Enhancing Digital Literacy skills while playing Casual Games Young People in Brunei As a Case Study

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Enhancing Digital Literacy skills while playing Casual Games: Young People in Brunei As a Case Study

by

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ABSTRACT

Digital Literacy Skills refer to skills which help digital technology users to participate meaningfully and safely in the digital world. These skills have become essential since digital technologies nowadays are imbedded in almost all aspects of everyday life, including education, work, home and leisure activities. In particular, it has been argued that the younger generation has developed a certain degree of digital literacy skills due to regular exposure to digital technologies.

Playing casual games is one of the popular activities amongst the younger generation, or young people as referred in the main thesis. With advantages such as portable technology, simplicity of play and easy access, these games can be played almost anywhere and anytime. The question therefore arises: To what extent would these casual game play activities enhance the digital literacy skills of the young people?

This thesis presents a qualitative case-study analysis of casual game play activities of young people and the potential associated enhancement of digital literacy skills from these activities. The model proposed by Eshet-Alkalai referred as The Conceptual Framework for Survival Skills in the Digital Era, was used as the main framework for this study. This model comprises of six digital literacy skills namely Photo-visual, Reproduction, Branching, Information, Socio-emotional, and Real-time Literacy Skills. The

model is chosen since the literacy skills within the model encompass all of the cognitive skills that are used when utilising digital technology.

Data was gathered from a sample selection of young people in Brunei Darussalam aged between 10 and 12 using think-aloud techniques, observations, and semi-structured interviews. The Activity Theory System was used to structurally guide the study in organising the game play activities based on hierarchical levels of actions and operations. The results of this study suggest that casual game play activities may likely enhance the digital literacy skills of young people.

In the name of ALLAH most Gracious, most Merciful.

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Ph.D. is a lonely journey, but not in mine. (All Praise Belongs to Allah)

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What I learned the most during my PhD journey:

ALLAH will always be there for you. Ask for His blessings.

And PRAY

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CHAPTER 1 INTRODUCTION

The Real Reason They Play So Much Is That Their Games Are Teaching Them to Succeed in the Twenty-First Century.

(Marc Prensky 2006, preface page)

1.1 Introduction

This thesis presents a study on young people's game play in relation to enhancing their digital literacy. In order to conceptualise the relationship between game play and digital literacy, I examine young people's casual games play and identify the activities that have the potential to enhance digital literacy.

In this study, digital literacy refers to a set of skills that individuals need in order to function effectively in digital environments, which not only involves the mere ability to use or operate a digital device but also includes cognitive, sociological, and emotional skills (Eshet, 2002a). With the proliferation of digital technologies in every aspect of our lives, digital literacy has become an important skill that young people need to possess. Young people are our future generations, and in a world that is mediated by digital technologies, digital literacy is important for their successful participation in digital environments. Consequently, educational institutions are incorporating

digital technologies into their curricula in order to develop digital literacy among young people in formal education settings.

Although digital literacy can be taught (Ng, 2012) and developed through school education (Hague, 2010; Hague & Williamson, 2009), it can also develop through everyday practices. It has been argued that because of their everyday exposure to digital technologies, young people—so called digital generation—have developed a certain degree of digital literacy (Oblinger, 2003; Prensky, 2001; Tapscott, 2008). If this exposure to digital technologies can enhance their digital literacy, it is also possible playing casual games will do so as well.

Casual games are a new generation of video games that are easy and simple to play (Juul, 2010) and that can be played using portable technologies such as mobile phones and tablets. With their simplicity and easy access, casual games have become a popular activity amongst young people, and with the recent popularity of these games, it is important to study on playing these games affects their digital literacy.

Using a case study approach, I study twenty young people as they play casual games. The participants were recruited through convenience sampling from four after-school computer clubs in Brunei. By adopting the conceptual model of digital literacy and activity theory as the theoretical framework of this study, I was able to answer the study's main research question.

The remainder of this chapter presents the motivation for this study, the background framework of the study, a literature overview, the study's significance, and the structure of this thesis.

1.2 Motivation

As an educational technology lecturer, I am interested in the recent issue of the need for young people to become digitally literate. In Brunei, the new education system expects educators not just to impart knowledge to their students but also to teach them digital literacy. To accomplish this, schools must integrate digital technologies into pedagogy practices throughout their curricula. Through digital practices in schools, young people will develop digital literacy.

With the importance of digital literacy education as a backdrop, this thesis studies young people as they play casual games on their portable devices such as iPads, tablets, or smart phones. I noticed from my observations that young people fully immerse themselves in the imaginary worlds of casual games and ignore what is happening around them. I believe that this game play has a positive impact on today's young people, particularly in developing their technology skills and competence. In this sense, I perceive playing casual games as a significant approach to enhancing digital literacy because it has the potential to promote skills and competences in informal settings; for instance, playing casual games gives young people access to

gaming communities in which they can search for advice on advancing through games' different levels. Therefore, to identify other impacts of casual game play on enhancing digital literacy, it is crucial to explore young people's casual gaming activities and relate them to digital literacy.

1.3 Brunei Darussalam and the Need for Digital Literacy

Brunei Darussalam (henceforth called Brunei) is a small country with a population of 422,700, and is heavily dependent on the oil and gas industry for growth and stability. In Brunei, the education system is managed and administered by the Ministry of Education. The education system has a policy of providing each student a minimum of 12 years of education, which comprises of 7 years in primary education (includes 1 year of preschool) and 5 years in secondary education. Formal schooling begins at the preschool level at the age of five-years. Then, from the age of six-years onwards, students will follow 6 years of primary education, and then students proceed to 5 years at the secondary level. In addition to formal schooling, Muslim students must also attend religious school (year 1 to year 6), which is usually conducted in the afternoon.

Currently, there are 254 government (public) and private education institutions nationwide. Table 1-1 shows the number of educational institutions designated as either public or private schools. Public schools are

managed by the Ministry of Education, and private schools are managed by private organisations.

Table 1-1 Breakdown of educational institutions in Brunei (Ministry of Education, 2015)

Level of Education	Public	Private
Primary	118	73
Secondary	32	
Sixth Form	4	
Vocational Technical	7	3
Higher Education	4	2

The Ministry of Education realises the importance of educational institutions, which includes not only providing knowledge but also preparing students for the future after leaving school. There is a need to continue fine-tuning the education system to ensure that students are equipped with the relevant knowledge, skills, values and attitudes demanded in the 21st Century.

In address this situation, the Ministry has completed a major reform of the education system in Brunei. In 2009, a new education system called, *The National Education System for the 21st century* (henceforth called SPN21), was introduced. The main aims of the system were: to meet the social and economic challenges of the 21st century, to realise the Ministry of Education's vision (Quality Education Towards a Developed and Prosperous Nation), to satisfy the mission (Provide Holistic Education to Achieve Fullest Potential for All), and to equip students with 21st century skills (*sources* from the

Ministry of Education for SPN21). For SPN21, major changes have been made in three main areas, as illustrated in Table 1-2.

Table 1-2 Some Major Changes in SPN21

	Previous Education System	**SPN21**
Education System Structure – *changes made in Primary- and Secondary-level structure.*	*Class label:* *For Primary: Primary 1 to Primary 6.* *For Secondary: Form 1 to Form 5* *Exit Point:* *After Public exam at Form 3, students may join vocational and technical education.*	*Class label:* *For Primary: Year 1 to Year 6* *For Secondary: Year 7 to Year 11* *Exit point:* *Students are expected to proceed until Year 10 (4-year secondary programme) or until year 11 (5-year secondary programme), and then they can apply to vocational and technical education.*
Curriculum and Evaluation	*Normal curriculum subjects. Only upper secondary has core and complementary subjects.* *Conducting end of year examinations.*	*Emphasis on curriculum subject: Core subjects and complementary subjects depending on education levels. Students from every level have core and complementary subjects.* *In addition to end of year examination and public*

	Conducting Public examinations such as: GCE 'O' Level and GCE 'A' Level'. *No/less emphasis on developing of essential skills.*	*examination, three new school-based assessment:* *Student Progress Assessment, School-Based Assessment, and Student Progress Examination* *Emphasis on developing and enhancing essential skills, such as communication skills, numeracy and digital literacy.*
Technical Education	1. *National Vocational Certificate* 2. *National Trade Certificate 2* 3. *National Trade Certificate 3* 1. *Pre-National Diploma* 2. *National Diploma* 3. *Higher National Diploma*	*National Skill Certificate (Equivalent to National Diploma)* *This is a 3-year course inclusive of 6 months of industrial attachment.* *Diploma (equivalent to Higher National Diploma)* *This is a 3-year course inclusive of 6 months of industrial attachment.*

The need for digital literacy skills

In this education reform, one of the main aims of SPN21 is to equip students with 21st century skills, with emphasis on the development of digital literacy. To meet this aim, a strategy called 'e-Hijrah' has been developed by the

Ministry of Education to support the full integration and development of digital technology within the education system in Brunei. This strategy is a blueprint consisting of a 6-year tightly aligned plan (2011-2017), where execution and implementation of the plan are designed to establish all the necessary components towards the transformative use of digital technology in education (Brunei Report, 2013). It is designed to establish a culture of digital technology and build a foundation of digital technology services across the Ministry and all schools in Brunei (e-Hijrah blueprint, MOE 2010). According to the Ministry, e-Hijrah acts as a major catalyst in the transformation of education in Brunei to produce confident and capable students who are fortified with the knowledge and skills to be successful in digital technologies while retaining the traditional values and beliefs of Brunei. To meet the e-Hijrah objectives, the Ministry has recognised three actionable pathways, namely, *Whole school digital technology development*, *i-Services*, and *Foresight and Innovation*. These pathways act as the main thrust of digital technology projects and programmes that need to be implemented by the Ministry. Since 2011, several projects and programmes (as summarized in Table 1-3) have been conducted for each of these pathways.

