENGLISH FOR SPECIFIC PURPOSE (ESP) VOCABULARY: A CASE STUDY** ” under the supervision of Dr Nadya Supian, from the Department of Modern Languages, Faculty of Creative Industries and Mr.Cheah Kok Sung from the Department of Languages and Linguistics, Faculty of Arts and Social Science.

I understand that the University will upload a softcopy of my dissertation in pdf format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.


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DECLARATION

I, Tan Wilson hereby declare that the dissertation is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.



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CHAPTER 1

INTRODUCTION

1.0 Background of Study

English for Specific Purpose (ESP) is a compulsory course taught at higher institutions to develop graduates' communicative competence required for future professions. ESP refers to the learning of English language as a course for professional and academic purposes (Ahmed, 2014; Dudley-Evans et al, 1998). Dudley-Evans et al. (1998) suggest ESP focuses on the ways people learn, and it is important to identify the learners' needs to improve the effectiveness of learners' learning. The main objective of ESP focuses on real communication in actual communicative contexts and prepares students for future professions through an enhanced English proficiency level in specific areas (Fălăuș, 2017). Learners' needs are the most important factor for educators, syllabus designers, and learning institutes to consider when designing a syllabus.

ESP is often found to adopt a teacher-centred approach in teaching, often relying on text-based materials (Liton, 2015), and the exam-oriented and result-based education system in Malaysia has resulted in a lack of emphasis on developing learners' critical thinking (Dwee et al., 2016). As a result, students often find themselves struggling to learn language independently. Vocabulary learning is especially challenging for students who are too dependent on their instructors, resulting in poor vocabulary knowledge. This will contribute to problems such as limited comprehension of reading texts, and difficulties with summarising and

paraphrasing texts (Ashrafzadeh & Nimehchisalem ,2015) and in-depth understanding of texts (Musa et al., 2012). Hence, learners with poor vocabulary knowledge will have difficulty thinking critically and expressing their thoughts and ideas. (Othman et al., 2022)

One of the methods to promote learners' critical thinking through language courses is by using digital video games to support and develop language learning at tertiary level, specifically vocabulary learning (Chen & Hsu., 2019; Chen et al.,2018, Ranalli, 2008; Supian et al.,2019). Learners could potentially enhance not only their critical thinking skills through the integration of game-based vocabulary learning in the language classroom (Wu, 2018), but also their metacognition through metacognitive awareness, which is an individual's ability to reflect, understand and control their learning (Schraw & Dennison, 1994). This is further supported by the study of Braad et al. (2019), where the researchers suggest that instructors can integrate game-based learning to enhance students' metacognition which is a fundamental skill for the future workforce. It is necessary for learners to be aware of their own metacognition so that they can monitor their cognitive process and their own learning (Garner,1987; Schraw, 2001) so they will be better able to monitor and assess their own vocabulary learning progress.

1.1 Problem Statement

Malaysian undergraduates possess insufficient vocabulary knowledge. According to Schmitt and Schmitt (2014) and Laufer and Ravenhorst-Kalovski (2010), it was argued that the vocabulary size for undergraduates to be successful in

college education should not be lower than 9000-word families. Accordingly, word families refer to base words and all its derived and inflected forms can be understood by a learner without having to learn each form separately (Bauer & Nation, 1993). Having sufficient levels of word families enable students to read critically and convey their ideas effectively .

However, the study by Harji et al. (2015) on undergraduates in a private university in Malaysia, found undergraduates only obtain a mean of 2000 word families. Additionally, Lin et al. (2015) reported Malaysian tertiary remedial students have only 3335-word families, while Yunus et al. (2016) reported that undergraduates for first year English Major have an average of 4,460-word families. Based on these studies, it can be concluded that most of Malaysian undergraduates are facing the same problem: lack of vocabulary size. The lack of in-depth vocabulary size will lead to problems such as summarizing a written text and constructing sentences (Ashrafzadeh & Nimehchisalem, 2015). This is further supported by Adibah et al. (2014), the researchers report that vocabulary plays an important role in learners' productive skills such as writing and speaking. An et al. (2022) mentioned that the lack of in-depth vocabulary leads to undergraduates demotivated to speak and to have effective communication.

There are several problems that contribute to the lack of vocabulary among ESP learners and the lack of metacognition. ESP learners are found to lack critical thinking due to Malaysia's education system that remains exam-oriented and result-based (Dwee et al., 2016). Students are evaluated based on their performance in their summative assessment such as their marks in their examination (Musa et al., 2012).

The emphasis on scoring good grades resulted learners memorizing for examination instead of acquiring the course content (Siong et al.,2010).

Furthermore, it was found that lecturers focus more on technical aspects of language learning such as grammar, revision of past-year papers, textbooks, and exercises (Musa et al., 2012). This approach of teaching is viewed as a traditional approach to teaching which often results in a lack of emphasis on developing learners' critical thinking skills, which is also a part of metacognition (Dwee et al., 2016). Apart from that, according to the needs analysis conducted by the researcher in 2020 and the research conducted by Negi and Laudari (2022), undergraduates are found to lack metacognitive awareness due to their dependency on their instructors. The undergraduates lack awareness of their own learning as they expect the lecturers to provide them with complete information. They perceive this way of learning as improving learners' language proficiency and enhancing their language learning experience.

These problems are not new and have been addressed by implementing game-based learning in other countries such as Japan, America, and England (Fujimoto et al., 2016). In Malaysia, there have been attempts to implement game-based learning but in ESL settings. The potential for game-based learning has not been fully explored, and thus we lack further research in this area especially in the ESP area. Furthermore, the current pandemic has also presented a different and more challenging environment for language learners, which requires greater independence and metacognitive awareness to learn language effectively through

using the various affordances provided by technological tools, such as using video games to support vocabulary learning.

1.2 Research Objectives

Accordingly, three research objectives are formulated for this study.

1. To investigate the effect of game-based learning on ESP learners' vocabulary acquisition.
2. To investigate the effect of game-based learning on ESP learners' metacognitive awareness.
3. To explore the perception of ESP learners on the usefulness of game-based learning in developing their metacognitive awareness and facilitating vocabulary acquisition.

1.3 Research Questions

The following research questions aim to achieve the objective of the study:

1. Does the use of game-based learning affect ESP learners' vocabulary acquisition?
2. Does the use of game-based learning affect ESP learners' metacognitive awareness?
3. What are the perceptions of ESP learners on the usefulness of game-based learning in developing their metacognitive awareness and facilitating vocabulary acquisition?

1.4 Hypotheses

The following hypotheses are formulated to answer the research questions:

Null hypotheses

H₀: Game-based learning has no significant effect on ESP learners' vocabulary acquisition.

H₀: Game-based learning has no significant effect on ESP learners' metacognitive awareness.

Alternative hypotheses

H_a: Game-based learning has a significant effect on ESP learners' vocabulary acquisition.

H_a: Game-based learning has a significant effect on ESP learners' metacognitive awareness.

1.5 Significance of Study

This research hopes to investigate the effect of digital game-based learning on ESP learners' vocabulary acquisition, and metacognitive awareness and to explore the perception of ESP learners on the usefulness of game-based learning in developing their metacognitive awareness and facilitating vocabulary acquisition. The findings of this study will benefit ESP practitioners, ESP learners, higher education institutions, and game developers.

The findings from this study would provide more understanding of game-based learning that would be useful to enhance ESP learners' vocabulary learning and assist ESP practitioners in teaching ESP. Game-based learning could become a supplementary tool for developing vocabulary ESP learners' and facilitating their metacognition.

The findings of this study would benefit stakeholders in higher education institutions such as curriculum developers. Stakeholders play an important role in designing the ESP syllabus. The integration of game-based learning as supplementary material is hoped to help the learners facilitate their metacognitive skills and improve their vocabulary acquisition.

Furthermore, stakeholders such as ESP course leaders, heads of departments, and the deans of the faculty identify suitable games that meet the syllabus requirements and distribute them as teaching tools or supplementary material for the ESP practitioners. ESP practitioners will be able to integrate these tools as game-based learning into their lessons to provide learners with an authentic learning environment and facilitate learners' metacognition and vocabulary acquisition.

Game developers are one of the parties that will benefit from the findings of this study. The findings of this study can provide a platform for game developers to study on how to develop a game to suit the ESP practitioners and learners' needs. For instance, game developers could produce an affordable simulation game which imitates real-world working scenarios and language, such as in *The Sims 4 Get to Work* expansion pack where it contains words such as *purchasing advertisement*,

restock products, price markup, items sold, outgoing cost, and net profit in the game. Using the findings from this research, if the game developers can understand how significant game-based learning has an impact on learning and design a game that meets the needs of ESP practitioners and learners, it will bring gaming to another level of understanding gaming as a platform of education instead of gaming for fun purposes; such as in the Sims 4 Get to Work, players are required to perform tasks related to business such as owning their retail shop, managing your retail store, and managing the life of the character in the video game (Maxis & The Sims Studio, 2015).

Therefore, the findings of this study will bring significance to the following: ESP practitioners, ESP learners, higher education institutions, and game developers.

1.6 Definition of Terms

1.6.1 English for Specific Purposes (ESP)

English for specific purposes is defined as the teaching and learning of English where the goal of the learners is to achieve communication competency (Hutchinson & Waters, 1987). Due to the development of economies, English has shifted from formal language features to a tool for international communication purposes in professional fields (Widdowson, 1987); for instance, in business, medical purposes, education, and technology (Hutchinson & Waters, 1987).

English for specific purposes is divided into seven different areas, which are English for academic purposes (EOP), English for business purposes (EBP), English

for occupational purposes (EOP), English for vocational purposes (EVP), English for sociocultural purposes (ESCP), English for legal purposes (ELP), and English for medical purposes (EMP) (Belcher, 2009). This research will focus on EBP learners because of the terms used in *The Sims 4 Get to Work*. Some of the terms include net *profit*, *items sold* and *outgoing cost* are found in the game (Maxis & The Sims Studio, 2015).

1.6.2 Game-based Learning

Game-based learning refers to the integration of video games into a learning environment. The integration of video games into language learning allows learners to develop cognitive skills such as critical thinking, problem-solving, and metacognitive skills due to learners' need to control the characters in the video game and make the right decision to meet the objectives in the game (Supian et al., 2019; Yang, 2012). In this research, game-based learning refers to the situation where ESP learners develop what they have learnt throughout their years of study when playing *The Sims 4 Get to Work*.

1.6.3 Metacognition

Metacognition generally consists of three stages which are planning, evaluation and regulation (Jacobs & Paris, 1987). In other words, the ability to evaluate, revise and make decisions to achieve a certain goal or to complete a task (Flavell, 1979). In this study, *The Sims 4 Get to Work* will become a tool to explore the metacognition of ESP learners in learning ESP, such as how learners are going to interact with the characters in the game and make different decisions.

1.7 Conclusion

This chapter has discussed the background of the study, problem statement, research objectives, research questions, the significance of the study, and definitions of terms. Undergraduates are found to lack metacognitive awareness due to the exam-oriented education system in Malaysia and the undergraduates lack vocabulary knowledge. The lack of current research that explores ESP learners' metacognitive awareness has been identified. Thus, this research wished to investigate the effect of using digital game-based learning on ESP learners' vocabulary acquisition, the effect of using digital simulation game-based learning on ESP learners' metacognitive awareness, and to explore the perception of ESP learners on the usefulness of game-based learning in developing their metacognitive awareness and facilitating vocabulary acquisition.

CHAPTER 2

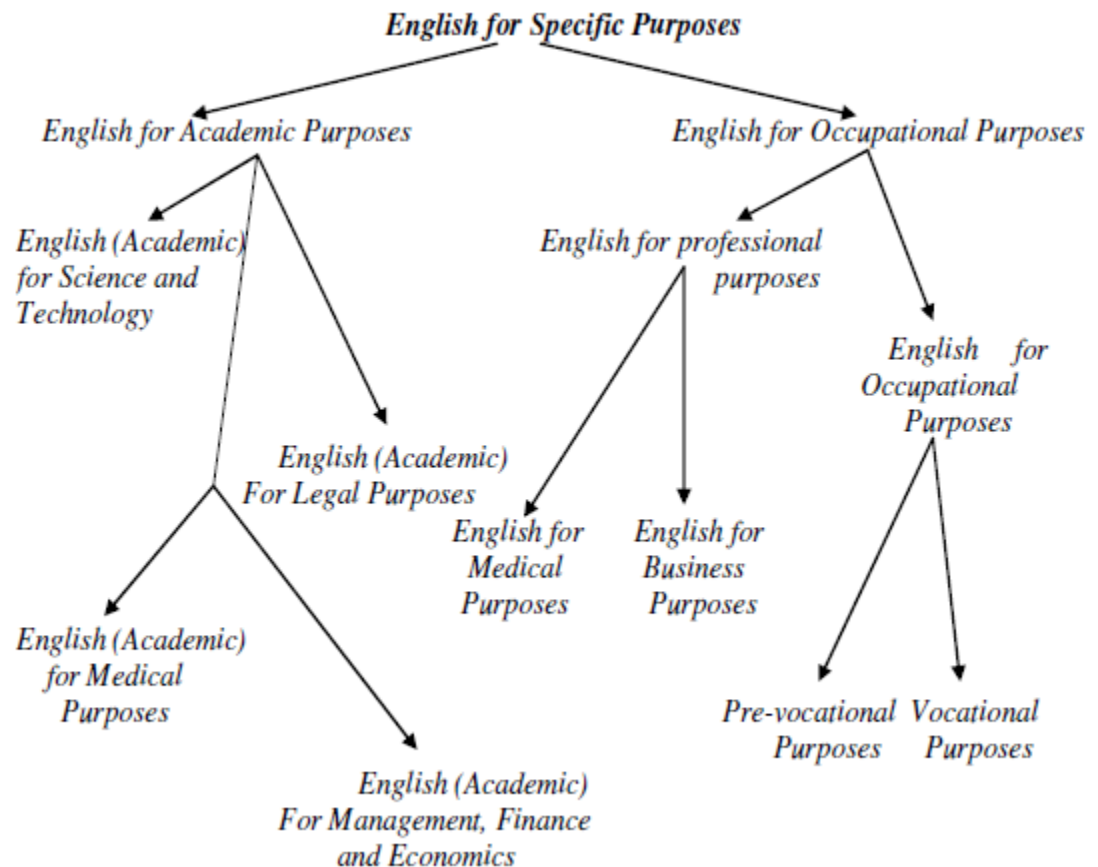
LITERATURE REVIEW

2.0 Introduction

This chapter serves to review past studies on game-based learning, metacognition, simulation games, and vocabulary acquisition. By reviewing the past studies conducted by other researchers, gaps in the previous studies are identified, and a conceptual framework is formed towards the end of this chapter.

2.1 English for Specific Purposes

English for specific purposes (ESP) is the teaching and learning of the English language where the learner's objective is to use English in a particular environment. For instance, learners learn English for their professional needs in their future working environment (Ahmed, 2014; Rao, 2020). ESP is divided into two different categories. According to Hutchinson and Waters (1987), the two categories are English for Academic Purposes (EAP) and English for Occupational Purposes (EOP). English for Academic Purposes was designed and specialised in subjects related to being taught academically. English for Occupational Purposes (EOP) helps professionals develop linguistic skills according to their occupational needs (Rico et al., 2019). The categories are used to cater to language learners for different professions (Refer to Figure 2 1).

Figure 2.1*Branches of ESP*

Source: García Laborda (2011)

Figure 2.1 shows the different branches of ESP. It is further divided into different types of English for Specific Purposes under EAP and EOP. English for Science and Technology, English for Legal Purposes, English for Medical Purposes, English (Academic) for Management, Finance, and Economics which are categorised under English for Academic Purposes. Apart from that, English for Occupational Purposes are divided into two sub-branches: English for Professional Purposes and English

for Occupational Purposes, English for Medical Purposes, and English for Business Purposes are categorised under the branch of English for Professional Purposes. As for English for Occupational Purposes, it is further divided into two different types: Pre-vocational Purposes and Vocational Purposes. According to Dudley-Evans and St John (1998), ESP teaching materials should be designed according to the linguistic needs of the learners. For instance, the materials designed for English for Business Purposes should be related to the business field. ESP is introduced in the university to prepare learners for their future workforce. Thus, it is important to develop suitable teaching materials that cater to learners' needs in their future workforce.

Besides, the purpose of ESP was introduced to university students to meet the learners' needs in the future working environment. It is suggested that ESP is a learner-centred approach because the objective focuses on real communication in context and prepares learners for future professions through the enhancement of the English Language in specific areas (Fălăuș, 2017). Hutchinson and Waters (1987), understanding the fact that learners have different needs and interests is essential as learners' needs and interests would affect their effectiveness of learning. Dudley-Evans et al., (1998) further added that no ready-made and foreign ESP textbooks fit the local teaching contexts. Therefore, ESP educators are encouraged to adapt materials according to their needs.

Two of the main criteria for adapting materials to teach ESP are a) authentic materials, and (b) relating to learners' needs (Carver, 1983). Authentic materials are the use of authentic texts such as letters, graphs, and charts (Fitria, 2019). These

materials are commonly used in the real working environment. Thus, adapting authentic materials for learning ESP by the ESP educators can expose learners to the future working environment context. Other than that, the adaptation of authentic materials enables ESP educators to simulate different tasks in preparing students for different working environments (Carver, 1983). It provides an opportunity for learners to practice their language skills, communication skills, and problem-solving skills as these skills are essential in the future working environment. Hutchinson and Waters (1987) state that learners' language skills are able to improve if the course is designed according to their needs in the future working environment.

2.1.1 English for Business Purposes (EFB)

English for Business Purposes (EFB) is a branch under ESP which it focuses on business-related language functions. For instance, learning business-related vocabulary, communication skills, and business language functions (Julian, 1996; Rao 2020). It is perceived as a special form of language focusing on business context (Hutchinson & Waters, 1987).

2.2 ESP and Computer Assisted Language Learning (CALL)

Computer Assisted Language Learning is the integration of technology affordances to improve learners' language acquisition (Beatty, 2013). It is reported that due to the variety of benefits CALL offers, ESP practitioners are encouraged to integrate CALL into the teaching of ESP (Dashtestani & Stojković, 2016).

However, not all technology affordances can be used to enhance learners' language acquisition. According to Chapelle (2003), there are six criteria that language educators need to evaluate before integrating technology into language classrooms. These criteria are important to educators because they serve as a guide for them to select an appropriate material to be integrated to teach language. By choosing the right learning material such as software, videos, and other technology affordances learners can acquire language effectively (Jamieson et al, 2005). Table 2.1 shows Chapelle (2003) criteria for CALL evaluation.

Table 2.1

Chapelle's (2001) CALL Evaluation (adopted from Jamison et al., 2005)

Language Learning	The degree of opportunity present for beneficial focus on form.
Meaning focus	The extent to which learners' attention is directed toward the meaning of the language.
Learner fit	The amount of opportunity for engagement with language under appropriate conditions given learner characteristics.
Authenticity	The degree of correspondence between the learning activity and target language activities of interest to learners out of the classroom.

Positive impact	The positive effects of the CALL activity on those who participate in it.
Practically	The adequacy of resources to support the use of the CALL activity.

However, there are limitations to the affordance. It was mostly synthetic, and impersonal. The next generation of CALL featured more authentic learning environments, such as games, which are discussed in the following sections.

2.3 Game-based learning in Language Learning

Game-based learning is the integration of video games into a learning environment. The combination of game content and game experience enhances acquisition in learning through problem-solving activities in the game (Qian & Clark, 2016). Game-based learning involves cognitive skills such as critical thinking, problem-solving and metacognitive skills by solving the tasks given in the game or achieving the objectives in the game; thus, learners benefit from learn-through-play (Supian et al., 2019). However, not all types of games can be integrated into a learning environment, as discussed in 2.2 Computer Assisted Language Learning (CALL), the selection of games must fulfil the criteria set by Chapelle (2001). This is further supported by Supian et al (2019), selection games must have clear pedagogical objectives, focus content-related activities, and guidelines for assessment.

Based on previous studies, game-based learning is found to have a positive impact on language learning. Chen et al (2018) reported students' comprehension improved after the integration of game-based learning in the class because it serves as a tool to aid learning and to assist educators in language teaching. Besides, game-based learning showed it was an effective tool in language learning. It is revealed that game-based learning is an effective approach in facilitating students' knowledge, and improves students' problem-solving skills (Plass et al., 2015).

2.3.1 Game-based Learning and Metacognition

The landscape of video games has changed over the years, video games are no longer a form of software only for entertainment purposes but for learning purposes as well. According to Prensky (2003), video games can provide learning opportunities such as making decisions quickly, problem-solving skills, and synthesis of important information. It is supported by Green and Bavelier (2003) that, integration of game-based learning enables learners to process information efficiently, make a decision quickly, and enhance learners' multitasking skills because they need to process information and make a decision in a short time.

During the process of playing a game, metacognitive skills are used to achieve the objectives in the game because players need to assess how to achieve the objective, plan strategies, execute the plan to achieve the objectives given, and assess the action taken after the player completed the objectives given (Garris et al, 2002).

Metacognition is the ability to plan, monitor, and evaluate own performance in a task (Flavell, 1979; Supian et al., 2019). Game-based learning requires the player to plan, monitor, and evaluate decisions made in the gaming process. Supian et al. (2019) claim that in-game quests offer a platform for learners to apply their metacognitive skills. This enables learners to improve their metacognitive skills.

2.3.2 Computer-based Simulation Games and Vocabulary Learning

Computer-based simulation is a software application that offers reality-based, goal-focused, and interactive (Fletcher et al., 2007). The application of computer-based simulation can expose language learners to meaningful context (Purushotma, 2005) and offer an interactive environment for vocabulary learning (Miller & Hegelheimer, 2006; Ranalli, 2008, Bakar & Nosratirad, 2013). The research by Miller and Hegelheimer (2006) integrates simulation games into language classrooms and as supplementary material in vocabulary acquisition; the result of the study shows students performed better when they explicitly received vocabulary instruction.

Besides, a simulation game provides learners with a realistic setting in which language and problems in the game mimic the “real-world” contexts (Miller & Hegelheimer, 2006). It serves as a bridge in providing realistic sociocultural context and target-language for language learning (Freiermuth, 2002). Metacognitive skills are required during the process of interacting with the simulation game, learners are required to assess their goals, plan, and set their goals, and review the plans after they have achieved an objective in the game (Saliés, 2002).

Metacognition is a crucial part of the critical thinking process (Halpern, 1998; Supian et al., 2019). The process of critical thinking includes scientific reasoning, decision making and problem-solving (Binkley et al., 2014). According to Halpern (1998), critical thinking is transferable to solve real-world problems. The previous statement supporting simulation games offers a platform for learners to facilitate their metacognitive skills in problem-solving in game and in real-world situations as it is transferable.

2.4 Review of Studies on Game-based Learning

This section reviews the past studies of game-based learning. The review explores different past studies on game-based learning and vocabulary learning, game-based learning and metacognition, and simulation games and vocabulary learning. The selection of articles is based on the keywords identified in research databases: *game-based learning*, *metacognition*, *The Sims*, and *vocabulary acquisition*.

2.4.1 Studies on Metacognition and Game-based Learning

Castronovo (2018) conducted a quasi-experimental design that was designed to evaluate the effect of virtual construction simulation (VCS) 4 simulation on engineering learners. The participants of this research involved 65 students in the third year of college. The students were divided into an experimental group and a control group. There were 40 participants in the experimental group and 25 participants in the control group. Problem-solving skills assessments were given during the pre-test and post-test. The pre-test was given a day before the integration

of VCS 4 and the post-test was given a day after the integration of VCS 4. The difference between the experimental group and control group is the experimental group received prompting conditions during the integration of VCS 4 whereas the control group just interacts with VCS 4 in their learning. Results of the study showed the students achieved higher problem-solving scores in their post-test compared to the pre-test. It was reported that the integration of VCS simulation improves students' problem-solving skills and knowledge which improves the students' metacognition.

Scoresby and Shelton (2014) conducted a study to investigate students' learning reflection and metacognition by using a 3D simulation. The study adopted a qualitative approach whereas the data were collected through interviews and observations. The participants of the study were fifteen college students between the ages of 18 and 24 and they were the students who took introductory psychology courses. A software named HEAT simulation was used to investigate how the simulations support metacognition. The participants were given two scenarios in HEAT simulation whereby they needed to solve the situation given in the simulation game, after each scenario an interview session was conducted by the researcher to discuss the actions taken in each scenario. The process of the simulation was recorded for data analysis. The researchers used the Metacognitive Awareness Inventory to study the metacognitive awareness of the participants. The findings showed participants' metacognition awareness when it was accompanied by a facilitator and the findings support that the facilitator may play a role in helping students to focus on their reflection and organisation of their thoughts.

The review of both studies showed that game-based learning is a tool to facilitate learning. Thus, it can be concluded that learners' metacognitive skills are facilitated during the integration of game-based learning.

2.4.2 The Sims and Vocabulary Learning

In Miller and Hegelheimer's (2006) study, they investigated *The Sims* as a supplementary material for enhancing vocabulary acquisition among ESL adult learners. The process of the intervention lasts for 50 minutes a week throughout 15 weeks of the semester. The participants are further divided into six groups of triads. The triads are categorized based on their pre-test score and their prior performance in class. Each member in each group was assigned to a role: manager, controller, and recorder. The roles assigned are rotated each day. Each group was assigned to a game station which consisted of two computers, one for *The Sims* and one for supplementary materials such as explicit vocabulary, grammatical and cultural instructions, and use of supplementary materials such as online dictionaries. The process of the description of data collection is shown in Table 2.2 .

Table 2.2

Description of Data Collection Stages for Miller and Hegelheimer's Study, (2006)

Method	Description of data obtained
Pre-test scores	The scores are used to group the students according to their proficiency level.

Pre-project survey	A survey was given to gather data on the learners' computer literacy and language background.
Access to materials	<p>Each group is exposed to three different conditions during the gameplay, which are:</p> <p>Station 1: With structured supplementary materials such as explicit vocabulary, grammatical, and cultural instruction.</p> <p>Station 2: The students were given a choice to use supplemental materials such as on-line dictionaries, grammar exercise, vocabulary list, and grammar description.</p> <p>Station 3: No supplemental material was given.</p>
Post-project scores	The data on overall linguistic acquisition throughout the days.
Quizzes	The data of students' vocabulary knowledge and specific grammar features.
Questionnaires	Data on learners' perception about the supplementary materials and simulation game in general.
Post-project survey	Collection of data on overall impression of the Sims and other supplementary materials.

Discussion	The analysis of the perceptions of <i>The Sims</i> and group work and suggestions for improvement.
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It was reported that the learners were explicitly exposed to vocabulary learning and their vocabulary acquisition increased after the integration of *The Sims*. The final implication of the study is simulation games are highly appealing to learners and most importantly simulation game improves their vocabulary acquisition along with the use of supplementary material such as online dictionaries. The Sims offers an authentic computer simulation task which increases task effectiveness.

Ranalli's (2008) study was adopted from Miller and Hegelheimer's (2006) study. However, in Ranalli's (2008) study, the research explored the participants' responses to *The Sims* as supplementary material and the mode of play, and participants' perception of the enjoyment of and the usefulness of *The Sims* as a language learning tool. This study involved nine intermediate-level ESL learners in a university. The participants were divided according to their proficiency level and further divided into dyads. Then the dyads took turns to control the game. Pre- and post-surveys were employed to evaluate the enjoyment from playing the game, the experience of playing with a partner, perceived usefulness and actual use of supplementary materials, perceptions of *The Sims* as a language-learning tool and self-assessment of language-learning gains from the game. The result revealed that commercial games are used as supplementary material in vocabulary acquisition with theoretical guidance and participants were more open to the integration of computer simulation games such as *The Sims* in language learning.

Wang (2019) conducted a study by integrating The Sims 4 as a language learning tool to explore potential interventions to increase the pedagogical relevance of simulation games. This pool of participants was English communication class freshmen in a Japanese university. The research was divided into three forms of classroom intervention which are teacher instruction, peer instruction and in-class activities. During the teacher instruction intervention, group-oriented instruction was given before the gameplay and the teacher gave instruction to the whole class in vocabulary and gaming skills; in this intervention, the teacher walked around and resolved the students' questions. The second intervention was peer-interaction. In this intervention, both first language and second language are allowed to be used for discussion. Participants were given game quests which required them to complete the game. After the session, they are required to present interesting gameplay which they choose during the intervention of the game, in the form of a presentation. The participants were divided into three groups which are the baseline group, experimental group and control group and the description is shown in Table 2.3.

Table 2.3

Description of Different Groups of Participants

Group of participants	Description of instructions
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Baseline group	10 university students were selected to complete all vocabulary quizzes as their results will be used as a reference to the consistency of all quizzes.
Experiment group	Students in this group were divided into pairs for enhanced peer interactions. At the same time, they received the teacher's instruction before and during the gameplay and they were required to complete structured in-class activities. The students in this group were introduced to the gameplay and they took vocabulary tests at the beginning and during the intervention as an assessment of their learning results.
Control group	The students in this group were introduced to the gameplay and they were given a vocabulary test at the beginning of the intervention of the game. However, the students in this group did not receive any teacher's instruction and they are not required to present their interesting gameplay in a presentation form. The students had to go through 4 vocabulary tests.

The researcher collected the data of the experimental group by using surveys, recorded gameplay sessions and vocabulary quizzes; in the control group, only vocabulary quizzes were collected which were used to evaluate students' vocabulary acquisition. The recordings of the experimental group were used to provide qualitative data on how the students acquired and used vocabulary during the three different interventions. Surveys such as a pre-questionnaire, a post-questionnaire

and an interview for the experimental group are used to perceive the learning experience of game-based learning.

The findings of the research show through classroom intervention, teacher instruction and in-class activities, game-based learning is found to promote vocabulary acquisition. The researcher reported that teacher instructions helped students in mastering game techniques and helped students to learn efficiently. It was reported that peer interactions failed to provide any impact on the learners' vocabulary acquisition due to participants used their L1 to communicate and focus less in using the vocabulary they learned.

2.5 Gaps in the Past Studies

Several research gaps were identified during the process review of the previous studies for this research. This subsection shall discuss the gaps in past studies. Based on Ranalli's (2008) and Miller and Hegelheimer's (2006) studies, results reported the integration of *The Sims* can be integrated as a supplementary material for language learning for ESL learners. However, these two research studies do not conduct a study on the metacognitive skills on how the integration of *The Sims* can promote learners' metacognitive skills. Besides, the participants of the two studies are ESL learners. Thus, it has formed an application gap to be explored in ESP.

In the study conducted by Wang (2019), the focus of the research was vocabulary acquisition, and the research adopted a mixed methods approach. However, there are several issues found in the research, the issues are the research

reported that the experimental group which received the intervention *The Sims 4* performed poorly compared to the control group. This is a contrast to the pioneer study conducted by Ranalli (2008) and Miller and Hegelheimer (2006) and this has made the present research worthwhile to study.

Other than that, studies by Yang (2012) and Cheng and Su (2012) reported that game-based learning had a significant impact on students' learning. Both researches adopted a mixed-method approach in collecting the data of the studies. According to Yang (2012), the integration of game-based learning improves the students' problem-solving skills. The researcher suggested that in future research game-based learning should explore the high-order elements of cognitive domains such as critical thinking and metacognition.

Based on the articles reviewed by the researcher, it was found that all the research is conducted in foreign countries. However, game-based learning is yet to be fully explored in Malaysia. The lack of research on game-based learning in facilitating ESP learners' metacognition and vocabulary acquisition in Malaysia has formed a gap for this research to be conducted.

2.6 Game-based Learning and Social Constructivism

Social Constructivism is the theoretical foundation for game-based learning (Li & Tsai, 2013). The focus of social constructivism is on a social-cultural context in understanding the world through social interaction and constructing knowledge (Wu et al., 2012). Through the social constructivist view of game-based learning, players are constantly constructing new knowledge in a social setting due to the

interaction between players and games (Wu et al., 2012). The interaction between players and the game relates to cognitive constructivist learning theory; during the process, players are constantly constructing meaning and knowledge through interactions.

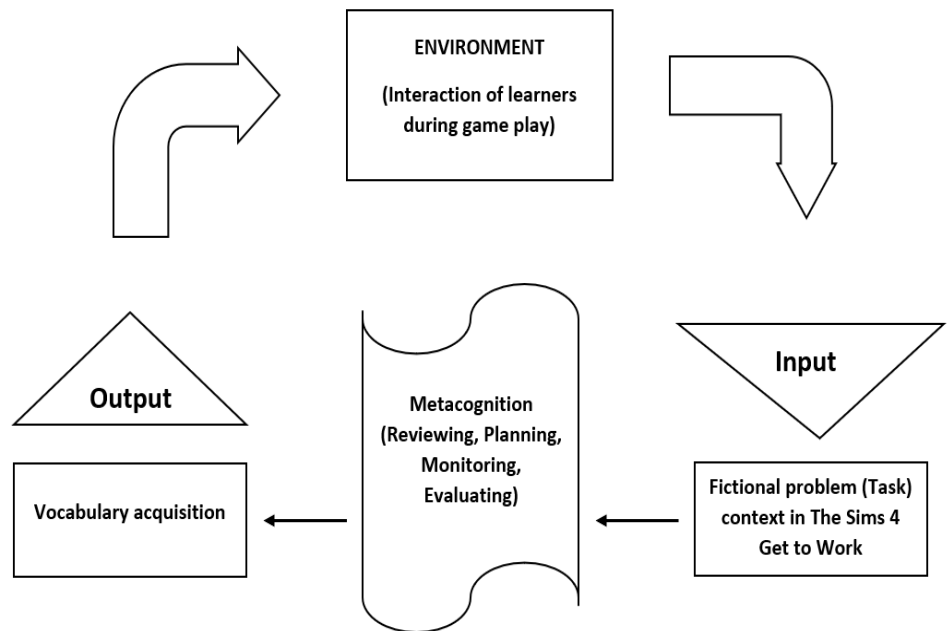
Piaget (2003) argues that learning is a way to search for knowledge where learners are learning through their participation and exploration. Students benefit from a variety of interrelated series such as interdisciplinary skills, goals through individuals and collaborative exploration (Piaget, 2003). Constructivism focuses on interactions between learners and the environment (Wu et al., 2022). It is believed that meaningful interactions are created through the interpretations of life experiences (Etmer & Newby, 1993). It is viewed as the process of social interaction that leads to higher levels of reasoning and learning (O'Connor, 1998). This is regarded as an active process involving the acquisition of knowledge (Jones & Brader-Araje, 2002; Nkadimeng & Ankiewicz, 2022).