Table 1-3 Summary of goals and corresponding projects for the three main pathways of e-Hijrah (sources from the Ministry of Education in Brunei)

Pathways	Goals	Projects	Project Descriptions
Whole school digital technology development	To develop processes, practices and skills of school leaders and teachers	Whole School Approach to Digital Technology Development (WSID)	A whole school approach – provide resource materials of digital technology to all schools. Bring your own device (BYOD) programme. In January 2014, 20 representative schools have been using a 'whole school approach' to implement and develop a culture of digital technology within the school.
		Leadership	On-going process of development programmes and training courses for school leaders on both digital technology strategic planning and building the right environment to foster digital technology.
		Media and in-Service Centre (MiSC).	In October 2013, a digital learning hub that supports digital technology development initiatives has been launched.
i-Services	To provide a range of automated or "e" information services that serve both	Integrated national education information system (iNEIS) Phase 1: Implementati	iNEIS is a management information system that covers all important information that is required in schools and the Ministry. Such information includes: attendance, enrolllment, assessment, and examination. iNEIS has been implemented and launched

	schools and the Ministry	on iNEIS Phase 2: Feasibility Study & Design	in January 2015.
Foresight and Innovation	To emphasise sustaining innovations, and provide continuous improvements.	1:1 Computing in Model Schools	Provide model schools with 1:1 professional learning programs and learning environment models to adopt emerging technologies into pedagogy practices. In August 2014, 5 model schools were identified to act as pilot schools where digital technology projects can be initiated and implemented.
		Interactive Technologies	Provide all schools with interactive technologies to support the innovative pedagogy practice.
		Special Education Access to Communication Learning Management (SALAM)	Equip the main Special Education Unit Resource Centre and Model Inclusive Schools with the appropriate 21st century technologies that can enhance teaching and learning.

As stated in Table 1-3, the Brunei government, through the Ministry of Education, has set their budget towards e-Hijrah projects in order to embed digital technology culture in schools and the education systems in Brunei. The initiatives of the Brunei government (Table 1-3) to maintain digital

culture in education systems have shown that there is a need to increase the digital literacy of young people.

1.4 Study Background

In keeping with the claim I made in Section 1.2, this study is underpinned by three distinct research disciplines, which I consider important contemporary areas that need exploring: the importance of digital literacy, the claim of young people as the digital generation, and the popularity of casual game play. Figure 1-1 shows the study framework that forms the main research question.

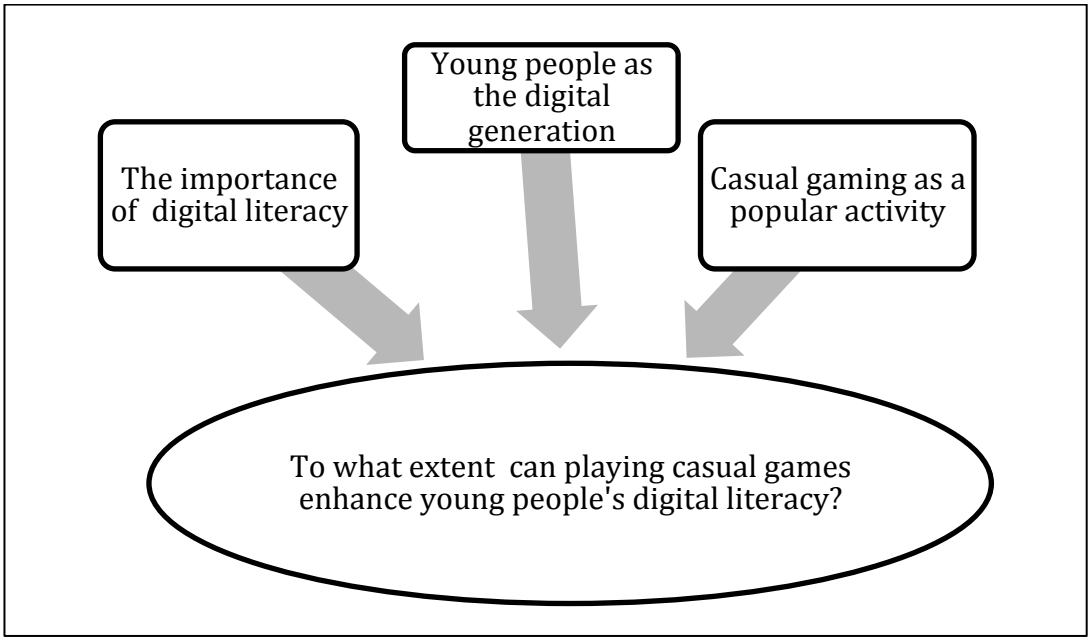


Figure 1-1. This study draws together the importance of digital literacy, young people as the digital generation, and the popularity of casual games

The first discipline is centred on the importance of digital literacy. With the current use of digital technologies in every aspect of life, digital literacy

acquisition is emphasised in educational institutions around the world. The recent increasing use of digital technology in everyday life is reflected in the paradigm shift in education of not only imparting traditional knowledge to young people but also developing their digital literacy skills. Therefore, education policy makers in countries and regions such as Singapore, the European Union, and the U.S. (Belshaw, 2012) as well in Brunei have begun to integrate digital technologies across curricula. With the incorporation of these technologies, young people will acquire the necessary digital literacy for functioning in the contemporary world. However, in this study, and with support from literature reviews (such as Gumulak & Webber, 2011; Prensky, 2006), I claim that digital literacy can also enhanced through playing casual games. The literature review is discussed further in Chapter 2, Section 2.1.

Casual game play is the second discipline that influenced this study. Strong evidence suggests that playing casual games outside of school settings is a popular activity amongst young people today. The fact that casual games are the most popular game category in recent years (Newzoo, 2012) offers the opportunity to exploit this popularity by investigating their potential to enhance digital literacy. The literature review in Chapter 2, Section 2.1.3 suggests that video games contribute to enhancing literacy skills. In addition, casual games are an emerging trend in the video game industry, and thus there has been little research on the subject in relation to digital literacy.

As seen in Figure 1-1, the third discipline focuses on the claims that today's young people are the digital generation. They have also been labelled digital natives (Prensky, 2001), the net generation (Tapscott, 2008), and the iGeneration (Rosen, 2010) because of their early exposure to digital technologies in everyday life. As stated in Section 1.1, informal exposure to digital technologies can help to develop digital literacy in young people. The claims of their being the so-called digital generation will be discussed further in Chapter 2, Section 2.2.

1.5 The Research Question

With the combination of the three disciplines discussed above, I consider it important to investigate young people's digital practices by focusing on their casual game play. Based on the three disciplines, the main research question of this study is as follows:

To what extent can playing casual games enhance young people's digital literacy?

As such, the study's purpose is to identify casual game play interactions that could affect digital literacy amongst young people and also to provide detailed descriptions of how digital literacy is enhanced through this game play.

1.6 The Conceptual Framework for the Study

Figure 1-2 shows the conceptual framework that combines all of the concepts that informed this study, including the three disciplines that formed the main research question above. In order to answer the research question, I examine young people's casual game play activities. In the figure, the triangle presents (Engeström, 1987) activity theory in the context of casual game play.

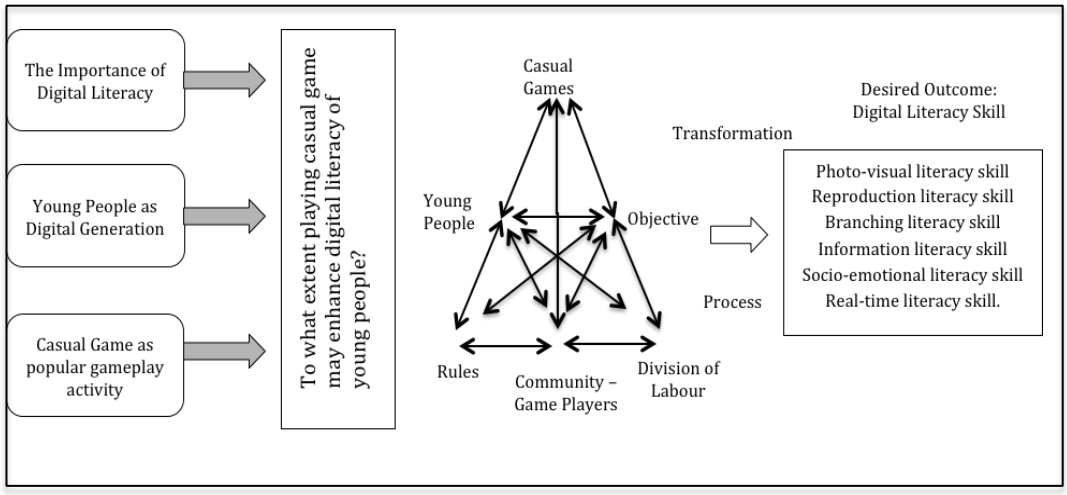


Figure 1-2 The Conceptual Framework for the Study

In order to investigate this game play, I conduct an instrumental case study of young people in Brunei aged between 10 and 12 years. Instrumental case studies focus on one issue (the main research question) and use a single case to discuss the issue. This approach was adopted because the study aim was to provide in-depth, detailed descriptions of young people's game play activities. With one-to-one methods, I used observations, think-aloud techniques, and interviews to collect information from participants.

The participants' game play was analysed using the hierarchy of activity theory (Kuutti, 1996) to examine the activities that could contribute to enhancing digital literacy; as shown in the Figure 1-2, this enhanced literacy is the desired outcome of activity theory as discussed in this study. Digital literacy comprises the six types of literacy listed in Eshet's (2012) conceptual framework for survival in the digital era: photo-visual, reproduction, branching, information, socio-emotional, and real-time. This subject will be discussed further in Chapter 4.