Game-based learning adopts the concept of learn-through-play which fulfils the criteria of the constructivist approach (Supian et al., 2019). Players constantly construct new knowledge when they interact with other players and the game itself (Wu et al., 2012). The previous statement was further supported by Miller and Hegelheimer (2006), who reported simulation games offer learners a realistic environment in which language and problems in the game mimic the “real-world”. Simulation games serve as a bridge between sociocultural context and language learning (Freiermuth, 2002). Besides, it was suggested that game-based learning

involves metacognitive skills, and these skills are transferable to solve real-world problems (Halpern, 1998).

According to Jong et al. (2010), when an individual plays a game, they need to analyse the perceived information and the context in the game before applying their knowledge and skills to make a decision before solving a task and then reviewing their decision after making the decision. This involves declarative knowledge (*knowing that*) and procedural knowledge (*knowing how*) when solving a problem (Marone, 2016).

Adapting the theoretical framework from Simina and Hamel (2005), learners receive input in the form of fictional problems in *The Sims 4 Get to Work*. The learners will then associate it with their metacognition by analysing the problem, planning to solve the problem, monitoring and reviewing their decision. As they continue interacting with the players during the game session to solve the tasks given, they unintentionally use the vocabulary that is set in the vocabulary test. This means that if they complete the tasks without realizing they have acquired vocabulary. Therefore, vocabulary acquisition is achieved by the end of the game session.

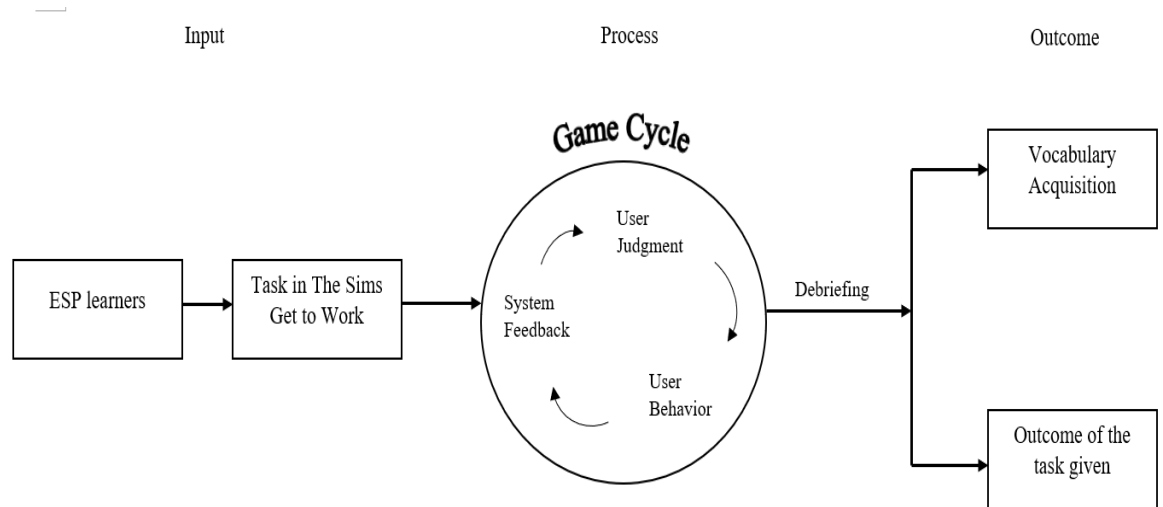
Figure 2.2*Theoretical Framework of Social Constructivism***2.7 Input-Process-Outcome Game Model**

The input-process-outcome game model was proposed by Garris and other researchers (2002) in hopes of developing learners who are self-directed and self-determined. The model describes the process of playing computer games that help users to develop learning. The model is divided into three different parts: input, process, and outcome. Each part has different roles in forming the whole process of the model.

As mentioned earlier, the game model is divided into 3 processes. It all starts with (1) setting an objective to design an instructional program that integrates the features of the game. The features of the game then (2) trigger a cycle which includes

user judgement such as enjoyment and interest, user behaviours and system feedback. This cycle then leads to (3) achievement of the objectives set in the earlier stage.

Adopting this model into the context of this study describes learners are actively constructing knowledge based on their experience in the game during the process. The whole process starts with input where the learners will be given a task to complete. The game-cycle process occurs when they are solving the task together with other members. In this stage, they continuously judge and respond to the feedback given by the group members – user judgement, user behaviour, and system behaviour. In this loop, learners also constantly analyse the problems, solve the problems, and review their decisions. Therefore, metacognition is formulated in this stage. Unintentionally, they acquire the vocabulary that is set in the game when they can review whether they have completed the task given through debriefing. Therefore, vocabulary acquisition and task completion formulate the outcome of this model.

Figure 2.3*Input-Process-Outcome Game Model***2.8 Conceptual Framework**

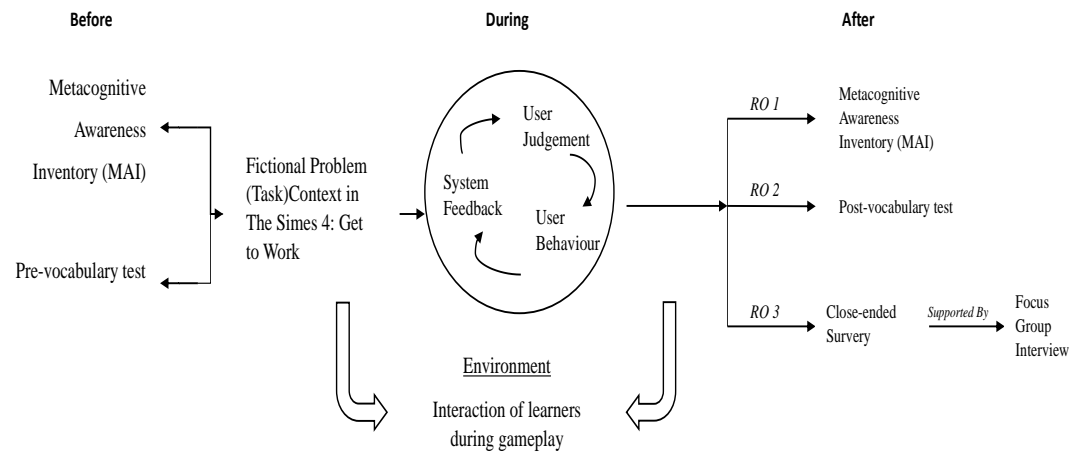
In earlier sections where **2.6 Game-based learning and Social Constructivism**, and **2.7 Input-Process-Outcome Game Model** were discussed, with reference to the theoretical framework a conceptual framework was formed to serve as a guide for the researcher of this study.

In the context of this study, the objective is the vocabulary acquisition of ESP learners by integrating *The Sims 4 Get to Work* as a tool to assist in vocabulary acquisition to explore the ESP learners' metacognitive awareness and explore the perception of ESP learners on the usefulness of game-based learning in improving their metacognition and vocabulary acquisition.

The participants were given a pre-vocabulary test and a pre-MAI test before the intervention of *The Sims 4 Get to Work*. During the process of the intervention

of *The Sims 4 Get to Work*, the participants will be given fictional problems and they will go through the process of game-cycle, ESP learners will use their metacognitive skills to solve the task in the game. At the same time, interactions are going on during this stage as they will be discussing how to solve the fictional problems given. In which the participants will analyse the task, solve the task in-game and assess their decision based on the completion of the task in-game. For instance, if the learners fail the task given, they will evaluate what went wrong during the process and how they are going to complete the task. During the process of the game cycle, the learners are having an interaction with the game in which they are constantly learning vocabulary.

After the intervention, MAI post-test and post-vocabulary test will be given to the participants. MAI will be the instrument used to achieve the first research objective in this study which is to investigate the effect of digital simulation game-based learning on ESP learners' metacognitive awareness. The post-vocabulary test will be used to achieve the second research objective: To investigate the effect of digital simulation game-based learning on ESP vocabulary acquisition. The close ended-survey will be further supported by a focus group interview to explore the perceived usefulness of game-based learning in developing their metacognitive awareness and facilitating vocabulary acquisition.

Figure 2.4*Conceptual Framework***2.9 Conclusion**

This chapter provided a review of the literature on game-based learning on metacognition and vocabulary acquisition. By synthesizing the literature on game-based learning, this chapter has provided a framework that guides the researcher in conducting this research by using the framework provided.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

In this study, a mixed-method approach was adopted to achieve the research objectives established. This study aimed to investigate whether using game-based learning affects ESP learners' metacognitive awareness and vocabulary acquisition and to explore the perception of ESP learners on the usefulness of game-based learning in developing their metacognitive awareness and facilitating vocabulary acquisition. Focus group interviews were conducted to obtain the qualitative data for this study. The data collected were then analysed using thematic analysis. Specifically, thematic analysis was a method employed to identify, organise, and report patterns of qualitative research data gathered (Braun & Clarke, 2012). By adopting thematic analysis in analysing interview data, findings that were unique and distinctive in terms of meanings and perceptions could be obtained (Braun & Clarke, 2006). This chapter began by explaining the research design, followed by addressing the sampling method, research instrument, data collection and analysis procedures, and ethical considerations.

3.1 Research Design

Despite the popularity of adopting this research design, Creswell (2014) claimed that the mixed-methods approach did not merely involve collecting quantitative and qualitative data. When arriving at a certain point of researching a

phenomenon of interest, data were related, integrated, or mixed to capture the reality or realities behind the phenomenon. By doing so, the mixed-methods approach would yield a more comprehensive and complete analysis through a combination of techniques on the data received.

Previously, Collins et al. (2006) pointed out four rationales for mixing both quantitative and qualitative research methods, to which the four rationales were *participant enrichment*, *instrument fidelity*, *treatment integrity*, and *significance enhancement*. Each rationale was discussed in detail in the following.

Participant enrichment. Recruiting more participants in research is deemed desirable. Collins et al. (2006) asserted that the sample size was directly proportional to the validity and reliability of the research findings. Simply, the more participants involved in a study, the better the validity and reliability of the research findings. In relation to this, 65 ESP learners who enrolled English for Business between January and May 2021 were recruited from a private university in Peninsular Malaysia.

Instrument fidelity. It concerns maximising the utility and appropriateness of the research instruments employed in the study (Collins et al., 2006). In relation to this, survey questionnaires and focus group interviews were employed. The utilization of questionnaires aimed at soliciting ESP learners' demographic background, metacognition awareness, and vocabulary acquisition. Focus group interviews were conducted to explore ESP learners' perspectives on digital simulation game-based learning and discuss the effects game-based learning brought in developing their metacognitive and vocabulary acquisition.

Treatment integrity. It integrates both quantitative and qualitative research approaches to examine the reliability of the intervention introduced during the research process (Collins et al., 2006). In the study conducted, a digital simulation game, *The Sims* was used as supplementary material to develop ESP learners' metacognition and vocabulary acquisition. The results from the Metacognition Awareness Inventory (MAI) and the vocabulary test were then triangulated using qualitative data from focus group interviews to further support the statistical findings obtained from data of the survey questionnaires distributed.

Significance enhancement. A mixed-methods research approach is used to maximise the data interpretation (Collins et al., 2006). Employing a mixed-methods research approach enables a researcher to facilitate and ensure that data are thick and rich in answering the phenomenon of interest. In the present study conducted, the researcher employed two different data analysis techniques, paired t-test, and thematic analysis, to unveil and enrich the findings of digital simulation game-based learning in developing ESP learners' metacognition and vocabulary acquisition.

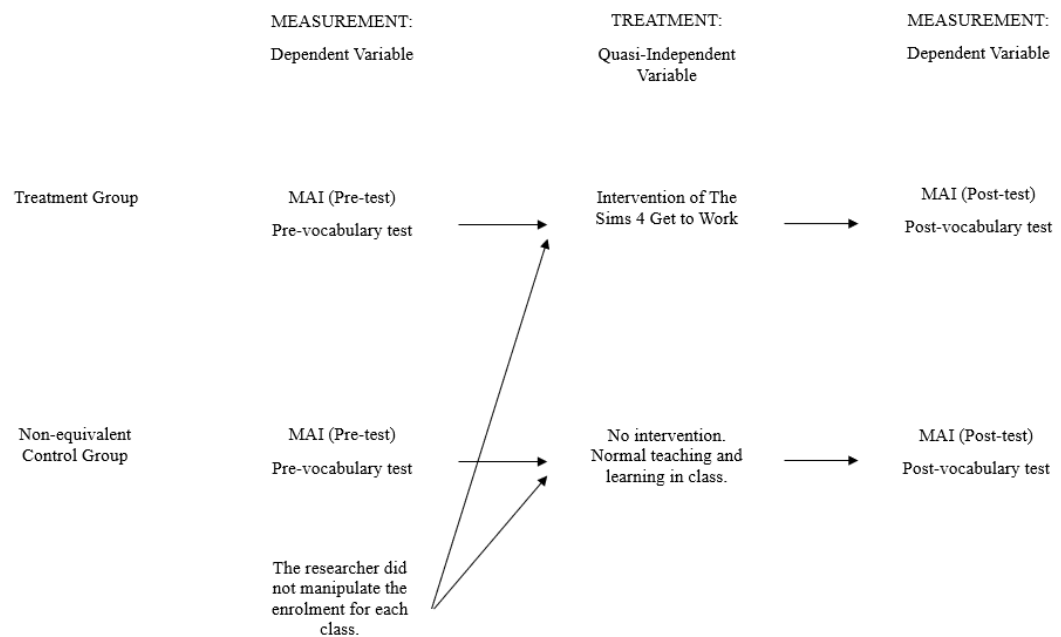
Quasi-experimental design. This form of design involves conducting pre-tests and post-tests on the experimental and control groups without randomisation (Creswell, 2014). Further, only the experimental group will receive the treatment (Creswell, 2014). In the present study, the treatment group were given a pre-test and post-test and received the intervention of *The Sims 4 Get to Work* design to investigate the improvement of using game-based learning on ESP learners' metacognitive awareness and vocabulary acquisition. In the present research conducted, game-based learning served as the independent variable and the

dependent variables were the ESP learners' metacognitive awareness and vocabulary acquisition.

Both the experimental and control groups were given pre-tests and post-tests to measure their initial and post-level metacognitive awareness and vocabulary acquisition. The experimental group received the intervention in the form of three gameplay sessions on *The Sims*, while the control group did not receive any form of intervention. Instead, the control group attended normal teaching and learning sessions as usually delivered in daily lectures and tutorials at the university. At the end of the intervention introduced to the experimental group, post-tests were conducted and administered to both the experimental and control groups. Figure 3.1 displays an illustration of how the quasi-experiment was conducted for this research.

Figure 3.1

Illustration of How the Quasi-Experiment is Conducted



3.2 Sampling Method

3.2.1 Purposive Sampling

Purposive sampling or purposeful sampling refers to the researcher's intentional act in selecting cases that are information-rich to meet the research objectives (Palinkas et al., 2016; Thomas, 2022). The sampling process is deliberately focused on participants that best meet the criteria for providing rich data, and there is no randomness in this sampling method (Pro et al., 2016; Thomas, 2022). As Merriam and Tisdell (2015) asserted, purposive sampling was greatly useful as it directly reflected the objectives established in any form of study. For this study, two inclusion criteria were established when recruiting participants: (1) The participants must be from business, accounting, and commerce-related programs, and (2) the participants must register for the course, English for Business, during the research duration which was between January and May 2021. The rationale of only selecting this group of participants was justifiable after analysing the phrases used in *The Sims 4 Get to Work*. These phrases include *set store prices*, *transfer retail funds*, *purchase advertising*, and *manage employees* (see Figure 3.2) were business-related and they were recorded as entries in the Cambridge English: Business Preliminary Wordlist, in which this dictionary was mainly made up of entries for business employees.

Figure 3.2*Business-related Vocabulary*

For this research, the research designs from Miller and Heilgheimer (2006) and Ranalli (2008) were employed, wherein Miller and Heilgheimer's (2006) research involved 18 participants, and Ramlli's (2008) study had nine participants. In the present research conducted, the researcher had set the parameter for the samples, wherein the experimental group contain 32 participants and control group contain 33 participants each, which the figure was triple the number of participants in the aforementioned previous studies. Localizing to the setting of the research, the researcher randomly selected two EFB tutorial groups from the ESP learners identified and involved them in the present study.

3.3 Research Instruments

The following subsections served to present the research instruments used for this mixed-method study along with the justifications to such implementation.

Research Instrument to Answer Research Questions 1 and 2

3.3.1 Metacognitive Awareness Inventory

Developed by Schraw and Dennison (1994), the Metacognitive Awareness Inventory (MAI) aims to assess participants' metacognitive awareness. This instrument contains 52 items that are classified into eight subcomponents of cognitive knowledge: (1) Declarative, (2) procedural, and (3) conditional, or by specific metacognitive process: (4) Planning, (5) information management strategies, (6) monitoring, (7) debugging strategies, and (8) evaluation. Each component of MAI was discussed extensively in the following.

(A). *Knowledge of Cognition*. It measures an individual's knowledge about cognitive beings, competence, and limitations. The sub-components of *Knowledge of Cognition* are further discussed in the following.

Declarative Knowledge. Individuals who possess the ability to process information on the task given. The individual is familiar with his or her own strengths and weaknesses and is capable of anticipating his or her performance in the given task.

Procedural Knowledge. An individual's ability to apply knowledge to complete a task assigned through necessary procedures or processes. This includes

understanding the information on how to execute learning procedures. Learners are required to demonstrate an understanding of the processes and show when to apply the processes in different circumstances.

Conditional Knowledge. It involves time and condition, such as when a particular strategy should be used, and under what conditions an individual learns best. It also involves individuals demonstrating the ability to use strengths to compensate for their weaknesses. It requires knowledge of when and why learning techniques should be used.

(B.) Regulation of Cognition. A series of activities that allows individuals to manage learning. The subcomponents in the regulation of cognition are *planning*, *information management strategies*, *comprehension monitoring*, *debugging strategies*, and *evaluation*. The subcomponents are discussed in the following.

Planning. It refers to individuals who set goals for themselves prior to learning. This includes what needs to be learnt, what are the goals, and how to choose the best way to solve problems.

Information management strategies. It involves an individual's skills to process information effectively. For instance, organizing, elaborating, summarizing, and selective focusing. An individual can refer to previous knowledge and can process information into chunks.

Comprehension monitoring. It refers to an individual's evaluation of his or her own learning strategies employed. This involves tracking one's own progress,

assessing possible solutions to problems, and determining whether the methods are useful when interpreting the contents received in learning.

Debugging Strategies. It refers to methods used by an individual in correcting his or her own errors and performance. This involves an individual making decisions about learning and checking if difficulties are encountered during the learning process.

Evaluation. It refers to an individual's analysis of his or her own learning and the effectiveness of the learning strategies used. This is to determine if the learning process is effective and whether the goals established for learning have been achieved.

The original version of MAI consisted of 52 questions with true or false response options. Some of the behaviours and cognitions measured on the MAI include “*I am good at organising important information,*” “*I summarize what I’ve learned after I finish,*” “*I reevaluate my assumptions when I am confused,*” and “*I have control over how well I learn.*”

Although these questions were previously validated and suitable for administering, to dichotomously respond to an extreme “true”, as in *I always do this*, or a “false”, as in *I never do this*, was controversial as there remained degrees of being true or false (Terlecki, 2020). To accommodate the enhanced sensitivity of MAI, the instrument was adapted from a dichotomous scale to a five-point Likert scale so the participants could provide accurate self-report on the extent of exhibiting these behaviours or cognitions during the learning processes. The

responses in the updated scale ranged from “*Strongly Disagree*,” “*Disagree*,” “*Neutral*,” “*Agree*,” and “*Strongly Agree*.” The Evaluation strategies component of the MAI was not included in the adapted version of the questionnaire. As standards of evaluating as there is a tendency for a participant to evaluate themselves as being successful, which is a sign of being biased and less objective (Kim et al., 2009). One such issue of using evaluation as stated in the MAI is that evaluations are often considered authentic, but the procedures of evaluations have challengeable justifications as the extent of authenticity remains blurry (Kim et al., 2009). Hence, there remains a need to address and identify more specific assessment tools to interpret the process of evaluation (Braad, 2018).

Since, the present research only sought to determine whether ESP learners experienced vocabulary acquisition, understanding the learners' experience to make connections was not part of the actual research objectives.

Thus, evaluation will be assessed using qualitative methods to fully capture the nuances of the participants' responses regarding their evaluation of the gameplay. Further details of the qualitative instrumentations will be discussed in the section.

The MAI was administered to both the experimental and control groups as a form of pre-test to get an initial score of the participants' metacognitive awareness before the intervention and after the treatment to identify if there were any gains from the intervention.

Additionally, MAI was also distributed to the control group to identify whether the participants' metacognitive awareness increased without receiving any

intervention playing *The Sims 4 Get to Work* in the present study. This would inform if the participants had demonstrated any forms of metacognition after receiving the intervention, which was the game. MAI was also deemed suitable as it reflected the nature of the input-process-outcome game model and social constructivism, wherein the participants had to interact with team members in order to achieve the game objectives while coming up with strategies to run the retail store. Participants who received high scores in the first which is *Knowledge of Cognition* (17 items) indicated possessing great metacognitive knowledge; participants who gained high scores in *Regulation of Cognition* (35 items) indicated great metacognitive cognition. In addition to the knowledge of cognition score and regulation of cognition score, the total score of MAI was obtained by summing up responses by the participants. All three scores - total metacognitive awareness score, knowledge of cognition score and regulation of cognition score-were then used for statistical analysis.

To test the adapted MAI's reliability, the research instrument was pilot-tested on 30 ESP learners from the said university, which revealed a Cronbach's alpha of .85. These 30 ESP learners involved were not recruited for the actual research. According to Taber (2018), Cronbach's alpha which ranged between 0.70 and 0.94 was considered reliable. Thus, the adapted MAI was deduced to be reliable for this study.

3.3.2 The Sims 4 Get to Work

The *MPU32023 English for Business* is a compulsory course offered to university students majoring in business, accounting, entrepreneurship, property

management, and economics. The objectives of the course are to develop students' skills in comprehending business-related texts, interpreting data from charts and graphs, using the correct format and conventions in writing business memos, newsletters, and business letters, as well as delivering coherent and effective presentations in professional settings. However, most existing tutorial activities frequently focused on writing tasks and gap-fill exercises with very few activities specially devoted to enhancing student communication.

In this regard, *The Sims 4 Get to Work* has the potential as a supplementary teaching and learning material to support the aforementioned two learning outcomes, which were delivering coherent and effective presentations in professional settings among students and sharpening students' communication skills. *The Sims 4 Get to Work* would provide a virtual authentic business environment for students where they could set up and develop their own business and monitor their profits and losses. To fully establish a business, students were required to have discussions in groups and communicate ideas, opinions, and thoughts effectively among each other. Additionally, the business-related challenges set in the game would stimulate students to engage in brainstorming and idea generation to produce a corporate newsletter that they were expected to produce in the formative assessment.

Furthermore, the justification for the simulation game was previously extensively discussed by drawing Chapelle's (2003) discussion on the six criteria for selecting CALL. The six criteria were learning potential, learner fit, meaning focus, authenticity of learning environment, and practicality (see 2.3 Computer Assisted Language Learning). These six criteria previously discussed aided in

identifying the right simulation game for the present research which was *The Sims 4 Get to Work*. Table 3.1 displayed the evaluation of *The Sims 4 Get to Work* based on Chapelle's (2003) criteria.

Table 3.1

Evaluation of The Sims 4 Get to Work Against Chapelle's CALL Criteria

Criteria	Classroom features	The Sims 4 Get to Work features
Language learning potential	Vocabulary acquisition of EFB learners.	Provides a business-related vocabulary.
Learner fit	No restriction on the level of proficiency of students.	User-friendly and suitable for everyone.
Meaning focus	Meaning.	Meaning and the context of the game.
Authenticity	Superficial communication skills.	Mimic real-life scenarios.
Positive impact	Vocabulary acquisition promotes metacognitive skills in problem-solving and engages EBP learners.	Promotes metacognitive skills and enhances motivation in vocabulary acquisition.

Practicality	Laptops with an intermediate level of hardware.	It is compatible with a normal personal computer.
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Following the analysis as displayed in Table 3, *The Sims 4 Get to Work* fulfilled the criteria for promoting metacognitive skills and vocabulary acquisition. Thus, it sufficiently fulfilled the requirement of this present study.

3.3.3 Scenarios in The Sims 4 Get to Work

The research participants were divided into groups of three. They were required to assign one leader in the group. The leaders were assigned the role of creating the Sims character by discussing with their respective group members, and the leaders would be players who controlled the character in the game (see Table 4.2).

Table 3.2*Roles and functions of each member*

Roles	Function
Leader	Responsible for the finances in the retail store and controlling the character in the game.
Manager	Responsible for the operation of the retail store.
Controller	Responsible for controlling the gameplay

Apart from that, they were required to attend to the needs of their Sims character such as emotional needs, and physical needs, resolve interpersonal problems, decorate their own house with preferred furniture and appliances, and run a retail store. The Sims character owns a fashion retail store. Further, three-game objectives were given by the researcher to the players, in which the objectives were:

The character had to own a fashion retail store and achieve the given objectives:

1. The first game objective set was business establishment. The game starts off with the character having a total of 5000 simoleons in the business account,

they are required to choose the appropriate location for their store. The players were then required to earn 10,000 simoleons (in-game currency) within four weeks of in-game time. The players started off by hiring a staff for their retail store, whereby they need to take note of wages and the strengths and weaknesses of the staff they want to hire (Refer to Figure 3.5 & Figure 3.6). The players were allowed to plan and select available options to achieve this objective such as *setting the price for the retail items, hire their own employee* and other options which were shown in the game (refer to Figure 3.2, Figure 3.4 & Figure 3.6). The selection of options was based on the discussion with their group members, and they were reminded to look out for the vocabularies given by the researcher. For instance, *Ring up, Employee, Ethics, Maintenance, Exorbitant, Pricey, Clearance* and *Mark Up*. The first game objective was to test participants' metacognitive awareness such as *Declarative knowledge, Regulation of Cognition, Information Management Strategies and Planning* (Refer to 3.3.1 Metacognitive Awareness Inventory)

Figure 3.3

An In-game Display of The Sims

**Figure 3.4**

Selection of location for retail store



Figure 3.5

Wages of the staff



Figure 3.6

Strengths and Weakness of the Staff



2. The second objective was business establishment. Participants were required to figure out a way to attract more customers to the shop by having

discussions on how to attract more customers to the shop, and identify sales strategies. After completing all the tasks given, they were required to demonstrate how to ring up customers and how to greet customers. They were reminded to look out for the meaning of business-related vocabulary such as *retail, boost, consistent, wages, interaction, shopper, advertisement, long term, short term, foot traffic, assign and preference*. The metacognitive awareness involved included *Declarative knowledge, Procedural Knowledge, Regulation of Cognition, Planning, Information Management Strategies, Comprehension Monitoring, Debugging Strategies* (Refer to 3.3.1 Metacognitive Awareness Inventory) when the participants were completing the objectives given; whereby they needed to come up with strategies and discussion with their group members to complete the objectives. All players would be interviewed by the researcher after they completed the objective, regardless of being successful or not.

3. The third objective was business operation and expansion. Participants were given situations such as their employee was asking for a raise, there were problems with their employee's attitude, lack of sales and expanding their store. They were required to come up with strategies to solve these problems. The discussion to solve the business-related problems, involved participants' *Conditional Knowledge, Regulation of Cognition, Information Strategies, Comprehension Monitoring and Debugging Strategies* to solve the tasks given (Refer to 3.3.1 Metacognitive Awareness Inventory). Apart from that, participants were asked to look out for business-related vocabularies:

manager, checkout, item, range, discuss, spike, revenue, manage, work task, criticism, feedback, offer and socialise.

These objectives were added to mimic real-world situations, and this would promote an authentic learning environment. Wang (2019) mentioned the lives of the characters in The Sims 4 resembled lives in a reality where the characters needed to eat, take showers, have entertainment, socialize, and work. By adding these objectives to the gameplay, players were able to facilitate their metacognitive awareness and the situation would encourage them to communicate with each other to make the best decision possible for their retail store. Players were able to review their decisions if the plan failed. Other than that, players were able to learn vocabulary from the game itself. This statement was further supported by Wang (2019) where players were exposed to more vocabulary during their interactions as the characters with the surrounding avatars and objects around them in-game.

3.3.4 Vocabulary Lists

A list of 30 vocabulary words was selected based on the Cambridge English: Business Preliminary Wordlist. The researcher consulted several EFB lecturers to get their feedback on the selected vocabulary words before the research, and feedback from the lecturers was that the words were related to the English for Business course. Participants were first given 10 vocabulary items during each gameplay session (three in-game sessions in total) and they were required to infer the meaning of the vocabulary from the game itself where vocabularies were

contextualised. The contextualised vocabularies were the vocabularies previously identified and were related to the English for Business course.

3.3.5 Vocabulary Quiz

The objective of the vocabulary test was to study the effect of game-based learning on ESP learners' vocabulary acquisition. The vocabulary quiz consisted of 50 questions and was divided into three sections. Section A consisted of 22 matching the terms with the correct definitions which tested their understanding of the meaning of the words, Section B consisted of 22 items to test the use of the word in context, and Section C consisted of six questions on multiple-choice questions that tested on collocations. The vocabulary quiz was given as a pre-test and post-test. The scores were recorded and analysed by using SPSS.

Research Instruments to Answer Research Questions 3

3.3.6 Survey

A survey was given to the participants in the experimental group before the focus group interview. The survey aimed to examine ESP learners' perceptions of the usefulness of game-based learning specifically on improving metacognition for facilitating vocabulary acquisition. Adapted from Chen et al. (2018), the survey evaluates their perceptions of the game's perceived usefulness, narrative design, and scaffolding.

- Perceived usefulness
 - Vocabulary learning - relevance to the course learning outcomes,
 - Easy to learn?

- Easy to use in various settings?
- Language use during gameplay
 - Game-experience
 - Does it promote proper use of language structures?
- Game Experience
 - Complicated?
 - Easy to navigate?
 - Stimulating?
- Narrative design
 - Business tasks
 - Relevance to the course learning outcomes?
 - Are the activities helpful?
 - Authenticity of learning environment
 - To what extent does it simulate a business environment?
- Scaffolding
 - Metacognition
 - Does it develop their critical thinking skills?
 - Does it develop their problem-solving skills?
 - Does it help them to evaluate their performance in achieving their game task objectives?

3.3.7 Focus group interview

A focus group interview is a qualitative research technique that consists of a group of individuals who focus and engage in discussions on a given topic (Anderson et al., 1998; Dilshad & Latif, 2013). All 32 participants were interviewed to collect their perceptions and evaluations of the effectiveness of game-based learning on their metacognitive awareness and vocabulary learning (Refer to Appendix F) There were five interviews conducted, with six EFB learners in each session. The interview sessions were conducted after the intervention, and the researcher recorded the interview sessions for data analysis. The recordings were then transcribed and then analysed for themes and sub-themes to generate the findings of the study. (Refer to Appendix A)

3.4 Data Collection Procedure

Prior to recruiting participants for this study, the researcher had sought the approval of the faculty dean of the selected university. After the researcher received approval from the faculty dean, an email was sent to the respective EFB lecturers to seek their consent in recruiting participants in their EFB classes. The researcher then joined the EFB class to promote the research and a brief explanation of the research procedure was given to the students. A recruitment poster along with Google Form registration links were created by the researcher, and the link to the Google Form was given to students in the selected tutorial class.

Next, a briefing session was scheduled to brief the participants on the procedure of the research. Participants were asked to acknowledge their consent on

the consent forms distributed during the briefing session. The whole data collection process took 14 weeks of the semester. The participants were given a vocabulary test (pre-test) before the gameplay. The gameplay sessions were then scheduled according to the available time given by the participants. Each gameplay session took 50-70 minutes to complete depending on the progress of the participants. The gameplay sessions were scheduled according to the participants' available time. During the intervention, the participants were only allowed to discuss and convey their ideas in English. The gameplay for all the experimental groups took 7 weeks to complete. After the gameplay, the participants were given a vocabulary quiz (post-test), and a survey and focus group interview were conducted.

During the interview session, the researcher recorded the whole session for data collection purposes. The data collected were used to generate the findings of this study. Further, each focus group would be assigned the pseudonym, GX, with G stood for Group while X stood as the group number, and X stood as the random number assigned to the participants. Then, GXN would be used as the pseudonym to address each focus group member. The researcher would like to emphasize that a pilot test was conducted prior to carrying out the actual research. Due to the pandemic of Covid-19, the data collection process was conducted via Google Meet.