1.7 The Significance of the Study

This study is significant in a number of ways. This section discusses the study's significance for educators and researchers.

First, from the education perspective, the study will benefit primary and secondary school teachers because it explores the contemporary issue of digital literacy. Although this study focuses on enhancing digital literacy in informal settings, teachers may benefit from the enhancement process by adopting it as a guideline for adapting digital technology in classroom practices. It was stated earlier that digital literacy is important to young people in order for them to participate successfully in today's digital environment. Schools have become places that help young people to develop and enhance their digital literacy, and teachers are responsible for promoting students' digital participation by embedding digital technology in pedagogy

practices. In order to develop students' digital literacy, teachers are now aiming to integrate creative and critical ways to use digital technology across curricula. Therefore, this study might provide guidelines on how to enhance young people's digital literacy.

Secondly, and also from the education perspective, this study is also relevant to education policy makers and school leaders because it provides information about the potential of digital devices, specifically regarding casual games, that can be used and implemented across school curricula. Studies suggest that education policy makers and school leaders have begun implementing digital technologies across curricula to promote digital literacy among students, and their challenge is to find ways to adapt and modify the curricula and teaching practices to make room for digital technology in classrooms (Hague & Williamson, 2009). In the context of this challenge, this study is also useful for guiding policy makers and school leaders in implementing digital technology policies across curricula.

Thirdly, this study is also relevant to researchers who are specifically investigating the three disciplines of digital literacy, casual games and young people. These three disciplines make this study unique because they are contemporary issues that need to be studied. Furthermore, this study provides a number of methodological considerations that should be helpful for researchers who study game play activities. These considerations

highlight the importance of data collection that uses guided think-aloud questions that allow young people to openly discuss their game play activities. This study also highlights the importance of adopting the activity theory framework in analysing young people's game play. These methodological considerations might help researchers to minimise the shortcomings of their studies.

1.8 Thesis Structure

This thesis contains nine chapters in total, including this introduction. This section briefly summarises the contents of each chapter.

Chapter 1 introduces the contents of this thesis by the original motivation for the study. This chapter also provides the study's background, conceptual framework, and significance.

Chapter 2 sets a review of literature on the three disciplines of digital literacy, casual games and the digital generation. It begins with the concept of digital literacy and its importance to young people today. The second section of the chapter describes the references to today's youth as the digital generation, and the final section reviews the literature on casual games, a brief history of video games, and the relation of casual game and young people.

Chapter 3 describes the theoretical framework of this study. The study adopts the digital literacy model designed by Eshet to ground game play in a six-skill model. The chapter also describes the activity theory framework that assisted in analysing the data collected for the study.

Chapter 4 describes the study's research methodology, beginning with the philosophical assumption that informed the methodology. This chapter also describes the casual game titles that the participants played and how they were selected. In addition, the chapter describes the data collection and data analysis processes and explains a pilot study at the end.

Chapter 5 presents the first study findings, which relate to the research question: How can the interactions of young people with virtual game environment enhance digital literacy skills?

Chapter 6 presents the third set of findings, which focus on the social aspects of playing casual games. The chapter centres on the research question: *What kinds of interactions between young casual game players enhance their digital literacy?*

Chapter 7 presents a second set of findings that relate to the question: *How do young people's game play level completions enhance their digital literacy?* This question focuses on how young people complete—that is, their specific techniques and strategies—casual game levels.

Chapter 8 is the discussion chapter. The chapter compiles the above-referenced six facets of digital literacy and discusses how its enhancement occurs during casual game play using activity theory.

Chapter 9 concludes this thesis by highlighting its contributions to the existing knowledge base, including its limitations, and it also considers future directions for this research.

CHAPTER 2 LITERATURE REVIEW

A future where the computer will be a significant part of every child's life

(Papert, 1980, p. 18).

This chapter presents a review of literature in relation to three concepts that have influenced this study being developed. This study is grounded in the theories of digital literacy as one of the important skills in the present day of the digital environment. It is also based on the claims of young people having developed a certain degree of digital literacy due to regular exposure to digital technologies. In this study, digital technology focuses on the casual game play activity. I chose this activity because of the popularity of these games among young people. Therefore, this chapter provides a review of the research literature in relation to the above sentences, which are the theory of digital literacy, young people as a digital generation, and the casual game as digital technology.

2.1 Digital Literacy

Digital literacy is the focus area of this study. In order to study the digital literacy of young people, I must first define and understand the term "digital literacy". Since there are various definitions of digital literacy, which lead to

confusion, it is necessary to clarify exactly what is meant by digital literacy in this study. This section discusses how I decided to choose the definition of digital literacy, which is grounded in this study. I further discuss the importance of digital literacy, and its importance to young people.

2.1.1 Defining Digital Literacy

The term *digital literacy* has been widely used, and is often used interchangeably with other terms such as 21st Century Skills, Digital Competence (Ferrari, 2012), and Technology Fluency. Since there is a massive amount of literature on each term, I only focus on definitions that use the term *digital literacy*.

Digital literacy is a confused term. Some scholars of digital literacy (such as Bawden, 2008; Eshet, 2004; Lankshear & Knobel, 2006; Thompson, Jaeger, Taylor, Subramaniam, & Bertot, 2014) have argued that the term "digital literacy" is hard to define, and several attempts have been made to clarify the concept of digital literacy. Gillen and Barton (2010) state that digital literacy is a dynamic term, which keeps evolving, and is constantly updated in line with the contemporary usage of digital technology (Gillen & Barton, 2010). As a result, the concept is difficult to navigate due to overlapping definitions with new concepts of digital literacy.

The concept of digital literacy was first defined and popularised by Paul Gilster (1997). Gilster (1997) defines digital literacy with regard to the emergence of online information. During that period of the late 1990s, information was massively available through the Internet (Bawden, 2008). Concerned about the influx of information found on the Internet, Gilster (1997) argues that individuals must have basic thinking skills and core competencies in order to thrive in an interactive online environment. In line with the situation, he defines digital literacy as the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers (Gilster, 1997, p. 1). With digital literacy, individuals will be able to make critical judgments on the reliability and validity of digital information found in news groups, bulletin boards, and other online sources. He emphasises that digital literacy is a fundamental act of cognition and is important in the information age.

In his book entitled *Digital Literacy*, Gilster (1997) lists a set of core competencies of digital literacies for Internet use. The most essential one is the ability of evaluating information content; the second competency is to know how to navigate hypertext and hypermedia that link to other sources; the third one is the ability to assemble knowledge obtained from diverse online sources; the final competency is the ability of searching information through millions of pages of online information. Some researchers (such as Bawden, 2008; Gillen & Barton, 2010) signify Gilster's definition as the *softer*

skills of digital literacy, only focusing on the competencies of online information-seeking skill. With the definition only focusing on online information, it is not suitable to apply Gilster's definition of digital literacy to this study. This is because the aim of this study is to investigate digital literacy whilst playing casual games, in which the game play activities are more than information-seeking activities.

With regard to Gilster's definition of digital literacy, Lankshear and Knobel (2006) propose extending the term *digital literacy* to the plural form of *digital literacies*. They suggest that digital literacy should not just refer to one competency or skill, but rather to multiple ones. In line with their claims, Lankshear and Knobel (2006) define the term *digital literacy* as two main types: conceptual definition and standardised sets of operations. The conceptual definition is reflecting the definition given by Gilster (1997), which emphasised digital information. The second one is focusing more on the operational type of skill. They refer to standardised sets of operations as competences of individuals with tools and procedures in using digital technology.

The above definition suggests that it is not adequate for this study to define digital literacy as the above definitions, which are only focusing on online information and operational skill. It is also argued by Eshet (2002b) and Buckingham (2008) that digital technologies cannot be regarded as

information providers and as tools. Digital technologies serve various ways of mediating, communicating and entertaining. Therefore, it can be said that digital literacy is more than just these two aspects of digital literacy. Consequently, with a comprehensive definition, Eshet (2002b) refers to digital literacy as more than a simple ability to use software or operate a digital device: it also includes a large variety of complex cognitive, motor, sociological, and emotional skills, which users need in order to function effectively in digital environments (Eshet, 2004, p. 93). With this definition, Eshet (2002b) suggests that digital literacy involves a special kind of thinking skill — an assortment of cognitive-thinking strategies that individuals need to perform in digital environments. Based on his research study on high school students, college students and adults, Eshet (2004) concludes that digital literacy comprises five digital literacy skills: Photo-visual Literacy Skill, Reproduction Literacy Skill, Branching Literacy Skill, Information Literacy Skill, and Socio-emotional Literacy Skill. In addition to these literacy skills, Eshet-Alkalai (2008) added a sixth digital literacy skill: Real-Time Literacy Skill.

The concept of digital literacy is more confusing to define when several literatures on digital literacy have created their own definition of the term. For example, Futurelab, a non-profit UK-based organisation, provides definitions of digital literacy based on the digital literacy practices in

education (http://www.futurelab.org.uk). The next paragraphs provide a compilation of the definitions used by this organisation.

In one of their research studies, focusing on teacher and student experiences in school-based digital literacy intervention, Hague (2010) compiles educators' perceptions on the use of digital literacy concepts in schools. As a result of the compilation, the term "digital literacy" refers to a wide range of critical, creative and cultural practices that allow one to understand, make and share meaning and knowledge in different modes and formats through various forms of engagement with technology and media (Hague, 2010, p. 22).

Another definition is taken from the Futurelab handbook, which states that digital literacy refers to skills, knowledge and understanding that enable critical, creative, discerning and safe practices when engaging with digital technologies in all areas of life (Hague & Payton, 2010, p. 19). This definition reflects the purpose of this handbook to support teachers in beginning to think about how to address digital literacy in their everyday classroom practices.

Another handbook produced by FutureLab defines digital literacy as skills, knowledge and understanding that are required for digital participation (Hague & Williamson, 2009, p. 4). This handbook is a review document that provides a critical introduction to policies and research on the subjects of

digital literacy and digital participation, seeking to show what they mean for classroom practices.

A report from Grant (2010) refers to digital literacy as the ability of an individual to make sense of the content and artefacts of digital media and to understand what it means to use digital media and technologies, how they express their own meanings, and how they interpret and understand the meanings represented by others using digital media (Grant, 2010, p. 4). This report is based on the result of a research project focusing on the connection of digital literacy between a home and school. Grant (2010) mentioned in the report that her definition of digital literacy is based on the aims of the project, and is also different from the basic ability of operating digital technologies.

Based on the definitions stated above, it can be stated here that there are various definitions of digital literacy. The concept of digital literacy is bounded in the context or situation in which it has been used or defined. For example, Gilster's definition is focused on online information, because he was concerned about the influx of online information found on the Internet during that period. Meanwhile, Futurelab defined digital literacy based on the digital literacy practices in schools, centring on understanding and making meaning of the skills and knowledge when digital technology is used in classroom practices.

For the purpose of this study, I must consider playing casual games involving cognitive skill (Gee & Shaffer, 2010); thus, I choose the definition of digital literacy by Eshet (2002a; 2008). This is because (Eshet, 2002a) has created an extensive model of digital literacy that incorporates not only technical skills but also cognitive skills when using digital technologies. This model will be discussed further in Chapter 3 (Section 3.1).

2.1.2 Digital Literacy Models

Literature suggests that there are several digital literacy models. These models tend to emphasise different sets of skills, which depends on the context. For example, if we look at the digital literacy models designed by FutureLab and JISC, these two models are designed for educators to use these models as a framework to develop learners' digital literacy in the classroom.

Figure 2-1 shows the digital literacy model developed by FutureLab (Hague & Payton, 2010). FutureLab is non-profit organisation that is dedicated to transforming the teaching and learning processes, making it more relevant and engaging for 21st century learners using innovative practice and technology. Regarding the digital literacy model, aligning with the aim, FutureLab purposely designed the model for teachers to plan classroom activities with the aim of extending students' digital literacy (Hague & Payton, 2010). In this model, as shown in Figure 2-1, there are eight

components that refer to different dimensions of digital literacy. According to FutureLab (Hague & Payton, 2010), when digitally literate students find meaning in and make use of digital technology, they show the characteristics of functional skills, creativity, critical thinking and evaluation, cultural and social understanding, and collaboration as well as the ability to find and select information, effective communication, and e-safety.

With a similar purpose, Jisc (2011) has also developed a digital literacy model that can act as a framework for education to support students in developing new digital skills. JISC is a UK-based organisation that provides digital services and solutions to further higher education. One of their services is to provide guidelines for educators on how to develop digital literacy of students for higher education.

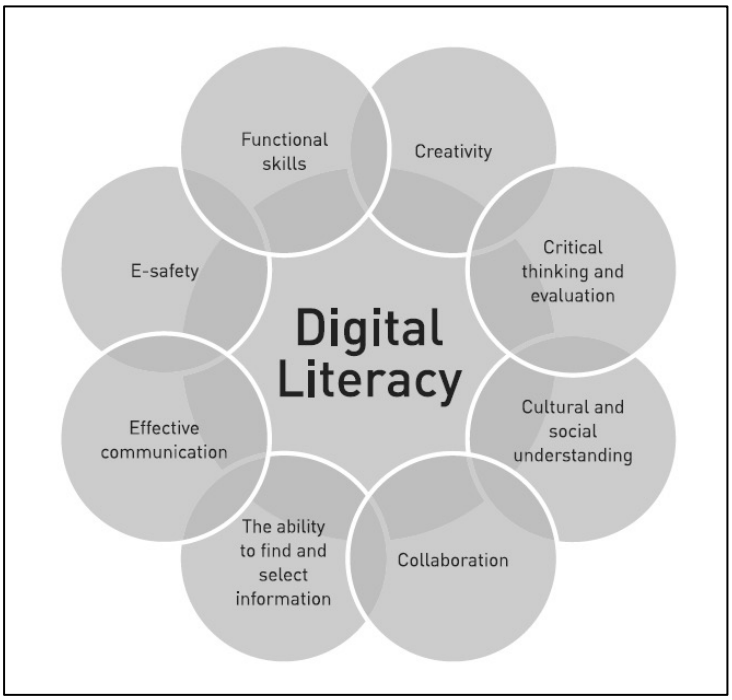


Figure 2-1 FutureLab Digital Literacy Model (taken from Hague & Payton, 2010)

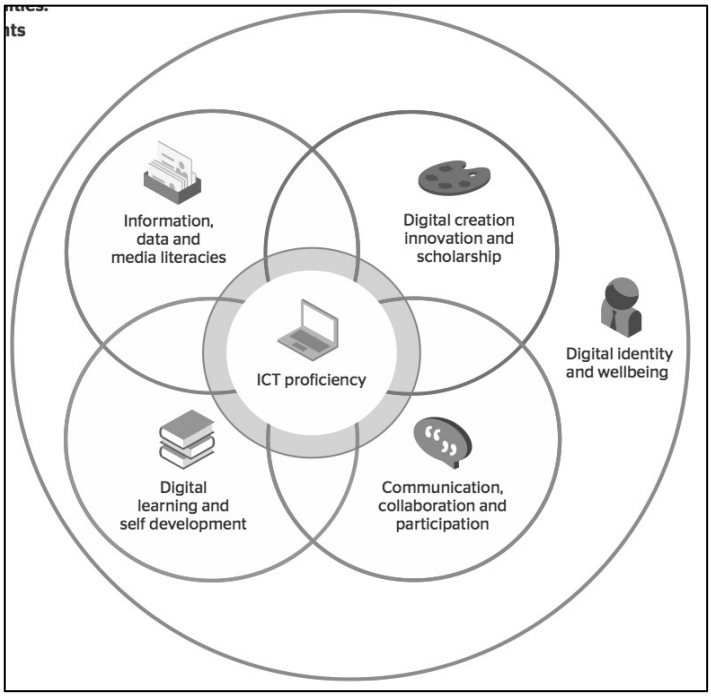


Figure 2-2 JISC Digital Literacy Model (taken from JISC Website https://www.jisc.ac.uk/blog/thriving-in-a-connected-age-digital-capability-and-digital-wellbeing-25-jun-2015

JISC's developed model, as shown in Figure 2-2, outlines seven elements of digital literacy, in which JISC believes that this model may help stakeholders of higher institutions build a shared understanding of how and what digital literacy skills might be developed, supported, and evaluated.

As shown in Figures 2-1 and 2-2, the listed components/elements are suitable for learners to develop these elements for learning purposes. For example, in the FutureLab model, creativity is the ability to involve generating novel ideas, to make connections between ideas, and to generate creative products. This type of skill is not a digital literacy skill because creativity is a skill that must be acquired to become an intelligent learner. Similar to the JISC model, elements such as digital creation innovation and scholarship are skills to become a good learner in a digital environment. Table 2-1 describes the definitions of the elements.

Table 2-1 Definitions of Digital Creation, Innovation, and Scholarship (JISC, 2015)

Digital creation	The capacity to design and/or create new digital artefacts and materials; digital writing; digital imaging; digital editing of images, video, and audio. At higher levels, the ability to code and design applications, games, virtual environments, and interfaces.
Digital research and scholarship	The capacity to collect and analyse research data using digital methods. At higher levels, to discover, develop, and share new ideas using digital tools; to undertake open scholarship; to design new research questions and programmes around digital issues/methods; to develop new digital tools/ processes; and to evaluate effects of digital interventions.
Digital innovation	The capacity to develop new practices with digital technology in organisational settings and in specialist subject areas (professional, vocational, and disciplinary); digital entrepreneurship. At higher levels, the ability to lead organisations, departments, teams, and practice/subject areas in new directions in response to digital challenges and opportunities.

Referring to the FutureLab model and JISC model, although they provide comprehensive frameworks for educators to support the development of the digital literacy of their students in the classroom, these models are suitable as frameworks in the context of school settings rather than in playing casual games, as this study reviews.

As stated in the previous section (Section 2.1.1), I utilised Eshet's definition to define the term *digital literacy* for the purpose of this study, and I also used Eshet' model (2004, 2012) as a framework of this study. The Eshet model is called the conceptual framework for survival skills in the digital era. This model consists of six digital literacy skills: photo-visual literacy skills, reproduction literacy skills, branching literacy skills, information literacy skills, socio-emotional literacy skills, and real-time literacy skills (further discussion in Chapter 3), in which these six skills, as argued by Eshet, are the survival skills that individuals need to function effectively in a digital environment.

As stated by Eshet (2002a), this model was derived and strengthened from a series of research studies done with his colleagues. This is one reason for me to select this model. This shows that this model will provide a powerful framework and guidelines. Another reason for selecting Eshet's model is due to the six skills that are suitable to act as a framework to study the game-play activities. For example, real-time literacy refers to the ability of users to

perform effectively in advanced digital environments (Eshet, 2012, p. 271). According to Eshet, this skill specifically refers to the advanced digital environments, including high-tech machines, multimedia games, and multimedia training environment

2.1.3 The Importance of Digital Literacy

Now that I have a definition of digital literacy, I can consider this definition to be related to its importance. This is because this definition refers to a set of *survival skills* (Eshet, 2012) for individuals to use in order to perform effectively in a digital environment. The proliferation of digital technologies in the world of education, workforce, economy and cultures has contributed to the importance of digital literacy. One important reason is the higher demand of employers in recruiting digitally literate employees. Workforces now demand individuals who not only are knowledgeable, but also have digital literacy skills. This is not just needed in high-ranking jobs, as technology has become cheaper and more readily available; more blue-collar jobs also require digital literacy. This reason is related to economic motives stated by Sefton-Green, Nixon, and Erstad (2009). Economic motives refer to the production of a digitally literate population stemming from an interest in reconfiguring schools and higher education institutions for the knowledge economy of new times (Sefton-Green et al., 2009, p. 108).