Figure 3.7*The Procedures of Data Collection***3.5 Data Analysis***Quantitative Data Analysis*

Analysis of the vocabulary quiz and MAI were analysed by using SPSS version 25. SPSS was used to analyse the means, standard deviation, and paired-sample t-test for the vocabulary quiz scores. The data were then compared and analysed, and the results served to determine the effect of game-based learning on learners' metacognition and vocabulary acquisition.

The results were then used to determine if game-based learning has a significant effect on ESP learners' vocabulary acquisition and metacognitive

awareness. In this study, the independent variable was the integration of digital simulation game-based learning, and the dependent variables were vocabulary acquisition and metacognitive awareness.

Qualitative Data Analysis

Thematic Analysis

The data collected from the interview were analysed using thematic analysis. Thematic analysis is a descriptive approach to identifying, analysing, and reporting patterns (themes) within a set of data (Braun & Clarke, 2006). Thematic analysis is used to capture important data that are related to the research questions (Braun & Clarke, 2006; Vaismoradi, 2013). Selecting the theme does not necessarily depend on the quantifiable measure, and the selection of themes is dependent on capturing important information that relates to the overall research questions. As such, the thematic analysis process of this study was based on Braun & Clarke (2006) phases of conducting thematic analysis (refer to Figure 13).

Figure 3.8

Phases of Thematic Analysis by Braun & Clarke (2006)

Phase	Description of the process
1. Familiarising yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells; generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

In this study, thematic analysis was used to address the third research objective, which was to investigate the perception of ESP learners on the usefulness of game-based learning in developing their metacognitive awareness and facilitating vocabulary acquisition. The themes would reveal the extent of metacognitive awareness and vocabulary acquisition exhibited by the ESP learners who had received the intervention through *The Sims 4 Get to Work*.

3.6 Ethical Considerations

Research ethics plays an important role when it comes to data collection. As a researcher, it is the researcher's responsibility to be mindful and protect research participants from unnecessary risk or harm, and it is also a way to offer respect for autonomy to the research participants (Guillemin & Gillam, 2004). Ethical clearance along with the adapted interview questions and interview consent forms had been submitted by the researcher to the researcher's institution to get approval for conducting this study. Interview consent was given to the participants to complete and acknowledge if they were willing to participate in this research. The participants were allowed to opt-out of the research if they did not feel comfortable during the interview. Further, their details were acknowledged to be kept confidential.

Other than that, the researcher had emailed Reinders and Wattana (2015), the original authors of the interview questions prior to adapting their interview questions for this study. The research design of this study was adapted from Jim Ranalli (2008). Prior to adapting the research, the researcher had emailed Jim Ranalli to seek permission to adapt the research design for this study.

In order to recruit participants for this study, the researcher emailed the dean of the faculty to obtain their consent to recruit participants. Once the researcher obtained the consent, emails were sent to EBP lecturers to obtain their permission to promote this research in their classes through Microsoft Teams. The researcher would like to emphasize this research was purely to fulfil the postgraduate studies

requirement in the researcher's institution, and all the responsibilities of this research were bear by the researcher himself.

3.7 Conclusion

To summarise, this chapter discussed the research design, research instrument, data collection, data analysis, and ethical considerations. To reinstate, this research employed a mixed-method approach in conducting the research. The researcher then collected the quantitative data by using a vocabulary test and Metacognitive Awareness Inventory. The qualitative data were collected by using focus group interviews. Thematic analysis was used to analyse the interview transcripts.

CHAPTER 4

FINDINGS AND ANALYSIS

4.0 Introduction

This chapter served to discuss the quantitative and qualitative findings obtained in relevance to the research objectives established. The quantitative data were obtained from the vocabulary test and Metacognition Awareness Inventory (MAI); the qualitative data were obtained from focus group interviews conducted with accounting major undergraduates learning English for Business. A quantitative discussion of the findings was made to determine if game-based learning effect learners' vocabulary learning (Research Objective 1) and their metacognition awareness (Research Objective 2). A qualitative analysis using thematic analysis was conducted to analyse the usefulness of game-based learning in developing their metacognitive awareness and facilitation of vocabulary acquisition (Research Objective 3). The data were analysed by using SPSS Version 25 and NVIVO Version 12. Findings generated from the analyses conducted were reported accordingly in this chapter.

4.1 Demographic Background of Research Participants

Table 4.1

Participants' Gender for Control and Experimental Groups

Gender	Control (N)	Experimental(N)
Female	23	17
Male	10	15
Total	33	32

This study involved 65 undergraduates (refer to Table 4.1) from an undergraduate accounting programme. A total of 32 undergraduates (49.2%) were in the experimental group, and within the group, 17 participants were females (26.1%) and 15 males (23.1%). A total of 33 undergraduates were categorised into the control group. It consisted of 23 females (35.3%) and 10 males (15.2%).

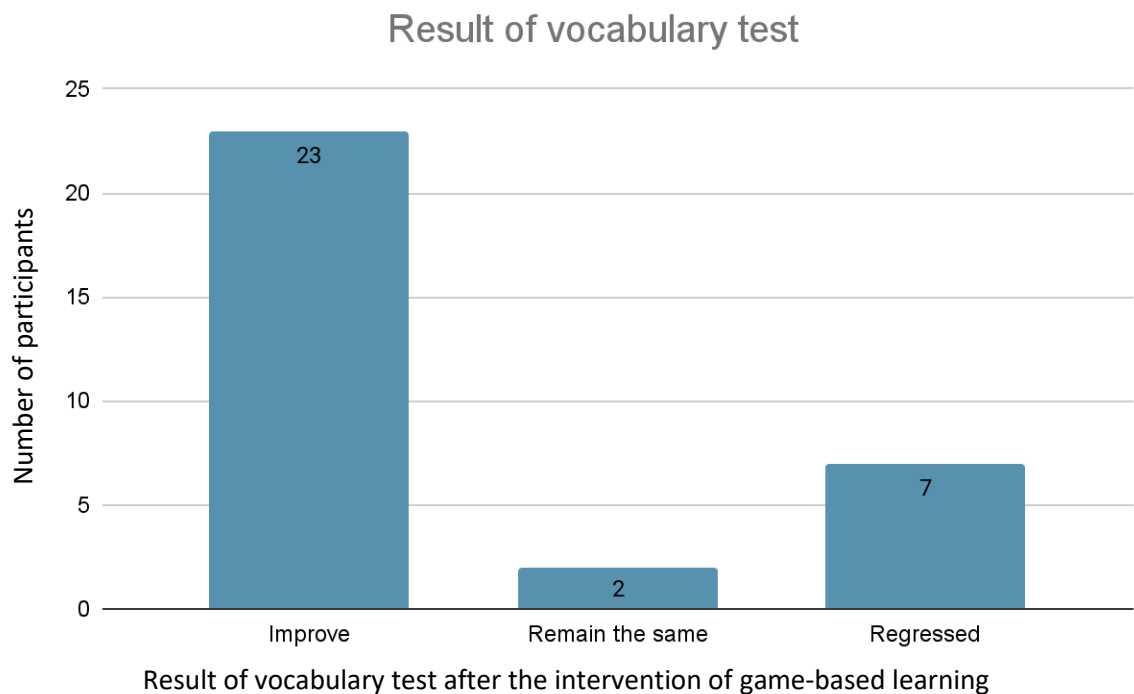
4.2 Vocabulary Test

The objective of the vocabulary test was to investigate the first research question: *Does the use of game-based learning effect ESP learners' vocabulary acquisition?* The vocabulary test consisted of 50 questions which were related to business vocabulary, and it tested the depth and breadth of the undergraduates' vocabulary knowledge. The questions were divided into three sections which tested their understanding of the meaning of the words (Section A), the use of the word in context (Section B), and word collocation (Section C) .

There were 22 questions in Sections A and B and six questions in Section C. The vocabulary quiz was given as a pre-test and post-test. The scores were recorded and analysed using Microsoft Excel and SPSS software. As previously stated, the vocabulary used for the study was taken from the dictionary, Cambridge English: Business Preliminary Wordlist. Figure 4.1 displays the result of the vocabulary test obtained from the experimental group.

Figure 4.1

Result of Vocabulary Test (Experimental group)



The chart from Figure 13 showed that there was an overall improvement in vocabulary scores after the intervention of game-based learning in the experimental group. A total of 23 (71.9%) participants showed improvement after the intervention.

However, there were seven (21.9%) regressed after the intervention, and two (6.2%) participants had the same score as their pre-test.

Figure 4.2

Result of Vocabulary Test (Control Group)

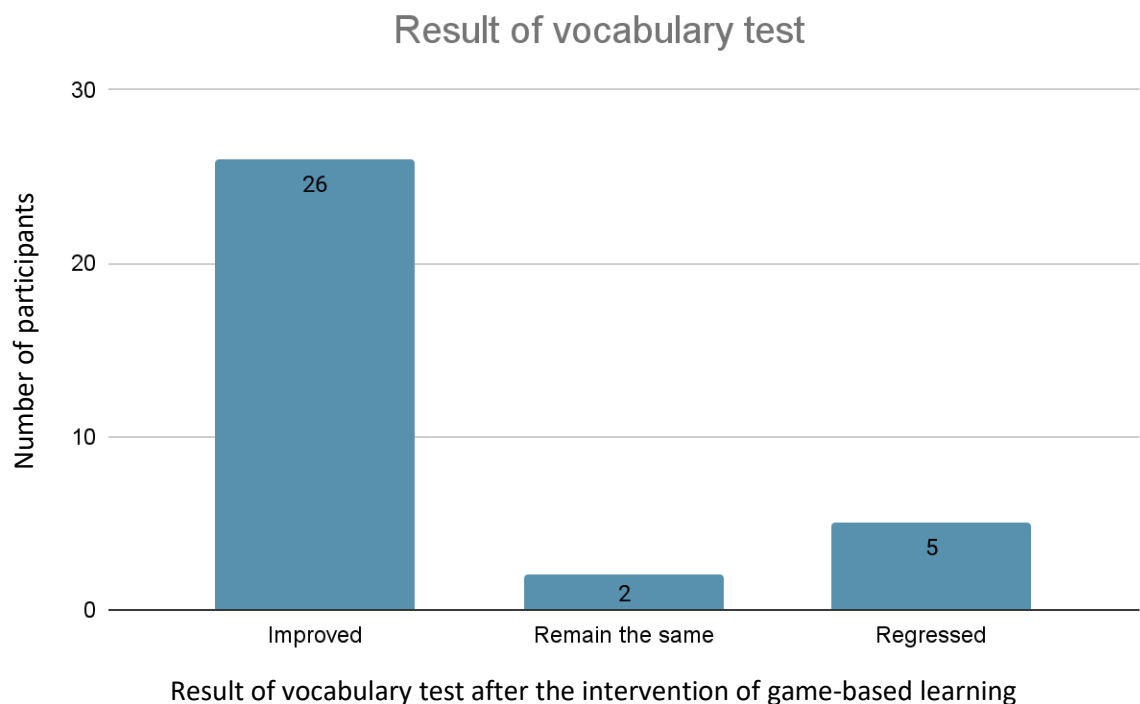


Figure 4.2 shows the result of the vocabulary test for the participants in the control group. A total of 26 participants showed an improvement based on their performance in the post-test despite receiving no intervention. Five participants regressed, and two participants got the same score in their post-test.

Paired Sample t-test on Vocabulary Test

Paired sample t-tests were used to analyse the effects of game-based learning on participants' vocabulary learning. It was analysed by using the participants' pre and post-test scores.

Table 4.2

Result of Paired Sample T-Test (Experimental and Control Groups)

Groups (Pre-test & Post-test)	Mean	Standard Deviation	Significant (2-tailed)
Experimental	-10.50000	16.679	0.001
Control	-3.15152	6.55802	0.009

From Table 4.2, it can be seen that the significance values between the experimental group (0.001) and control group (0.009) were slightly different from one another. Yet, findings from the paired t-test conducted had proven that the experimental group, who had received the game-based learning intervention, showed a better significant value. This subsequently proved that the experiment was a successful one and coupled with the overall improvement of the vocabulary test administered in the post-test (71.9%), this meant that game-based learning was indeed effective at aiding the ESP students in learning vocabulary through *The Sims 4 Get to Work*.

4.3 Findings from Metacognitive Awareness Inventory Questionnaire

In this research, a five-point Likert scale was used for the adapted Metacognitive Awareness Inventory. To test its reliability, a pilot test was conducted, and data were analysed using SPSS; the pilot test result showed a Cronbach's alpha value of .85, which was reliable.

The questionnaire consisted of seven sections, which the seven sections were *Procedural Knowledge*, *Declarative Knowledge*, *Conditional Knowledge*, *Information Management Strategies*, *Debugging Strategies*, *Planning and Comprehension Monitoring*. The objective of using the adapted MAI was to answer the research question: Does the use of game-based learning have an effect on ESP learners' metacognitive awareness? The questionnaire was administered as a form of pre- and post-test to both experimental and control groups.

Table 4.3

Results of Paired Sample T-Test of MAI (Experimental Group)

Paired Sample T-Test								
				95% Confidence Interval of the Difference				
	Mean	Std Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Procedural (Pre)-Procedural (Post)	-.12500	.70711	.12500	-.37994	.12994	-1.000	31	.325

Declarative (Pre)- Declarative (Post)	-.18359	.60073	.10619	-.40018	.03299	-1.729	31	.094
Conditional (Pre-) – Conditional (Post)	-.37500	.61957	.10953	-.59838	-.1516 2	-3.424	31	.002
IMS (Pre)- IMS (Post)	-.12109	.57893	.10234	-.32982	.08763	-1.183	31	.246
Debugging (Pre) – Debugging (Post)	-.11875	.63624	.11247	-.34814	.11064	-1.056	31	.299
Planning (Pre) – Planning (Post)	-.01339	.54953	.09714	-.21152	.18474	-1.38	31	.891
CM (Pre) – CM (Post)	-.25962	.44928	.07942	-.42160	-.0976 3	-3.269	31	.003

There are seven components in the MAI questionnaire: *Procedural Knowledge, Declarative Knowledge, Conditional Knowledge, Information Management Strategies, Debugging Strategies, Planning and Comprehension Monitoring.*

A paired sample t-test was conducted to analyse the participants' metacognitive awareness before and after the intervention of game-based learning. Out of the seven components of *MAI*, the analysis (Table 4.3) showed that there was a significant difference in their conditional knowledge before (M= 3.4, SD= 0.53) and after the intervention (M=3.8, SD= 0.63); $t(31)=-3.42$, $p= 0.002$. Besides, paired sample analysis showed there is a significant difference between Comprehension Monitoring before (M=3.4, SD= 0.65) and after the intervention (M=3.6, SD= 0.63);

$t(31)=-3.27$, $p=0.003$. However, the results showed that there was no significant difference in participants: Procedural Knowledge before the intervention ($M=3.6$, $SD=0.62$) and after the intervention ($M=3.8$, $SD=0.67$); $t(31) = -1.00$, $p=0.325$, Declarative Knowledge before the intervention ($M=3.5$, $SD=0.55$) and after the intervention ($M=3.6$, $SD=0.69$); $t(31)=-1.729$, $p=0.094$, Information Management Strategies before the intervention ($M=3.7$, $SD=0.49$) and after the intervention ($M=3.8$, $SD=0.50$); $t(31)=-1.183$, $p=0.246$. Debugging Strategies before the intervention ($M=4.0$, $SD=0.62$) and after the intervention ($M=4.1$, $SD=0.09$); $t(31)=-1.056$, $p=0.299$ and Planning before the intervention ($M=3.6$, $SD=0.60$) and after the intervention ($M=3.6$, $SD=0.78$); $t(31)=-0.138$, $p=0.891$, evidently with significance value of p more than .05.