The importance of digital literacy also relates to inclusions and access issues, in which Sefton-Green et al. (2009) relate inclusions and access issues to civic aspirations. Civic aspirations concern the view that an individual needs to be able to participate in technologically mediated forms of public life (Sefton-Green et al., 2009, p. 108). If we are not familiar and do not understand digital technology, there will be restrictions in our ability to progress further. It has been declared by Jeffrey et al. (2011)that a lack of familiarity with digital tools, their terminologies, and the common procedures on the use of digital tools has limited the ability of an individual to identify solutions and to navigate the digital environment. This is based on their findings on the investigation of the obstacles that hindered students' abilities to develop their technology-related skills. Since we are now living in a world operated and governed by technology, with digital literacy, an individual will have difficulties in moving forward (Ng, 2012).

Based on economic motives and civic aspirations, to young people, being digitally literate at a young age is very important. As mentioned by Hague and Payton (2010), the skills, knowledge and understanding of digital literacy are becoming essential to young people as they grow up in a society in which digital technology and media play an ever more important role. As new technologies and media are used more and more in teaching and learning, as well as in the home and throughout social life, young people need to develop more than just their ICT skills; they need a broad digital

awareness of the wider context in which technologies and media operate to wrap around these skills so that they can participate in this increasingly digital world (Hague & Williamson, 2009).

The importance of being digitally literate has made education institutions integrate the use of digital technology across all school subjects. Almost every country's education policymakers, such as Singapore, Norway, Australia, the European Union, and the USA (Belshaw, 2012), have made a few changes to their education system to give space to the practices of technology integration across the curriculum in order for digital literacy to develop through teaching and learning processes. In Brunei, for example, one of the reasons to make major transformations in the education system is to produce knowledgeable and digitally literate citizens in order to compete in modern society (Ministry of Education Brunei, 2012).

However, in the past 20 years there has been a significant difference between young people's digital technology use outside and inside school. There is increasing recognition that young people can have very different configurations of skills and knowledge in an informal setting. According to Hague and Payton (2011), young people arrive at school with an existing knowledge and experience of digital media that they obtained outside school. It has been stated by some authors (such as Ito et al., 2008; Sefton-Green et al., 2009) that practices of digital technologies in an informal setting,

such as at home, are different from the practices in a formal setting, e.g. schools.

Although digital literacy can be taught (Ng, 2012) and developed in formal education, it may also be developed in informal settings (Ito et al., 2008). In line with the claims of young people being more exposed to technology outside school, I have selected playing casual games as digital technology.

2.1.4 Video Games and Literacy

Playing video games is not a waste of time (Gee, 2003) because whenever one plays a game and whatever game one plays, learning happens constantly, whether the players want it to and are aware of it or not (Prensky, 2004, p. 1). As a result, regarding video games and learning processes, several dominant theories (for example J. P. Gee, 2003; Prensky, 2006; Shaffer, 2006; Squire, 2004; Steinkuehler, Squire, & Barab, 2012) to support the educational use of games have driven this study to research the effect of video games on the development of the digital literacy skills of players.

I will consider research studies that relate to playing video games and literacy. Literacy will encompass literacy skills that relate to digital technology skills, such as information literacy, visual literacy, and computer skills.

It has been stated that playing video games has positive effects on players. One of them is developing literacy skills. In a research study on a video game called *Lineage* (a massively multiplayer online game), Steinkuehler (2007) has identified when children and young people play digital games, they participate in a *constellation of literacy practices*. Her findings were based on the two-year participant observation study, with interviews and discussions on the literacy practices associated with playing *Lineage*.

The constellation of literacy practices comprises *within-game literacy practice* and *beyond game literacy process*. According to Steinkuehler (2007), based on the contemporary view of literacy, the *within-game literacy practice* refers to *reading* within the complex of the semiotic domain of the game world, *recognising* and *producing* the meaning of multimedia and multimodal resources that make up the game. Players need to understand the following different elements to make meaning: sound, images, words, actions, symbols, colour, and the like, singly or in combination (Beavis, 2012b). Several studies (such as Castel, Pratt, & Drummond, 2005; Green & Bavelier, 2003) have confirmed that game players demonstrate that they were better at understanding the meaning of the multimodal resources of video games. Green and Bavelier (2003) compared the visual skills of video game players and non-video game players and concluded that the video game players are better at understanding information provided by the elements in the game environment.

For activities that go beyond game literacy practice, Steinkuehler (2007) referred to reading activities using discussion boards, accessing walkthroughs, using cheat codes, and reading game reviews. This practice is called metagaming, which refers to common literacy practices for game communities of all forms in which participants theorise their own game, both within the virtual environment of the game world itself and beyond it in the online fandom space (e.g., websites, discussion forums, chatrooms, blogs, wikis, and sundry other online text) that has enveloped every successful title to date (Steinkuehler, 2007, p. 196). From her study, the participants read through these textual sources to obtain information about *Lineage*. Even though Steinkuehler (2007) did not mention how game players evaluated the online information, the findings can be used as evidence that playing video games has an effect on the development of information literacy skills. From the study, Steinkuehler (2007) found that the popular sources of the activities were on the Internet, even though these activities can be found in printed materials.

Gumulak and Webber (2011) also found that their participants interacted with a variety of textual sources to solve gaming problems. Their findings were based on interviewing young people between 11 and 15 years old. In regards to solving problems in video games, their participants were discovering information and applying it.

Regarding computer literacy, which is more focused on the technical aspects of computers, one cross-sectional research study conducted by Appel (2012) on 200 adolescents aimed to examine the relationship between adolescents' computer and Internet activities and computer literacy. In this study, Appel (2012) defined computer literacy as the knowledge, skills, and attitudes needed by all citizens to be able to deal with computer technology in their daily lives. According to the study, the relationship between playing computer games and computer literacy is positive. The time spent with video games on the computer was associated with an increase in computer knowledge, both practical and theoretical (Appel, 2012). In other words, individuals who are heavy users of computer games and social media might have the potential become computer literate.

Based on the research studies mentioned in this section, there is a gap in research studies based on *how* digital literacy skills are developed/enhanced through game-play activities. Steinkuehler (2007) conducted a comprehensive study on literacy and the video game *Lineage*; however, her study only focused on literacy in the reading context, not in holistic terms of digital literacy. From the literature, this study will therefore address this gap by investigating the relationship of game-play activities with the enhancement of digital literacy skills in a detailed investigation.

2.2 Young People as Digital Generation

Digital technology is always intertwined with the existence of a digital generation. The view of young people as high users of digital technology has been proliferated popularly by researchers and scholars, who refer to these as the digital generation. This section discusses the young generation being labelled as pervasive users of digital technology.

2.2.1 Claims on Young People as a Digital Generation

There are many claims that young people in the present day are a digital type of generation. These young people, for as long as they can remember, have been surrounded by dynamic digital technologies and practices that impact on their daily life. They have different characteristics from prior generations, e.g. being a multitasker, always connected digitally, loving the quick response or feedback, and that they are also visual and kinesthetic learners (Oblinger, 2003; Prensky, 2001; Rosen, 2010; Tapscott, 1998). In addition, this young generation is the generation who has grown up surrounded by digital technology, and has become a comfortable user of this technology.

With regard to this phenomenon, scholars have labelled this young generation with different names, such as the Net Generation (Tapscott, 1998), Digital Native (Prensky, 2001), and iGeneration (Rosen, 2010). Although the terms are different, they serve a similar purpose: highlight the impact of digital technologies within the lives of young people (Helsper & Eynon, 2010). To my knowledge, Net Generation and Digital Native are two common terms used by scholars, educators and researchers to describe the digital generation, either to oppose or to support the claims. The iGeneration, which was coined by Rosen (2010), is a new term which refers to a new type of young generation.

The Net Generation, according to Tapscott (1998), refers to people who were born between the years of 1977 and 1997. This generation is the first generation to grow up surrounded by digital technology and interactive media such as the Internet, CD-ROM and video games. As for Prensky (2001), he argues that Digital Native is an appropriate description of the generation who are all native speakers of the language of digital technologies such as computers, video games or the Internet. The so-called Digital Native generation was born between the years of 1980 (when social digital technologies such as Usenet and bulletin board systems came online) and 1994 (Palfrey & Gasser, 2013).

The next young generation of Digital Natives born between 1995 and the new millennium is called the iGeneration. This current digital generation was named by Rosen (2010) with regard to the rise in portable technologies. Based on his research study on more than 1500 parents, he confirms that these young people used portable technologies at a younger age than their older brothers and sisters. The iGeneration is based on the term "*individualised generation*", for which the letter 'i' stands. The term "individualised" refers basically to customisation, in which technology devices used by these young people are customised and individualised to their own preferences, e.g. choice of music, applications, pictures and videos.

Although the claims on young people as a digital generation have been questioned and debated by certain scholars (Bennett, Maton, & Kervin, 2008; Brown & Czerniewicz, 2010), it has had a significant impact on education practice.

2.2.2 Critical evaluation of the notion

Although many terms have been introduced to label the young generation today (as stated in Section 2.2.1), the term *digital native* has been widely used in numerous articles of arguments and discussions. One reason might be due to the common-sense appeal of the descriptions of the term (Bennett et al., 2008; Kennedy, Judd, Dalgarno, & Waycott, 2010; White & Le Cornu, 2011). The description is easily defined by Prensky (2001) by indicating the

differences from the prior generation, called digital immigrants. According to Prensky (2001), the prior generations are considered digital immigrants, generations who were not born into the digital world but later became adapted to new technologies. Alternatively, digital native refers to the generation born roughly between 1980 (the year the personal computer was introduced) and 1994, who are immersed in digital technology. The excessive amount of access to the digital technologies makes them different from older folks. Due to the extensive exposure to digital technology, these young people behave differently, learn differently, communicate in differently, and have different characteristics. Bennet, Matton, and Kervin (2008) stated the claim of digital native has been asserted without any empirical evidence. This makes the value in classifying using age characteristics questionable (Kennedy et al., 2010). According to Helsper and Eynon (2010), generation alone does not adequately define whether someone is a digital native. There is a range of factors involved, such as the degree of Internet and technology usage.

Many commentators (such as Bennett et al., 2008; Brown & Czerniewicz, 2010; White & Le Cornu, 2011) rejected the idea of classification by generation. Brown and Czerniewicz (2010) stated that the labels *digital native* and *digital immigrants* make the concept very specific to respective age generations, which makes it difficult because, if a person falls into one category, the person will just stay in this category. As stated by Bayne and

Ross (2011), the immigrant will stay an immigrant and can never become a digital native.

Due to the debate on age-related labelling, White and Le Cornu (2011) suggested *visitors* and *residents* as the replacement terms for digital native and digital immigrants. Unlike digital native and digital immigrant, visitors and residents are understood as a continuum rather than as a binary opposition. This typology is based on the metaphor of place and tool, and according to White and Le Cornu (2011), people act differently when using technology, depending on their motivation and context. The terms *visitors* and *residents* describe the range of ways individuals can engage with the web. The term *visitor*s describes individuals who decide to go the web to do tasks they wish to undertake. Visitors see websites as tools, which may help them do tasks. They just *visit* the web to do any tasks they want to do. One example is when individuals wish to find information regarding Angry Birds; they use the search engine and go to the *Angry Bird* website and then go offline and/or move on to another task. For residents, the individuals go online to *stay* connected. They see the web as a place for them to stay and do social activities with other people. As stated by White and Le Cornu (2011), residents do online activities for social interaction, and to communicate with the online community. These online activities could be blogging and communicating using Facebook.

2.2.3 Young Generation and Digital Technology

Now, let us focus on the use of digital technology of young people. This literature review is predominantly based on three quantitative studies by Rosen (2010), the MacArthur Foundations Report and EU Kids Online (Livingstone et al., 2011). In addition, some minor research studies will also be mentioned here to support the evidences. All of these studies are using young people as research participants. Although the contexts are not in Brunei, they statistically show that the young generation use technologies in their everyday life.

Portable Technologies

EU Kids Online (Livingstone et al., 2011) showed that going online is now thoroughly embedded in children's daily lives. A study released by this research organisation, based on 25,000 children aged between 9 and 16 years (for 25 countries), on online usage offers some interesting insight. One interesting finding is that Internet usage by these young people is increasingly individualised, privatised and mobile: 49% go online in their bedroom, and 33% go online via a mobile phone or handheld device. From Rosen's study on more than 1500 parents of young people, Rosen (2010) also mentioned that many children have their media at hand in the bedroom: 38% of parents (of 6-month-olds to 4-year-olds) admitted that their child has a television in the bedroom; two thirds to three quarters of the 5–12-year-olds

do as well (Rosen, 2010). Both findings from Rosen (2010) and EU Kids Online (2011) show that the technologies are right in front of the children and can be easily accessed by them.

The use of mobile phones is more than just texting and talking, as they are also using the mobile phone for connecting to the Internet for activities such as blogging and connecting to social networks, e.g. *Facebook*, *Myspace* and *Twitter* (Rosen, 2010). The i-technologies, such as the iPhone, iPod, and iPad, and other portable technologies, e.g. tablets and smartphones, make the Internet more easily accessible. These technologies offer all sorts of attractive features and applications that make the users use the Internet via a mobile phone, rather than a computer, more often. According to AdMob (mobile advertising platform), 40% of more than 7000 iPod and iPhone US users reported using the Internet on their mobile device more often than using the Internet from their computers or listening to the radio (Loechner, 2009).

Social Networking

One of the common online activities in which most young people partake is communicating and interacting with their friends through social networking. Social networking sites make it possible for them to interact and communicate with their peers from all over the world. The following are percentages reported by four studies on young people using social networking sites:

Based on Luckin et al. (2009): 79% of 2611 respondents (UK students) have at least one account on a social networking site, such as *Myspace* or *Facebook*.

Based on Rosen (2010): Nearly all of the 266 *Myspace* respondents have at least one social networking profile; most of them have two or more social networking profiles. From the 266 respondents, 89% of them spent at least one to two hours per day on social networking sites.

Based on a MacArthur Foundations Report Flanagin, Metzger, and Hartsell (2010): Nearly all of the 2747 respondents (American children aged 11 to 18 years) said that social networking is one of the most common activities conducted when they are connected to the Internet.

Based on EU Kids Online (Livingstone et al., 2011): 59% of the 25,000 respondents (European countries) between the ages of 9 and 16 years use social networking to communicate and interact with their friends.

Looking at the above percentages, social networking is the most common activity when connected to the Internet. Although most of the social networking sites require individuals to be at least 13 years old, according to the *Guardian* (7th August 2008), based on *Garlik* (online identity experts company), almost 25% of children between the ages of 8 and 12 years are evading the age restrictions imposed by social networking sites such as *Facebook*, *Bebo* and *Myspace*.

According to recent statistics announced officially by *Facebook* (quoted from *KozMedia News* on 25th March 2011), there are at least 20,000 underage users online per day, and most users on *Facebook* are not actually older than the minimum age of 13 years. The number of underage users with online accounts may be even higher, as there are millions of underage *Facebook* accounts that are not known to *Facebook* staff.

What are the kinds of activities in which young people take part when they are connected to social networking sites? When they are online, communication is still key. They are IMing (Instant Messaging) 3–4 friends simultaneously and use their social network to broadcast their life updates, thoughts, feelings and social plans to dozens of friends at the same time (Rosen, 2010). The survey study made by Luckin et al. (2009) also supported Rosen's claims: most of the respondents participated in picture and video sharing, and interacting and keeping in touch with friends; in addition, they are also using social networking for swapping ideas on their schoolwork/homework.

Because of these social networking activities, young people are labelled as collaborators (Luckin et al., 2009), whereby they are discussing topics of their interests on these social networking sites (Luckin et al., 2009; Rosen, 2010). Young people are characterised as content creators, whether it be in the form of photos, music, videos or producing and publishing text-based content,

such as posting statuses and discussion topics on their social networking sites.

Online Information Seeking

According to Rosen (2010), the MacArthur Foundations Report (Flanagin et al., 2010) and Luckin et al. (2009), for seeking information, most children use *Wikipedia* as the primary website for their schoolwork/homework. These young people commonly use the Web to support not only their schoolwork, but also personal interests and inquiries. Apart from *Wikipedia*, they also use search engines such as *Google*. Based on this online searching, young people are identified as researchers of retrieving information and extending their knowledge base (Luckin et al., 2009).

Video and Audio Online Entertainment

Another common online activity involves watching and downloading music, movies and video clips. There are many websites that allow the uploading and downloading of such entertainment. The MacArthur Foundation Reports (Flanagin et al., 2010) stated that most of the children in their research study use the Web for watching videos. EU Kids Online (Livingstone, Haddon, Gorzig, & Olafsson, 2011) mentioned in their report that about 86% of children watch video clips online (e.g. *YouTube*).

2.2.4 Claims on Young People as Digitally Literate

With the extensive use of technology by young people, it has been claimed that they have obtained a certain degree of digital literacy (Oblinger & Oblinger, 2005). This is also supported by Hague and Payton (2011), as they claim that, having grown up with regular exposure to digital technology, young people have a wealth of digital technology skills. There is no doubt that young people are high users of technology. Research studies on the digital generation (e.g., Jones, Ramanau, Cross, & Healing, 2010; Kumar, 2012) show that young people are active users of technology. Several research studies (Flanagin et al., 2010; Rosen, 2010) prove that young people who communicate and interact with their friends through social networking partake in online information seeking, uploading and downloading videos and audios, and gaming. Some research studies (Helsper & Eynon, 2010; Kumar, 2012) support the notion that these digital generations tend to be comfortable, high users of technology. Having grown up with technology, this generation can intuitively use a variety of digital devices and may develop digital literacy (Oblinger, 2003).

However, it is unclear as to the truth of the claim made about the young generation being digitally literate. We cannot assume that just because young people have grown up with digital technology that they have digital literacy. Jones and Shao (2011) stated that, in relation to students in higher education,

technological context does not translate in any simple way to a generational change in attitudes and skill levels related to technology. This statement was based on their findings from the compilation of empirical research done by researchers from several countries, such as the UK, USA, Europe, Australia, and China. The empirical research focused on the implication of next generation and digital natives for higher education. Boyd (2014) also stated that, although the digital generation is engaged with technology, their ability in interpreting and analysing digital content is not developed automatically; they need to be taught.

2.3 Casual Games

A casual game has been regarded by the Entertainment Software Association (ESA) as one category in the video game industry (http://www.theesa.com). It is a new revolution of video games, which has appeared as one popular category in the recent video market. The *International Game Developers Association (IGDA)* describes casual games as video games that are developed for the mass consumer, and even for those who would not normally regard themselves as a hard-core gamer (IGDA, 2009).