Table 4.4*Result of Paired Sample T-Test of MAI (Control group)*

Paired Sample T-test								
				95% Confidence Interval of the Difference				
	Mean	Std Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Procedural (Pre)-Procedural (Post)	-.13281	.10287	.12500	-.34262	.07700	-1.291	31	.206
Declarative (Pre)-Declarative (Post)	-.17969	.09865	.10619	-.38089	.02151	-1.821	31	.078
Conditional (Pre-) - Conditional (Post)	-.09357	.9588	.10953	-.28929	.10179	-.978	31	.336
IMS (Pre)-IMS (Post)	-.04297	.09519	.10234	-.15116	.23710	.451	31	.655
Debugging (Pre) - Debugging (Post)	-.59673	.10549	.11247	-.30889	.12139	-.889	31	.381
Planning (Pre) - Planning (Post)	.02679	.10780	-.19308	-.21152	.24665	.248	31	.805
CM (Pre) - CM (Post)	-.02404	.08679	-.20105	-.42160	-.15298	-.277	31	.784

Table 4.4 shows the result of the paired-sample t-test performed on the control group. Based on the figure, the paired-sample t-test showed that all the seven components in MAI were not significant: Procedural Knowledge (M= 3.6, SD= 0.69) in pre-test and (M=3.7, SD= 0.60); $t(31)=-1.29$, $p= 0.206$ in post-test; Declarative Knowledge (M= 3.4, SD= 0.68) in pre-test and (M=3.5, SD= 0.52); $t(31)=-1.82$, $p= 0.078$ in post-test; Conditional Knowledge (M= 3.5, SD= 0.65) in pre-test and (M=3.6, SD= 0.56); $t(31)=-.978$, $p=0.336$ in post-test; Information Management Strategies (M= 3.8, SD= 0.93) in pre-test and (M= 3.7 , SD=0.94); $t(31)= .451$, $p= .655$ in post-test; Debugging (M= 3.9, SD= 0.99) in pre-test (M=4.0 , SD= 0.93); $t(31)= -.889$, $p=.381$ in post-test; Planning (M= 3.5 , SD= 0.55) in pre-test (M=3.5 , SD= 0.60); $t(31) = .248$, $p= .805$ in post-test, and Comprehension Monitoring (M= 3.4 , SD= 0.56) in pre-test (M=3.5 , SD= 0.66); $t(31)=-.277$, $p= .784$ in post-test. Thus, from the paired sample analysis, findings showed that all the seven components in MAI were not significant as the significance value, p , was more than .05.

Further, based on the results of the paired sample t-test analysis, game-based learning had a significant influence on the experimental group's Conditional Knowledge and Comprehension monitoring compared to the control group, in which control group showed no significant influence in all the seven components of metacognitive awareness.

4.4 Perceived Usefulness of Game-based Learning

This section discussed the quantitative and qualitative data on the perceptions of ESP learners on the usefulness of game-based learning in developing metacognitive awareness and facilitating vocabulary acquisition. The data analysed

in this section served to answer the research question: *What are the perceptions of ESP learners on the usefulness of game-based learning in developing their metacognitive awareness and facilitating vocabulary acquisition?*

4.4.1 Quantitative Analysis of Perceived Usefulness on Game-based Learning

Table 4.5

Mean of Perceived Usefulness on Game-based Learning

Statements	Means
This game makes vocabulary learning easy.	3.7812
This game is easy to use in various classroom settings.	3.7812
This game is suitable for gaming and learning	4.1875
This game promotes proper use of language structures.	3.8125
The game setting is complicated for vocabulary learning.	3.1563
This game is easy to navigate .	3.7500
The Sims 4 is stimulating.	3.9688
Business tasks are relevant to the course learning outcome.	4.0313
Business tasks are helpful for my course.	3.9375

The Sims 4 provides a stimulating business environment.	4.1250
The Sims 4 helps me to develop my critical thinking.	4.2500
The Sims 4 helps me to develop my problem-solving skills.	4.0625
The Sims 4 helps me to evaluate my performance in achieving game task objectives.	4.0000

Table 4.5 shows the means of perception of ESP learners on the perceived usefulness of game-based learning in facilitating vocabulary acquisition. From the table, the means displayed were all between 3.1000 to 4.2500. Statements such as *This game is suitable for gaming and learning*, *Business tasks are relevant to the course learning outcome*, *The Sims 4 provides a stimulating business environment*, *The Sims 4 helps me to develop my critical thinking*, *The Sims 4 helps me to develop my problem-solving skills* and *The Sims 4 helps me to evaluate my performance in achieving game task objectives* obtained high means. The high mean values from these statements indicated that game-based learning was useful in facilitating learners' metacognitive awareness in vocabulary learning. Generally, the means indicated that game-based learning enabled learners to achieve metacognitive awareness and facilitate vocabulary learning.

4.4.2 Findings from Thematic Analysis

Thematic analysis was performed after gathering the participants' responses in the focus group interviews conducted. Using NVIVO Version 12, a total of three

themes were identified, which the three themes were Narrative Design, Perceived Usefulness, and Scaffolding. Each theme came with its respective subthemes and corresponding nodes obtained through NVIVO during thematic analysis. To provide an overview of the thematic analysis, Table 4.6 illustrates the main themes, subthemes with corresponding nodes, quotations from the interview transcriptions, and the number of occurrences.

Table 4.6

Findings from Thematic Analysis Performed

Theme: Narrative Design		Evidence from the interview	Frequency (n)
Main Themes	Sub-themes		
Authentic Learning	<ul style="list-style-type: none"> • Simulates real business environment 	“Gives me an idea how to handle business, (and) how to manage business.”	130
Theme: Perceived Usefulness		Evidence from the interview	Frequency (n)
Main Themes	Sub-themes		
Game Experience	<ul style="list-style-type: none"> • Interesting 	“I think this simulation game is interesting.”	18
	<ul style="list-style-type: none"> • Motivating 	“To help our studies because I’m really into games.”	4
Vocabulary Learning	<ul style="list-style-type: none"> • Efficient for Vocabulary Learning 	“It’s very helpful because the vocabulary which we use during the gameplay session (is based on) whatever we have learned.”	47
	<ul style="list-style-type: none"> • Vocabulary Learned 	“Like the meaning of ‘boost’ and ‘spike’.	110

		<p>It's very different. So, after the game session, I know that boost has a different meaning, as well as spike.</p> <p>"It helped me in many ways (where) I can use those words in my normal life with my friends and so on."</p>	36
Theme: Scaffolding		Evidence from the interview	Frequency (n)
Main Themes	Sub-themes		
Metacognition	<ul style="list-style-type: none"> • Declarative Knowledge 	"I can use them in exams, assignments, (and) presentations."	18
	<ul style="list-style-type: none"> • Procedural Knowledge 	"I need to take care of the staff's attitude too. That way, I will know that she will take care of our customers properly. If we don't take care of our staff properly, then our customers won't come and be satisfied with our service."	23
	<ul style="list-style-type: none"> • Conditional Knowledge 	"It could help me before starting a real business. I can plan my business plan. After I manage my real shop, I won't feel lost."	20
	<ul style="list-style-type: none"> • Regulation of 		19

	Cognition > Planning	“We need to determine what the customers want, or we need to do research and development to see whether the products fulfilled the customers’ needs.”	15
	> Information Management Strategies	“For example, if we earn a profit, we can make the decision such as continuing to operate.”	19
	> Comprehension Monitoring	“Maybe, the product offered is not suitable to the customer. It is based on the location and the customers’ willingness to buy from us.”	17
	> Debugging Strategies	“It helps me reflect on my shortcomings. For example, the customer service. I must improve my customer service.”	22
	> Evaluation	“The sales report can give us more information, and then we make the decision to solve the problem.”	

From the table (Table 4.6) , a total of three themes were generated with corresponding quotations that supported the nodes and themes based on the analysis of interview transcriptions in NVIVO (Appendix A). In the first theme, Narrative Design, the subtheme was Authentic Learning, and the corresponding node was that the intervention *stimulated real business environment*. A total of 130 responses fit this node, thus forming the theme.

The second theme identified was Perceived Usefulness, and the first subtheme was Game Experience. There was a total of two nodes contributing to the theme, which were *interesting* (18 responses) and *motivating* (four responses) respectively. The second subtheme was Vocabulary Learning, which was also made up of two nodes, the game was *efficient for vocabulary learning* (47 responses) and *new vocabulary was learned* (146 responses).

Finally, the third theme identified was Scaffolding, and the subtheme that came with it was Metacognition. The subtheme was made up of four nodes, which were *declarative knowledge* (18 responses), *procedural knowledge* (23 responses), *conditional knowledge* (20 responses), and *regulation of cognition* (92 responses). The fourth node, regulation of cognition, was further made up of sub-nodes, which were planning, information management strategies, comprehension monitoring, debugging strategies, and evaluation. The discussion of themes was then discussed in the next chapter, and further explanations were discussed to determine if all research objectives established for this study were successfully answered.

4.5 Conclusion

This chapter discussed the quantitative and qualitative findings based on the experimental research conducted. Vocabulary tests, MAI, and focus group interviews were used as the main research instruments in gathering the necessary data, and the data were analysed using SPSS and NVIVO. Generally, quantitative findings revealed that the undergraduates who had received the intervention through the game, *The Sims 4 Get to Work*, showed an improvement in the vocabulary post-test and had higher metacognitive awareness in learning. Findings from the qualitative analysis revealed three different main themes, which were Narrative Design, Perceived Usefulness, and Scaffolding. The next chapter served to discuss the findings obtained, draw an overall conclusion if the research objectives were met, and provide recommendations for future studies.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.0 Introduction

The poor vocabulary knowledge among undergraduates pursuing education in higher education institutions was regarded as an alarming one in the nation. Without sufficient vocabulary, surviving in higher education institutions would prove to be challenging, and undergraduates would experience greater challenges when stepping into the workforce. As such, to overcome the existing problem, game-based learning was strongly suggested as one of the potential and effective methods in aiding undergraduates to learn vocabulary.

The three research objectives in relation to the problems identified were as follows: (1) To investigate the effect of game-based learning on ESP learners' vocabulary acquisition, (2) To investigate the effect of game-based learning on ESP learners' metacognitive awareness and (3) To explore the perception of ESP learners on the usefulness of game-based learning in developing their metacognitive awareness and

facilitating vocabulary acquisition. To achieve the research objectives, a mixed-method approach inclusive of experimental research design was used. Data were gathered through pre and post-vocabulary tests, Metacognitive Awareness Inventory, and focus group discussions. They were then analysed using SPSS and NVIVO accordingly.

In this chapter, it served to provide a discussion of the findings obtained, both quantitative and qualitative data.

5.1 Discussion of Findings

To restate, in the vocabulary test distributed in the form of pre and post-tests, participants from the experimental group, who had received the intervention through *The Sims 4 Get to Work*, had shown improvement as compared to their initial scores; paired sample t-test revealed that the improvement between the vocabulary pre and post-test scores were significant at $p = 0.001$, which was significantly better than the control group. As for the results obtained in the Metacognitive Awareness Inventory, the conditional knowledge and comprehension monitoring of the experimental group was the only two aspects of MAI that were positive and significantly influenced by the intervention received, as revealed in the paired t-test conducted, wherein $p = 0.02$ (Conditional Knowledge) and $p = 0.03$ (Comprehension Monitoring).

As for the qualitative data which were analysed using thematic analysis, a total of three themes were obtained, which were Narrative Design, Perceived Usefulness, and Scaffolding. Each theme contained subthemes with respective nodes which was illustrated in Table 4.6 in the previous chapter. In the following sections, they served to discuss the findings obtained from the analyses conducted.

5.1.1 Discussion of Quantitative Findings

The improvement of vocabulary test scores in the post-test administered to the experimental group had proven that *The Sims 4 Get to Work*, not only served as a platform for gaming but also a form of technology capable of being a part of CALL

when teaching language to the students, as mentioned in the criteria for technology to be used as CALL by Chappelle (2003) and Jamieson et al. (2005). As revealed in the in-game situations in *The Sims 4 Get to Work*, the language used matched several entries in the dictionary, Cambridge English: Business Preliminary Wordlist, which were further validated by the lecturers in the said university's faculty. The game thus functioned similarly to a computer-based simulation that provides and exposes language contents to learners, as described by Purushotma (2005), while remaining interactive (Miller & Hegelheimer, 2006; Ranalli, 2008).

The significant improvement in vocabulary post-test shown by the experimental group was similar to the improvement in scores found in previous studies by Ranalli (2008) and Wang (2019). *The Sims*, regardless of edition as provided by Electronic Arts, were found to be beneficial in aiding students to learn vocabulary. In the case of Ranalli's (2008) study, vocabulary learning, among the nine intermediate-level ESL university learners, included general vocabulary learning; Wang's (2019) study, which involved teaching vocabulary to freshman students in a Japanese university, found that *The Sims 4* was a suitable tool in engaging learners to acquire vocabulary. Evidently, findings from the present study reaffirmed that *The Sims* was indeed a suitable game capable in delivering vocabulary to users.

Initially, the Metacognitive Awareness Inventory was developed by Schraw and Dennison (1994) to measure an individual's extent of metacognitive awareness and regulation of cognition. In terms of video games, metacognition involves an individual understanding the situation, synthesising problems, making quick

decisions, and solving problems (Green & Bavelier, 2003; Prensky, 2003). Further, metacognition also allows a video game player to reflect and evaluate his or her gaming process, subsequently improving metacognitive skills and performing better as the game proceeds (Flavell, 1979; Supian et al., 2019).

Yet, despite the seven sub-components in MAI, which were declarative knowledge, procedural knowledge, conditional knowledge, planning, information management strategies, monitoring, and debugging strategies. Conditional knowledge was found to be significant ($p = 0.02$) and Comprehension Monitoring was found to be significant ($p=0.03$) in the MAI distributed as revealed in the results of the paired t-test performed. To restate, conditional knowledge involves an individual's capability to use knowledge and strategy according to the time and condition (Schraw & Dennison, 1994). This includes the individual using his or her own strength to compensate for the weakness at that particular time and condition (Schraw & Dennison, 1994). Comprehension Monitoring refers to an individual's evaluation of his or her own learning strategies employed. This involves tracking one's own progress, assessing possible solutions to problems, and determining whether the methods are useful when interpreting the contents received in learning. (Schraw & Dennison, 1994)

Regardless, for both experimental and control groups, metacognition did not take place throughout the research, except for conditional knowledge and comprehension monitoring in the experimental group which was found to be significant.

Accordingly, the results could mean that game-based learning only affected learners' conditional knowledge and comprehension monitoring, not others, as displayed in MAI. Even though the game objectives and specific tasks included elements of metacognition, such as identifying end-game goals (earning 10,000 simoleons; declarative knowledge), figuring ways to accomplish goals (procedural knowledge; planning), and assessing ongoing problems in games (information management strategies), the insignificance of the other components in the MAI analysed suggest the tasks assigned may not be challenging (as the ultimate goal is to obtain 10,000 simoleons by running a retail store) due to the time constraints by lowering the difficulty bar or the participants have pre-existing knowledge of running stores and/or playing simulation games.

Nevertheless, the significance of conditional knowledge and comprehension monitoring that occurred in the paired t-test in the experimental group proved that the participants were using the newly learned vocabulary in the situation designed for them, which was to run a retail store and manage its staff and customers. This strongly suggested that the participants were actively using the knowledge at the appropriate time and condition, as previously highlighted by Binkley et al. (2014) and Supian et al. (2019).

Additionally, due to the game's nature in requiring players to constantly interact with the game and players themselves, the significance of paired t-tests on the vocabulary test scores proved that social constructivism had taken place. This was because the participants were continuously interacting with the game while engaging in discussions with each other to achieve the goals in the social setting, as

exemplified by Li and Tsai (2013) and Wu et al. (2012) on social constructivism. Further, the improvement in vocabulary test scores also signified learners had constructed new knowledge during the interaction with *The Sims 4 Get to Work*, which new construction of knowledge was a part of social constructivism (Li & Tsai, 2013; Wu et al., 2012). The collaboration among group members when playing the game also supported Piaget's (2003) proponent of constructivism, where meaningful interactions would occur among groups and goals are achieved in real-life situations.

5.1.2 Discussion of Qualitative Findings

As stated, there was a total of three themes identified in the interview transcriptions. These three themes were (1) *Narrative Design*, (2) *Perceived Usefulness*, and (3) *Scaffolding*. To restate, pseudonyms were assigned to each focus group, in which the pseudonym for each group was labelled as GX where X stood as numbers; and members of each focus group were labelled as GXN, where N stood as the numbers assigned to the members.

In the first theme, Narrative Design, participants stated that the use of *The Sims 4 Get to Work* had enabled them to have a gist of how a real business would look and function. Evidently, one such example was from G61, where he had stated the following during the focus group interview.

(The game) gives me an idea how to handle business, (and) how to manage business. [G61]

Further, from the focus group discussion conducted, there were at least 130 nodes that indicated *The Sims 4 Get to Work* gave an impression of surreal real-world business experience. This meant that the in-game experience in *The Sims 4 Get to Work* had provided a surreal experience that enabled the participants to have an understanding of how actual business would take place in reality. Accordingly, Fletcher et al. (2007) and Purushotma (2005) had previously mentioned that computer-based simulation often tends to provide real-world stimulus, which enables users to learn and interact meaningfully with the stimulus due to familiarity. As displayed in Figure 3.4, the surrounding environment in *The Sims 4 Get to Work* allows users to have a vivid imagination of how business would run. As such, the participants are narrating the in-game experience as being realistic to real-world business, which befits the first theme.

The second theme that emerged from the interview transcription was Perceived Usefulness, to which participants had quoted the game, *The Sims 4 Get to Work*, which was interesting and motivating. This was especially evident in two of the following quotations.

I think this simulation game (The Sims 4 Get to Work) is interesting. [G42]

(The game) is useful (in) helping our studies because I'm really into games.