This section further discusses the casual game, its definition and its relation to this study. Its features contribute to its popularity, causing this study to

choose casual games as the game play activities that may contribute to the digital literacy skill.

2.3.1 Brief History of Video Game

The history of video games started in 1952 when A.S Douglas created the first graphical computer game – a version of *Tic-Tac-Toe* (excerpt from http://inventors.about.com). This video game was played as programmed on a vacuum-tube computer, which had a cathode ray tube display. Since then, a few video games titles, such as *Tennis for Two, Space War, Chase,* had been created but they were not on the market.

Then in 1972, the first video game console was placed on the market by Magnavox called *Magnavox Odyssey*. However, this video game faced its downfall since it only worked with Magnavox Televisions 5 (www.time.com). In 1975, a well-known company called Atari released its home video game console called *Pong,* which became the company's first big hit. Then Atari produced a cartridge-based system called Stella, which played multiple games.

Since then, the world of video games has continued to evolve from the birth of *Atari to Mattel, Sega, Nintendo, Xbox* and *PlayStatio*n. This phenomenon happened between the year 1970s to 1990s, with the production of well-known video game titles, such as *Super Mario Bros, Metroid, The Legend of*

*Zelda, Final Fantasy, Donkey Kong, Tetris and Street Fighter*6. The sales of video game entertainment systems also begin to skyrocket.

Then video games evolved from playing on a console to handheld video game consoles. In 1989, Nintendo introduced the first major portable game console called Game Boy which came packed with a *Tetris* game, and which later underwent several modifications, including Game Boy Pocket in 1996 and Game Boy Colour in 1998. With the birth of Game Boy, portable games become popular with video game companies having created their own hand held consoles, such as *Game and Watch to Nintendo DS* (Nintendo) and *PSP* (Playstation).

Video games then developed from video game console and portable to online gaming. Online games are becoming more widely used since their emergence as multi-user dungeons / dimensions (MUDs) in the 1980s (de Freitas, 2006). And later, online games got more popular with the start of Massively Multiplayer Online Role-Playing Game (henceforth called MMORPG). This type of video game is capable of supporting large number of players at one time. With the use of Internet, gamers can play simultaneously with other players from all over the world as game-mates or opponents. Such popular MMORPG video game titles are *World of Warcraft* and *Final Fantasy*.

With modern sophisticated technologies, it was around the beginning of the millennium year that the immersive type of video game began to attract more players. With stunning 3D visual environments, surround sounds and interactivity increasing the satisfaction of people playing video games. Due the popularity of immersive type of video games, companies such as Nintendo, Microsoft and Sony have produced their own video game consoles called *Wii, Xbox and PlayStation* that allow players to immerse in the virtual world of video game. *Sims, Civilisation, World of Warcraft and Grand Theft Auto* are some popular video game titles that have been designed by third-party video game companies and that can be played on *Wii, Xbox and PlayStation.*

And now, more recently in 2009 to 2010, all three consoles had expanded to include add-ons, such as the *MotionPlus for Wii*, *Kinect for Xbox 360* and *Move for Playstation 3*. These add-ons similarly involve the capability to sense physical motion accurately, enhancing the interactive experience for players.

Aside from arcade and console games, computer and mobile games are another type of popular gaming platforms nowadays. The new wave of video games called casual games are video games played on smart phone or tablet, that have become popular to not just avid gamers, but also to individuals who did not play video games before. The start of casual gaming

began in 1990 when Microsoft started bundling Windows Solitaire with Windows (Cheng, 2011)

Then casual games evolved from playing on the computer to portable digital technologies. And now with the availability of powerful mobile computing devices combined with growing bandwidth in mobile networks enables (Froschauer et al., 2012), players can play casual games everywhere. Some well-known video game titles are *Angry Bird, Farmville, Diner Dash, Plant Vs Zombie City Ville, Bejewelled and Cooking Mama*. And now, because of the popularity of social networks, like Facebook, casual games have integrated a sharing mechanic to the form of being able to easily share your high scores and these integrations have made the casual game become more increasingly played.

With the popularity of casual gaming nowadays, this proposed study has selected this type of game as the research tool. From this proposed study's perspective, casual games refer to any video game applications played using portable devices, such as tablets and smartphones. However, the term casual game is not just a video game that can be played in such portable devices; it can also be played on all kinds of gaming platforms, such as consoles, handheld video game devices and the computer via the Internet.

2.3.2 Defining Casual Games

Defining casual games is confusing (Kuittinen, Kultima, Niemelä, & Paavilainen, 2007). This has also been stated by Chiapello (2013), in which he argues that there are no satisfactory definitions of the term "casual games". Although the definitions of casual games are confusing (Chiapello, 2013; Kultima, 2009), they have similar terms in describing casual games. One common term used by game associations and casual game researchers is "simplicity in design". The Casual Games Association (CGA) mentions that a casual game is designed in such a way that it is easy to learn and play (http://www.cga.global). It has been designed with minimal elements and user-friendly interfaces that make it easier for a player to get into the game as quickly as possible (Kultima, 2009). Juul (2010) refers to this feature as *usability*, in which a player, on the first play, may understand how to play the game and be able to play with little knowledge of game conventions. Cheng (2011) also states that due to the simple design of casual games, players do not require previous special video game skills and expertise on playing video games.

Casual games are agnostic, which means that this type of video game can be played via any game platform, such as a handheld video game device, video game console and also other digital personal devices, e.g. personal computer (PC), smartphone and tablet (http://www.cga.global). Since it can be played

using any gaming platform and portable technology, it can be defined as a game with a low barrier to entry, which can be enjoyed in short increments (IGDA, 2009).

2.3.3 Casual Games and Young Generation

Due to the features being easy to use, which can be played with portable technologies, playing casual games has become one popular activity. According to a report done by Newzoo Market Research (2014), the growth of casual gaming activities is continuing all around the world. The report states that there is an increase of revenue of casual games to 42% compared to the year before. This indicates that it will continue to grow.

A quantitative research study by *PopCap* and *Goldsmiths University* (2011) amongst 3250 parents and grandparents with children or grandchildren under 16 in the UK, in relation to family bonding while playing casual games, showed that the growth in casual games has resulted in children as young as two becoming proficient in the use of smartphones and other tablet devices, and over a quarter of parents (27 per cent) reported that their children borrow their smartphones every day to play casual games (http://www.bizjournals.com). Parents allowing their children to play casual games is a normal phenomenon.

The latest study done by the Casual Games Association (CGA) on an international sample of casual gaming families (1000 parents who have children ages 2 to 13 who play casual games at least weekly) (CGA, 2013, p. 3) has reported that about half of the kids in their study have access to portable devices which are used for gaming. This report, though not clearly mentioned, proved that all young people in this study played casual games on a weekly basis. A recent study in the UK (Internet Advertising Bureau, 2014) reported that in gaming time, young people aged 8 to 15 years play the longest compared to other age groups (http://www.iabuk.net).

2.4 Summary

In this chapter, I have reviewed literature on the three disciplines of digital literacy, digital generation, and casual games, which influenced me to study the enhancement of digital literacy in the form of young people playing casual games. The literature states that it is important for young people to possess digital literacy skill in order to become a digital citizenship. As digital technology is in use in every aspect of our lives, being digitally literate is important to avoid inclusion and access issues.

The claim of young people being digitally literate due to the constant exposure to digital technology in informal settings has driven me to examine whether playing casual games provides a positive relationship with digital

literacy. The recent trend of casual gaming and the popularity of casual games have also influenced how this study selected these game play activities to be investigated.

CHAPTER 3 THEORETICAL FRAMEWORKS: DIGITAL LITERACY AND ACTIVITY THEORY

As stated in Chapter 1, this thesis aims to investigate the game play activities of young people that have the potential to enhance their digital literacy. In this study, I adopted two models that acted as theoretical frameworks for the study. The first section of this chapter describes the digital literacy framework created by Eshet (2012), and the next section explains Engeström (1987) activity theory. The chapter also describes the purpose of the two study frameworks.

3.1 Digital Literacy Framework

As mentioned in Chapter 2, I selected one definition of digital literacy for this study, that provided by Eshet (2004), who referred to digital literacy as a holistic approach to users' abilities to perform tasks in digital environments. It involves not just the ability to use software or operate a digital device but also a large variety of complex cognitive, motor, sociological, and emotional skills that users need in order to function effectively (Eshet, 2004). One of the reasons I selected this definition was the attachment of cognitive skills; Eshet (2002b) argues that digital literacy comprises a special mind-set and special thinking skills that users need to execute tasks or activities in digital environments. I argue that when using digital technology, particularly in

playing casual games, the activities require not just technical game-playing skills but also the ability to think through how to execute tasks and solve problems.

In response to the confusion regarding a definition of digital literacy, Eshet (2004, 2012) created a model called the conceptual framework for survival skills in the digital era. The model comprises six digital literacy skills: photo-visual, reproduction, information, socio-emotional, branching, and real-time. According to Eshet (2012), these six skills are necessary for users to survive in the digital world.

This model was derived and strengthened from a serious of research studies done by Eshet (2002b) and his colleagues. In his initial study, Eshet (2002b) investigated a proposed digital literacy framework using three groups of participants: high school students, college students, and adults. In order to investigate the framework, Eshet (2002b) asked the participants to perform prepared tasks that required them to use different kinds of digital literacy. The tasks were designed to address five of the original digital literacy skills from his proposed framework: photo-visual, reproduction, information, socio-emotional, and branching. The study found that the proposed framework contributed to more deeply understanding how the study's participants worked in digital environments. Thus, the conceptual framework for survival skills in the digital era emerged.