[G12]

As seen in the quotations, while G42 saw *The Sims 4 Get to Work* as an interesting game, G12 believed that games served the otherwise, wherein he had the motivation to study when playing games. During the focus group discussion, there

were at least 22 nodes that mentioned similar responses where the game was interesting and motivating. This meant that the participants had a positive game experience during the experiment. As a form of game-based learning, scholars had previously stated that this form of learning is highly motivating and interesting due to the excitement that it brings to the users (Chen et al., 2019; Plass et al., 2015; Qian & Clark, 2016; Supian et al., 2019).

Another subtheme that made up the second theme, Perceived Usefulness, was vocabulary learning. During the focus group discussions, many participants had quoted that they learned new vocabulary, especially in terms of meaning and application to real-world situations. One such example of learning vocabulary in terms of meaning was seen in the following quote by G13.

For example, the meanings of 'boost' and 'spike'. They are very different. After the gaming session, I know that (the word), 'boost' has a different meaning, as well as 'spike'. [G13]

Evidently, the words, 'boost' and 'spike' had completely different meanings in business terms. Accordingly, in the dictionary, Cambridge English: Business Preliminary Wordlist, the word 'boost' indicates making an increase or improvement of something, such as profits, rates, sales, exports, and trades; 'spike' refers to the increase of amount or price to high levels before ultimately decreasing. These two words are prominent in business fields, and the participants gained new knowledge, other than the common meanings, of the two words through the gameplay.

It's (the game) very helpful because the vocabulary which we use during the gameplay (is based on) whatever we have learned. [G15]

It (the game) helped me in many ways (where) I can use those words in my normal life with my friends and so on. [G13]

The two quotes provided indicated that the participants had learned new words and thus applied them both throughout the game and interaction with peers. Further, there were at least 193 nodes throughout the interview transcriptions that mentioned similar contents about learning vocabulary. This served as clear evidence of demonstrating conditional knowledge, wherein individuals can make use of knowledge accordingly to time and conditions (Schraw & Dennison, 1994). In the exemplified quotes, G15 mentioned the use of vocabulary fitting to the game, while G13 stated that the vocabulary enabled him to communicate with peers. Further, the vocabulary learned in the game, *The Sims 4 Get to Work* enabled participants to bridge the knowledge learned into real contexts, which was a form of successful social constructivism as previously stated by scholars (see Freiermuth, 2002; Halpern, 1998; Miller & Hegelheimer, 2006; Supian et al., 2019; Wu et al., 2012). The application of this newly learned vocabulary as stated in the quotes also indicated a successful transfer of knowledge received to real-world settings, which was previously suggested by Halpern (1998) on transferring knowledge through interaction with games.

Finally, the third theme obtained, which was Scaffolding, was made up of the subtheme, metacognition, which contained many nodes. Accordingly, some responses reflected each subcomponent of the Metacognitive Awareness Inventory.

In terms of Declarative Knowledge, 18 participants had quoted the vocabulary's applicability in handling academic tasks. One such example is shown in the following.

I can use them (vocabulary) in exams, assignments, (and) presentations.
[G24]

In terms of Procedural Knowledge, 23 participants claimed that the vocabulary they had learned was applied and used to complete tasks in a necessary manner. Specifically, in the context of *The Sims 4 Get to Work*, the participants mentioned that the knowledge learned served to manage the fashion retail store and the people with it. Accordingly, one such example of a quote was provided in the following.

I need to take care of the staff's attitude too. That way, I will know that she will take care of our customers properly. If we don't take care (of) our staff properly, our customers won't come and be satisfied with our service. [G12]

Interestingly, while paired t-tests on MAI revealed no significance across the subcomponents in both experimental and control groups, participants during the focus group interview provided answers that indicated the existence of subcomponents in MAI. Firstly, 19 responses indicated Planning did occur during the gameplay, as seen in the following example.

We need to determine what the customers want, or we need to do research and development to see whether the products fulfil the customers' needs.
[G41]

Accordingly, scholars had previously stated that metacognition involves making decisions to reach goals, which includes planning (Freiermuth, 2002; Miller & Hegelheimer, 2006; Saliés, 2002). Evidently, the participants had devised plans when interacting with the game.

Next, 15 participants mentioned that they had used strategies to ensure profits were gained during the gameplay, which was a form of Information Management Strategies. This was as seen in the following quote.

For example, if we can earn a profit, we can make the decision such as continue to operate. [G51]

The decision to continue running the fashion retail store in *The Sims 4 Get to Work* was a part of using strategy when players saw that they were earning profits. Specifically, when the player was able to deduce that the retail store was earning continuous profits, he or she then decided to continue with the business based on the knowledge of running the retail store, which exemplifies a clear use of information management strategies as defined in MAI by Schraw and Dennison (1994).

Comprehension Monitoring refers to the individual's evaluation of his or her strategies employed (Schraw & Dennison, 1994). Further, in metacognition, an individual would show the tendency to assess the situations he or she is in to make better decisions (Saliés, 2002). From the focus group discussion, 19 participants mentioned that they were evaluating their performances when running the fashion retail store in the game, as seen in the following quote.

Maybe, the product offered is not suitable to the customer. It is based on the location and the customers' willingness to buy from us. [G11]

Debugging Strategies in MAI refer to the individual's capability to correct one's own performance based on the errors made (Schraw & Dennison, 1994). During the focus group interview, 17 participants mentioned that they had been correcting their performance when running the fashion retail store. One such quote was given in the following.

It helps me reflect on my shortcomings. For example, the customer service. I must improve my customer service. [G11]

Lastly, Evaluation in MAI refers to an individual's analysis of his or her own learning and effectiveness of strategies employed (Schraw & Dennison, 1994). Unlike the surveys distributed which did not include evaluation, in the focus group discussion, 22 participants mentioned that they engaged into evaluation when running the retail store.

The sales report can give us more information, and then we make the decision to solve the problem. [G11]

From the example given, it was evident that the participants had engaged into problem solving and critical thinking, which was part of the nature of game-based learning as previously explained by Qian and Clark (2016) and Supian et al. (2019). Even though evaluation is not included explicitly in the present study due to the complicated standards of assessing the evaluation process in metacognition as mentioned by (Braad, 2018; Kim et al., 2009), Plass et al. (2015) also mentioned

that game-based learning enables individuals to reflect and develop better problem-solving skills, such as in the case of the quote, the participants referred to the sales report to decide the existing problems that were occurring in the retail store, reflected on the problems, and took the steps to solve the problems.

By placing the findings of the quantitative data and qualitative data together, it was proven that *The Sims 4 Get to Work* sufficiently fulfilled the criteria of being a part of CALL. With reference to the criteria stated in CALL evaluation as provided by Chapelle (2001), *The Sims 4 Get to Work* fulfilled the criteria for language learning potential, wherein the ESP students got to learn new vocabulary and its corresponding meaning throughout the gameplay. The qualitative data from the focus group interview, in addition to the quotations provided in the findings, learning vocabulary through the game was authentic and fitting to their future professions. Lastly, the students had enough resources from the game and lessons learned in lectures to run the fashion retail store, which was a clear sign of practicality in CALL evaluation provided by Chapelle (2001).

The words learned during the gameplay in *The Sims 4 Get to Work* sufficiently met the goal of developing communicative competence among students for future work professions, as outlined in the objectives of ESP courses mentioned by Ahmed (2014) and Rao (2020). Based on the participants' responses in the focus group discussion, they had been working together in managing the retail store, which led them to achieve the objectives of the game. This was a sign of learner-centred learning, which was befitting to the idea of meaningful learning in ESP as

previously recommended by scholars (Ahmed, 2014; Fălăus, 2017; Hutchinson & Waters, 1987; Rao, 2020).

Yet, despite the paired t-test on MAI revealed to be insignificant among the participants who had responded, findings from the qualitative data indicated that the participants did demonstrate metacognition when interacting *The Sims 4 Get to Work* during the intervention. They demonstrated critical thinking skills, problem-solving skills, and decision-making skills as highlighted by Prensky (2003) and Green and Bavelier (2003) in relation to game-based learning and metacognition. Further, as the participants were reflecting and evaluating their own performances when running the retail stores, they were constantly applying metacognitive skills to achieve the objectives of the game, which aligned with the findings from Supian et al. (2019) where quests in games support development and improvement of metacognitive skills.

Theoretically, the participants from the experimental group had constructed new knowledge, which referred to the new vocabulary learned when playing *The Sims 4 Get to Work*. This proved that social constructivism in game-based learning, as mentioned by Li and Tsai (2013), had taken place. The social interaction between the participants among themselves and the game led to meaningful learning, and they were able to transfer the knowledge constructed through experience to real-life contexts, as seen in the quotes presented in qualitative findings. The participants' experience with the game thus directly confirmed Piaget's (2003) constructivism, where there was a social interaction between aspects to gain knowledge.

Further, the proposed input-process-outcome model by Garris et al. (2002) was proven to be applicable in game-based learning as well. As stated by Garris et al. (2002), the model was a cycle that started with setting objectives, followed by making judgements based on the objectives, and finally, completing the objectives. Further, a part of the model also required individuals to be self-directed and self-determined when striving to achieve the objectives (Garris et al., 2022). As seen in the experimental group, the participants had worked towards achieving the objectives of running the retail store while discussing in their respective groups. This showed that not only they were self-directed to achieve the objectives, but they were constantly receiving input, or vocabulary and knowledge in this context, but they were also applying the input received to achieve the objectives.

As such, drawing the discussions based on the quantitative and qualitative findings obtained, all three research objectives established for the study have been answered. The paired t-test on the vocabulary tests administered to the experimental group indicated that the ESP learners had experienced improvement in vocabulary acquisition; game-based learning had not resulted in any improvement in ESP learners' metacognitive awareness, and game-based learning was deemed to be effective in vocabulary acquisition as well as developing metacognitive awareness.

5.2 Implication of the Study

5.2.1 Practical Implications

As previously stated, ESP is a course aimed at improving students' communicative competence that is required in future professions (Ahmed, 2014; Dudley-Evans et al., 1998). The aim of an ESP course is to provide authentic

communication to the students, further ensuring they become professional when using the English language in future workplace (Ahmed, 2014; Dudley-Evans et al., 1998). Consequently, the used of game-based learning, specifically *The Sims 4 Get to Work*, was proven to be effective in improving the ESP undergraduates' vocabulary knowledge along with metacognitive awareness. Further, responses from the participants in focus group interviews revealed that they viewed game-based learning as an effective method of learning.

As such, stakeholders in higher education institutions, such as curricula, syllabi, and course designers could consider incorporating game-based learning as part of the learning methods in future ESP courses introduced to the students. As asserted by Alismail and McGuire (2015), the curriculum in the present, 21st century was no longer bound to incorporate traditional methods in delivering lessons to the students. Instead, learning should become meaningful, creative, and beneficial which would allow students to be better-ready to face their future professions (Alismail & McGuire, 2015). Learning was no longer a one-sided, teacher-centred manner but rather, it should involve students becoming active learners in the classroom by constantly engaging in lessons, performing critical thinking, engaging in discussions, and collaborating with each other (Alismail & McGuire, 2015).

Since *The Sims 4 Get to Work* had achieved the criteria of providing an authentic, interactive, and engaging learning environment through games, this game could be considered as one of the educational materials for students to participate in learning, and further enabling them to master the contents through real situations. Curriculum, syllabus, or course designers could make use of existing documents and

conduct some minor revisions by incorporating game-based learning as a form of learning to better allow students to learn the contents being taught.

Additionally, game designers, including Electronic Arts (EA) who were responsible for designing *The Sims 4 Get to Work*, could make use of the present study's findings and further develop future games that mimic real-life situations for consumers to simulate and learn the necessary skills to live in the real society. That way, consumers not only could enjoy the games, but they could also gain new knowledge that is applicable and relevant to their lives. Since Dudley-Evans et al. (1998) had mentioned that there were no definite references for ESP, Electronic Arts (EA) could make use of the game to collaborate with designers and adapt *The Sims* into ESP coursebooks.

5.2.2 Theoretical Implications

Theoretically, the findings of this study had proven that the social constructivism and input-process-outcome game model advocated by Garris et al. (2002) were valid theoretical foundations in terms of advocating game-based learning as a form of learning method.

When using game-based learning, which was *The Sims 4 Get to Work*, the meaningful construction of knowledge among the ESP learners through interaction with the game and group members proved that social interaction did exist during the learning process. The vocabulary acquired during the gameplay was continuous and through constant exploration, which was an acknowledgement of Piaget's (2003) proponent of knowledge constructivism. The active learning that occurred throughout the gaming sessions that was accompanied by successful learning among participants thus proved that social constructivism was present.

As for the input-process-output game model, participants had become self-directed in the process of vocabulary acquisition while striving to achieve the goals when running the fashion retail store. The participants were able to receive and understand the input received, which was the business-related vocabulary, and put it into application when running the retail store. The improvement in vocabulary test scores also showed that the participants had been actively constructing knowledge, similar to social constructivism when interacting with the game. As such, the input-process-output game model could be employed for future studies related to game-based learning.

5.3 Limitations of Study and Recommendations for Future Studies

This study, without a doubt, had its limitations. During the conduct of the study, there were two limitations identified, which these limitations were addressed in the subsequent paragraphs.

The first limitation was that this study was only conducted in one university, which was a private university located in the state of Perak, Malaysia. Specifically, only students from ESP courses were selected, which amounted to only 65 students in total. When dividing the students into experimental and control groups, the number became significantly lesser as each group only contained around 30 students. Even though the research objectives were successfully achieved, the present findings were insufficient to be generalised to the population of ESP students learning vocabulary in Malaysia.

As such, to address this limitation, future studies could consider expanding the research by recruiting more participants not only in terms of sample size but also involving ESP students from other higher education institutions. Accordingly, this would help in determining the extent of effectiveness of using game-based learning in aiding university students in learning vocabulary.

Another limitation that occurred during the research was the happening of COVID-19 pandemic, which led to the nation-wide lockdown in 2020. To limit the spread of COVID-19 among the people, the government issued a statement announcing the lockdown. Subsequently, all forms of educational institutions were instructed to close down, and lessons were required to be conducted online. Despite the gradual reopening of educational institutions, which allowed students to return

to campuses in cohorts, access to the participants continued to remain limited, in this case, only 65 students were accessible, as not all students would opt to return to campus due to health concerns. As such, the present study was affected by the COVID-19 pandemic.

In future studies, it is suggested that researchers could consider conducting similar research where all students have returned to their respective campuses for physical lessons. The large number of students would provide sufficient data in conducting the research, further giving a better opportunity to observe how would the students interact with the game when introduced as an intervention during the experiment.

Further, the contradiction of findings that occurred in MAI administered, and data from focus group discussions should be further investigated. This was because only conditional knowledge and comprehension monitoring were found to be significant in the paired t-test while all subcomponents in MAI were found to be present during the focus group discussions conducted. The removal of Evaluation in the MAT due to its complicated nature (Braad, 2018; Kim et al., 2009) may have resulted the contradicting findings even though the pilot test was found to be reliable and valid. Future research should investigate the extent of metacognitive awareness exhibited among ESP students to determine if all subcomponents, including Evaluation, exist.

Finally, there could be a possibility that some students had prior experience towards playing *The Sims* as aforementioned in the discussion, resulting several components of the MAI being viewed as insignificant. As the game's developer had

produced multiple versions of *The Sims*, some students might have experience in playing the game, which led to the possibility of having the knowledge of meeting the goals or objectives with less effort. This could potentially lead to bias, and thus affecting the result.

Future studies that intend to conduct similar research may check and verify if participants have had prior experience in playing *The Sims* or any other related games intended to be used for experiment purposes. This increases the possibility of removing experienced players from participating in the research which may lead to biased data.

5.4 Conclusion

This chapter served to provide a discussion of findings by drawing relevant literature and the theoretical framework previously established. Through the discussion, all research objectives were answered. Limitations of the study were addressed in this chapter, and necessary recommendations were provided for future studies interested in this field.

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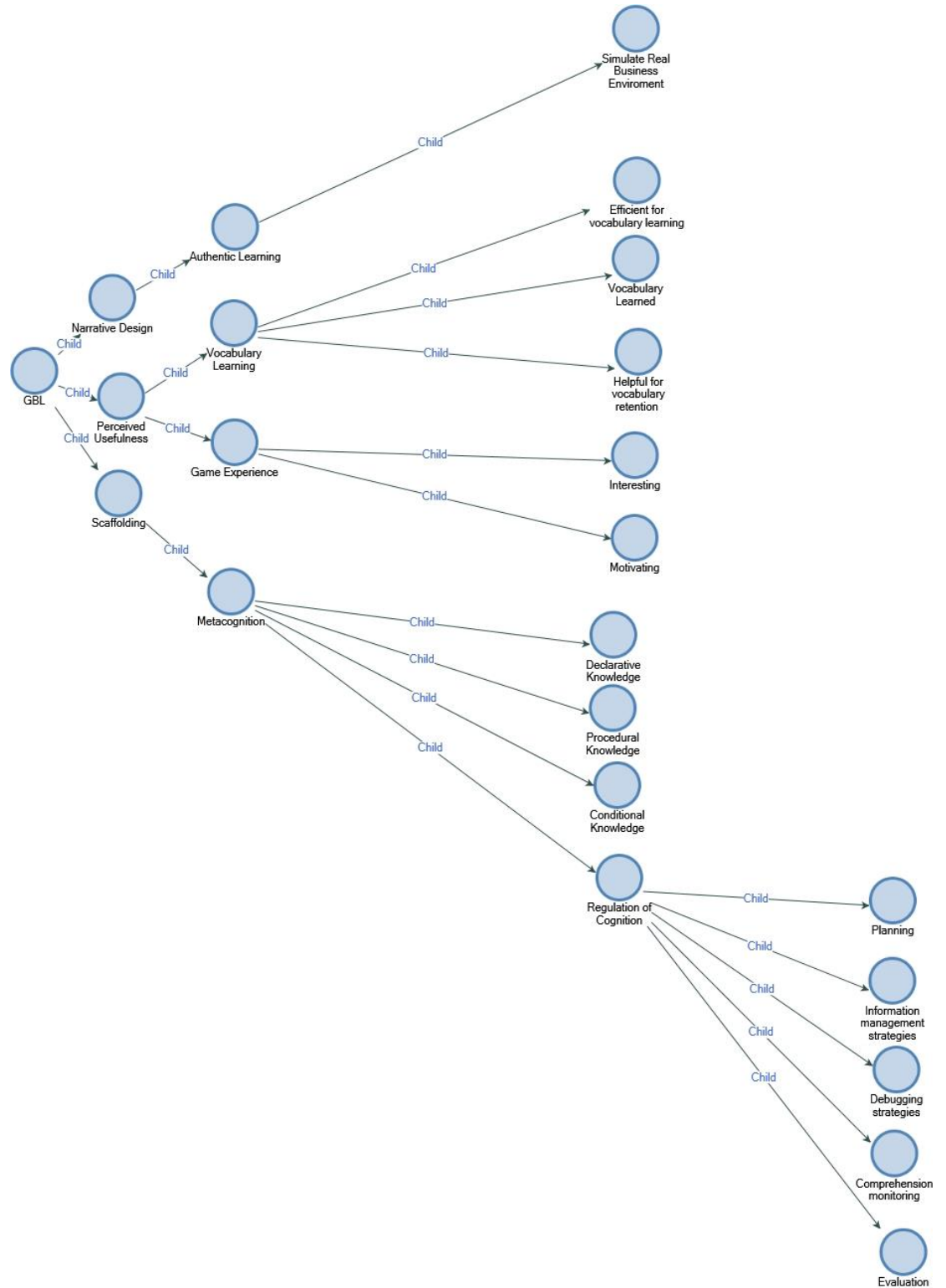
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Appendices

Appendix A



Appendix B**UNIVERSITI TUNKU ABDUL RAHMAN****CONSENT FORM FOR ESP LEARNERS**

RESEARCH PROJECT TITLE: APPLICATION OF GAME-BASED
LEARNING IN DEVELOPING METACOGNITION FOR FACILITATING
ENGLISH FOR SPECIFIC PURPOSE (ESP) VOCABULARY ACQUISITION:
CASE STUDY

RESEARCH INVESTIGATOR: TAN WILSON

RESEARCH PARTICIPANT'S NAME:

FACULTY OF ARTS AND SOCIAL SCIENCE

MASTER OF PHILOSOPHY (SOCIAL SCIENCE)

The research project will take about 2-10 weeks. There are no risks anticipated that are associated with your participation, but you have the right to stop the test or withdraw from the research at any time.

Thank you for agreeing to be a part of the test as stated in the above research project. Ethical procedures for academic research require participants to explicitly agree to being tested and how the information contained in their test will be used. This consent form is necessary for the researcher to ensure that you understand the purpose of your involvement and that you agree to the conditions of your participation.

All part of the research may be used;

- To achieve the research project as noted above.

By signing this form I agree that;

1. I am voluntarily taking part in this research project. I understand that I don't have to take part, and I can stop the test at any time;
2. I have read the information sheet;
3. I don't expect to receive any benefit or payment for my participation;

Participant's name: _____

Participant's signature: _____ Date:

Researcher's signature: _____ Date:

Contact information

This research has been reviewed and approved by the Faculty of Arts and Social Science, UTAR. If you have any further questions or concerns about this study, please contact:

Name of researcher: TAN WILSON

Telephone number: 017-2121273

E-mail: tan.wilson03@lutar.my

Appendix C

Vocabulary Quiz

Dear Participants

Participation in this survey is optional but I truly appreciate your time in responding to this survey, which takes 15-20 minutes. All information obtained is solely for academic purposes and all respondents' personal data and responses will be treated in strict confidence. You have the right to opt-out from this research if you are feeling unwell during the research. This survey form consists of 1 research instruments which are the Metacognition Awareness Inventory (MAI)

This quiz consists of:

Section A

Choose the correct terms given with the correct definition.

Section B

Fill in the blanks with the correct words.

Section C

Choose the right collocation of the words related to business.

Please answer all the questions in each subsection.

All the data collected will be kept confidential, only the researchers will be able to access the data for research purposes only.

Thank you very much for your helpful participation. If you have any questions or inquiries, please do not hesitate to contact me **Tan Wilson** via **017-2121273** or email (**tan.wilson03@utar.edu.my**).

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to take notice and require consent in relation to the collection, recording, storage, usage and retention of personal information.

Personal Details

Name: _____

Gender: M / F

Contact number: _____
S()

Course: _____ Y ()

*Y=Year, S= Semester

Section A

Choose the correct term given with the correct definition.

manage	short term	items	retail	shopper	ring up
revenue	foot traffic	checkout	advertisement	employee	assign
long term	spike	range	manager	preference	discuss
	interaction	boost	wages	consistent	

No.	Definition	Vocabulary Term
1.	The selling of goods to the public, usually through shops.	
2.	To make something increase or become better or more successful.	
3.	Having the same standard.	
4.	Regular amount of money that you earn, usually every week or every month, for work services.	
5.	To enter the cost of goods being bought in a shop on a cash register by pressing the buttons; to make sales of a particular value.	
6.	The person who is paid to work for somebody.	
7.	The act of communicating with somebody, especially while you work, play, or spend time with them.	
8.	A person who buys goods from shops.	
9.	A person who is in charge of running a business, a shop or a similar organization or part of one.	
10.	A notice, picture or film telling people about a product, job or service.	
11.	The place where you pay for the things that you are buying in a supermarket.	
12.	One thing on a list of things to buy, do, talk about, etc.	
13.	A greater interest in or desire for somebody/something than somebody/something else.	
14.	To give somebody something that they can use, or some work or responsibility.	
15.	A variety of things of a particular type.	
16.	To talk about something with somebody, especially in order to decide something	
17.	Lasting a short time; designed only for a short period of time in the future.	
18.	Over a long period of time.	
19.	The number of people who go into a shop or business in a particular period of time.	

20.	To rise to a higher amount, price, or level, usually before going down again.	
21.	The income that a business makes from sales regularly.	
22.	To be responsible for controlling or organizing someone or something, especially a business or employees.	

Section B

Fill in the blanks with the correct words from the table above.

manage	short term	items	retail	shopper	ring up
revenue	foot traffic	checkout	advertisement	employee	assign
long term	spike	range	manager	preference	discuss
	interaction	boost	wages	consistent	

- We need a capable manager to _____ this department.
- The company is currently facing bankruptcy due to insufficient _____ for the _____ past few months.
- The _____ proposal for the company looks good!
- If the price continues to _____, the company will not be able to afford the cost _____ of the item.
- Web advertisements would provide a boost in _____ until the end.
- Stability involves balancing _____ and long-term outcomes to achieve sustainable success.
- The employer and the employee need to _____ any possible solution to solve _____ the company's problem.
- Tesco offers a wide range of food and household _____.
- Click the _____ button in your Shopee apps after you have confirmed the items _____ in your cart.
- The Lazada 9.9 sales are around the corner, we can see the _____ for the sales _____ in every social media platform such as Facebook, Instagram, YouTube and Twitter.

11. There is a large crowd of _____ queuing in front of Jaya Grocery.
12. Mr. Ali is a very capable man because he is the _____ of 5 retail shops.
13. Jack was named employee of the month due to his _____ performance throughout the month.
14. Choosing what kind of car is a matter of one's own _____.
15. The Malaysia government has introduced several plans to _____ the country's economy.
16. Mr. Muthu had decided to award a car to his _____ due to the contributions and commitment he made to the company.
17. "Please _____ this customer". Ms. Lim told her one of the staff in her boutique.
18. I like to shop through Shopee because it offers a wide _____ of products.
19. The lack of understanding was due to no _____.
20. The Malaysian government had risen the minimum _____ of employees from RM 1100 to RM1200.
21. The clothes are much cheaper if you buy them at wholesale prices than _____.
22. Ms. Siti asked her manager to _____ different sales targets for every salesperson.

Section C

Choose the right collocation of words related to business.

1. Boost _____
A. powerful C. up
B. down D. big
2. Check _____
A. at C. down
B. out D. free
3. Consistent _____
A. stock C. performance
B. interaction D. spike
4. _____ term
A. prolongs C. inconsistent
B. right D. long
5. _____ traffic
A. foot C. busy
B. heavy D. international
6. Ring _____
A. up C. down
B. down D. bell

Appendix D

Metacognitive Awareness Inventory

Dear Participants,

Participation in this survey is optional but I truly appreciate your time in responding to this survey, which takes 15-20 minutes. All information obtained is solely for academic purposes and all respondents' personal data and responses will be treated in strict confidence. You have the right to opt-out from this research if you are feeling unwell during the research.

This survey form consists of 1 research instruments which are the Metacognition Awareness Inventory (MAI)

Please read the following instructions carefully before answering the questions.

Metacognition Awareness Inventory (MAI) questionnaires

The following scale and questions represent the **Metacognition Awareness Inventory (MAI)** used to study students' metacognition awareness.

Answer the questions one by one by marking in the Likert scale box

SD - Strongly Disagree

D- Disagree

N - Neutral

A - Agree

SA- Strongly Agree

Please answer all the questions in each and every subsection. There are a total of 2 main sub-sections which are Knowledge About Cognition and Regulation of Cognition. Under the 2-main sub-sections, there are 3 sections which are Declarative, Procedural, and Conditional knowledge.

Name: _____

Gender: M / F

Contact number: _____

Course: _____ Y ()

S ()

*Y=Year, S= Semester

Section A**Knowledge about Cognition**

Procedural Knowledge						
Statements		SD	D	N	A	SA
1.	I try to use strategies that have worked in the past.					
2.	I have a specific purpose for each strategy I use.					
3.	I am aware of what strategies I use when I am undertaking a task.					
4.	I find myself using helpful learning strategies automatically.					

Declarative Knowledge						
Statements		SD	D	N	A	SA
1.	I understand my intellectual strengths and weaknesses.					
2.	I know what kinds of information are most important to learn.					
3.	I am good at organizing information.					
4.	I know what are my expectations.					
5.	I am good at remembering information.					
6.	I have control over how well I learn.					
7.	I am a good judge of how well I understand something.					
8.	I learn more when I am interested in the topic					

Conditional Knowledge						
Statements		SD	D	N	A	SA
1.	I learn best when I know something about the topic.					
2.	I use different learning strategies depending on the situation in the task.					
3.	I can motivate myself to learn and complete the task.					

4.	I use my intellectual strengths to compensate for my weaknesses.					
5.	I know which strategy is the most effective.					

Section B

Regulation of Cognition

Planning						
Statements		SD	D	N	A	SA
1.	I pace myself while learning in the task in order to have enough time.					
2.	I think about what I really need to learn before I begin a task in the task.					
3.	I set specific goals before I begin a task in the task.					
4.	I ask myself questions about the material in the task before I begin.					
5.	I think of ways to solve a problem in the task and choose the best one.					
6.	I read instructions carefully before I begin a task in the task.					
7.	I organise my time to best accomplish my goals.					

Debugging						
1.	I ask others for help when I don't understand something in the task.					
2.	I change strategies in the task when I fail to understand.					
3.	I re-evaluate my assumptions in the task when I get confused.					
4.	I stop and go back over new information that is not clear in the task.					
5.	I stop and reread the instructions in the task when I get confused.					

Information Management Strategies						
Statements		SD	D	N	A	SA
1.	I slow down when I encounter important information in the task.					
2.	I consciously focus my attention on information in the task.					
3.	I focus on the meaning and significance of new information in the task.					

4.	I create my own examples to make information more meaningful.					
5.	I try to translate new information into my own words.					
6.	I ask myself if what I am experiencing in the task is related to what I already know.					
7.	I try to break the task down into smaller steps					
8.	I focus on overall meaning of the task rather than specifics.					

Comprehension Monitoring						
Statements		SD	D	N	A	SA
1.	I ask myself periodically if I am meeting my goals.					
2.	I consider several alternatives to a problem before I answer.					
3.	I ask myself if I have considered all options when solving a problem.					
4.	I periodically review to help me understand important relationships.					
5.	I find myself analysing the usefulness of strategies while I play the task.					
6.	I find myself pausing regularly to check on my comprehension in the task.					
7.	I ask myself questions about how well I am doing while learning something new in the task.					
8.	I know how well I did once I finish a task.					
9.	I ask myself if there was an easier way to do things after I finish a task.					
10.	I summarize what I've learned after I finish.					
11.	I ask myself how well I accomplish my goals once I'm finished.					
12.	I ask myself if I have considered all options after I solve a problem.					
13.	I ask myself if I learned as much as I could have once, I finish a task.					

-End of Questionnaire-

Appendix E

Perceived Usefulness of The Sims 4 Get to Work

Dear Participants

Participation in this survey is optional but I truly appreciate your time in responding to this survey, which takes 15-20 minutes. All information obtained is solely for academic purposes and all respondents' personal data and responses will be treated in strict confidence. You have the right to opt-out from this research if you are feeling unwell during the research. This survey form consists of 1 research instruments which are the Perceived Usefulness of The Sims 4 Get to Work

Please answer all the questions in each subsection.

Answer the questions one by one by marking in the Likert scale box

SD - Strongly Disagree

D- Disagree

N - Neutral

A - Agree

SA- Strongly Agree

All the data collected will be kept confidential, only the researchers will be able to access the data for research purposes only.

Thank you very much for your helpful participation. If you have any questions or inquiries, please do not hesitate to contact me **Tan Wilson** via **017-2121273** or email (**tan.wilson03@utar.edu.my**).

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Name: _____

Gender: M / F

Contact number: _____

Course: _____ Y ()

S ()

*Y=Year, S= Semester

Perceived Usefulness						
Statements		SD	D	N	A	SA
1.	This game makes vocabulary learning easy.					
2.	This game is easy to use in various classroom settings.					
3.	This game is suitable for gaming and learning.					
4.	This game promote proper use of language structures.					
5.	The game setting is complicated for vocabulary learning.					
6.	The game is easy to navigate.					
7.	The Sims 4 is stimulating					

Narrative Design						
Statements		SD	D	N	A	SA
1.	Business tasks is relevant to the course learning outcome.					
2.	Business tasks are helpful for my course.					
3.	The Sims 4 provides a stimulating business environment.					

Scaffolding						
Statements		SD	D	N	A	SA
1.	The Sims 4 helps me to develop my critical thinking.					
2.	The Sims 4 help me to develop my problem-solving skills.					
3.	The Sims 4 helps me to evaluate my performance in achieving game task objectives.					

-End of Questionnaire-

Appendix F

Interview Questions

Introduction

Explain the reason for and the purpose of the interview, summarize what will happen to the interview results, and reassure the interviewees on the issue of confidentiality.

Part A-General Questions (Demographic Information)

- What is your name?
- What programme of study are you from?

Metacognitive Awareness

- Describe your experience with this game simulation.
- To what extent does the sales report help you to review/reflect on your decision ?
- To what extent do you feel this simulation game helps to expand your knowledge about setting up a retail business? Please explain what you have learned.

List of follow-up and probing questions:

- Does this game give you an idea of how to set up a business/expand your business?
- How did you feel when you set up your own company?

- How/Why did you _____? Can you explain this to me?
- What do you think caused _____?
- I found you _____while playing games. Tell me why you did this. / Tell me why
- You responded here. /Tell me why you didn't say anything here.

VOCABULARY LEARNING

- Could you tell me the words you have just learned in the game session?
- Did you find the English words in the game interface helpful in achieving your business task?
- To what extent do you feel the gameplay helps you in understanding the meaning and use of the words you have learned?

List of follow-up and probing questions:

- How are they helpful/unhelpful?
- Could you explain the meaning and usage of the word?
- Can you list out the words you have learned ?

Closing / Ending the interview

Thank participants for their contribution and ask if there is anything (s)he would like to add or ask.