According to Aviram and Eshet-Alkalai (2006), this model was validated in two studies, by Eshet-Alkali and Amichai-Hamburger (2004) and Eshet-Alkalai and Chaiut (2005), that tested the different users' performances on digital environment tasks that required digital literacy skills. Based on the findings, Aviram and Eshet-Alkalai (2006) determined that further testing of the model improved the understanding of digital literacy and provided researchers with a powerful framework and guidelines.

However, according to Eshet-Alkalai (2008), this model has been debated and questioned regarding its validity by instructional technology designers, researchers, and educators. They stated that this model failed to incorporate real-time thinking skills, but with the addition of that skill, the framework covered the full scope of today's necessary digital literacy skills.

3.1.1 Digital Literacy Skills

As described earlier in this chapter, (Eshet, 2004) digital literacy framework consisted of five skills and subsequently added a sixth (Eshet, 2012), resulting in the following: photo-visual, reproduction, branching, information, socio-emotional, and real-time. Each skill is discussed below.

Photo-visual literacy

Photo-visual literacy refers to the ability to intuitively and freely *read* and understand instructions and messages that are presented in a visual–graphical form (Eshet, 2012, p. 268), and from this definition, it can be stated that photo-visual literacy is important today. Digital technology, particularly websites' graphical user interfaces, requires the ability to read and write visually in order to derive meaning from what is being communicated (Stokes, 2002).

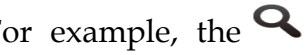
This skill requires individual to use cognitive strategies to understand the graphics, such as images, pictures, symbols, and icons, that are used on digital devices. Through these graphical displays, individuals can communicate with their digital environments because those images, pictures, symbols and icons have their own meanings that can be used to perform digital tasks. For example, the  icon represents the search function. Photo-visual literates will be able to automatically understand the icon as representing searching for information. They have good visual memory and also strong intuitive thinking that helps them to decode and understand visual display messages easily and fluently (Eshet, 2004).

Photo-visual literacy is not a new concept. It is in fact similar to the concept of visual literacy, which was coined in 1969 by John Debes. Debes (1969) defined the term "*as a group of vision-competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The*

development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, symbols, natural or man-made, that he encounters in his environment. Through the creative use of these competencies, he is able to communicate with others. Through the appreciative use of these competencies, he is able to comprehend and enjoy the masterworks of visual communication" (International Visual Literacy Association [http://www.ivla.org/drupal2/content/what-visual-literacy-0]).

Reproduction literacy

Reproduction literacy refers to the ability to create a meaningful, authentic and creative work or interpretation by integrating existing independent pieces of information (Eshet, 2004, p. 98). This skill allows individuals to combine pieces of information from different digital resources to create a new piece of information.

Digitally reproduction literates have multidimensional thinking that helps them to arrange information in new, meaningful ways (Eshet-Alkali & Amichai-Hamburger, 2004). In a digital technology world, reproduction literacy is also important for young people because reproduction literates have the ability to use cognitive strategies to manipulate information from different digital sources and then synthesise it to reproduce new meaningful information.

Information literacy

Information literacy refers to the individual ability to make educated information assessments (Eshet, 2012, p. 271). In this definition, information assessment relates to using cognitive strategies to find, evaluate, and select appropriate information and use it effectively. According to Eshet-Alkali and Amichai-Hamburger (2004), information literates are critical thinkers who always question information and never take it for granted. These authors believe that this skill acts as a filter that identifies false, irrelevant, or biased information and prevents it from penetrating users' cognition.

Information literacy was proposed by Gilster (1997) and refers to the ability to evaluate and assess information properly and critically. Bawden (2008) and Gillen and Barton (2010) consider this a softer digital literacy skill. Based on his definition, Gilster (1997) identified four digital competencies: assembling knowledge, evaluating information, searching, and navigating along non-linear routes.

Information literacy is also defined by the Chartered Institute of Library and Information Professionals (CILIP (2009) as knowing when and why information is necessary, where to find it, and how to evaluate, use, and communicate it in an ethical manner (Armstrong et al., 2005). CILIP based its definition on the ability to find information based on library discipline, and the definition can also be used for defining general information literacy.

Being information literate is important because with the massive amount of digital information that can be found online, information literates are better able to assess, evaluate, select, and use the information successfully.

Socio-emotional literacy

The new social media tools such as YouTube, Facebook, WhatsApp, Viber, Twitter, and blogs have introduced new social interaction practices, but this development may challenge people to employ socio-emotional literacy to understand the relevant social practices (Eshet-Alkali & Amichai-Hamburger, 2004). Socio-emotional literacy refers to being able to communicate and collaborate successfully in digital environments. It encompasses the willingness to share one's own data and knowledge with others, the ability to evaluate data, abstract thinking skills, and the ability to design knowledge through virtual collaboration (Eshet, 2012, p. 271).

With the new social digital media developments, being socio-emotional literacy is important because individuals with this skill will be able to understand how to share knowledge and emotions with others, identify deception in chat rooms, and avoid Internet traps such as hoaxes and malicious viruses (Eshet, 2012).

Branching literacy

Branching literacy relates to manoeuvring hyperlinks and hypermedia. Hypermedia, as defined by Myers and Beach (2001), is a digital environment that combines hypertext (texts linked by multi-linear nodes) and multimedia (e.g. photos, video, art, audio, text) to produce an interactive user media experience (Myers & Beach, 2001, p. 234). These combinations are used to design attractive and interactive digital environments. In hypermedia environments, individuals navigate in branching, non-linear ways, and thus these environments provide a high degree of freedom in navigating. This non-linear nature of hypermedia technology introduced users to new dimensions of thinking that are necessary to effectively use digital technologies. However, the same technology can lead to complexity and problems for some users (Eshet, 2002a) who seek navigation strategies. Gilster (1997) warned that the modern hypermedia technology could pose new challenges for users, finding that a new digital literacy skill would be needed for users to stay oriented in hypermedia environments.

Thus, Eshet (2012) highlighted that branching is an important skill for effective performance in hypermedia environments because it enables users to navigate easily in these environments. Branching literacy enables individuals to use skills and cognitive strategies to stay oriented and avoid getting lost in hypermedia environments. It focuses on non-linear thinking by which digitally literate individuals will be able to remain oriented and perform successfully in these environments.

Branching can also be related to cognitive flexibility theory. Spiro, Coulson, Feltovich, and Anderson (1988) presented this theory to describe the importance of multidimensional thinking skills for constructing meaningful understandings of complex phenomena, leading to the evolution of a new digital literacy skill, branching.

Real-Time literacy

Real-time digital skill (Eshet, 2012) refers to the ability to effectively and simultaneously process the fast-moving stimuli in digital environments. Eshet (2012) added real-time digital skill to his pre-existing five other skills, and Eshet-Alkai (2012) recently added that real-time literacy is important in the context of recent digital technology developments. Adding real-time literacy completed a holistic model of digital literacy skills.

Real-time literacy refers to the ability to perform effectively and quickly in advanced digital environments, specifically to advanced digital environments including high-tech machines and multi-media games and training environments. These types of digital technologies require the user to perform in real time at high speed.

3.1.2 The purpose of the model

Now that I have described the six digital literacy skills in Eshet's model, I can consider the model a comprehensive framework that I can utilise in this study. From the descriptions above, I argue that these skills are necessary for individuals to successfully complete tasks in digital environments, and the series of studies by Eshet and his colleagues to test this model also strongly influenced me to use it.

The main purpose in adopting the digital literacy model was to guide me in analysing game play activities. For this analysis, I had to select the game play activities based on Eshet's six digital literacy skills, and the analysis of the activities was grounded in his model.

3.2 Activity Theory

This section discusses activity theory as the second theoretical framework of the study. Activity theory studies different forms of human activities at both individual and socio-cultural levels.

This study centres on young people's interactions with casual games. Given that casual games clearly involve interfaces and users (players) (Barr, Noble, & Biddle, 2007), I use the theory of human-computer interaction (HCI) to evaluate participants' interactions with these video games.

HCI encompasses a variety of approaches. However, Nardi (1996) listed only three approaches for understanding human activity bounded in context or in one setting: activity theory, situated action, and distributed cognition. For this study, I selected activity theory to study young people's game play and digital literacy.

The main reason I selected activity theory over either of the other two approaches is of the differences in their units of analysis. For situated action, the unit of analysis is bounded in individuals' activities in a given setting. It focuses on ongoing activities that depend on the environment and on individual actions. Specifically, the idea is to focus on individual behaviour that depends on the environment. For distributed cognition, this approach focuses on a perspective in which humans are just part of a larger system (Alan, Janet, Gregory, & Russell, 2004, p. 730). The basic unit of analysis is a cognitive system composed of individuals and the artefacts they use (Nardi, 1996, p. 77)

In comparing the two approaches, activity theory is more appropriate because the unit of analysis is individual'' object-oriented processes as mediated by tools. In this study, the unit of analysis is young people's game play that could enhance their digital literacy, which does not align with the units of analysis of situated action and distributed cognition.

The remainder of this section presents further discussion on activity theory. The three sections discuss general characteristics of the theory: its historical development; the descriptions of each component; and the hierarchical levels of related human activity. The last of the three sections describes the use of activity theory in game studies, the description of each component of the theory triangle, and the purpose of activity theory in this study.

3.2.1 A brief history of activity theory

Activity theory dates from the early-twentieth-century work of Lev Vygotsky. It began when he and his colleagues sought to understand human beings' mental capacities (Bertelsen & Bødker, 2003). Based on his studies, Vygotsky developed the initial formulation of activity theory that intentional human action is invariably mediated by a tool, although it was noted that the tool could be conceptual or symbolic (such as an idea or a language) rather than being embodied (such as "hammer" or "computer") (Oliver & Pelletier, 2006a). Vygotsky's initial formulation is represented in a basic triangular model, shown in Figure 3-1(a), in which the human object-oriented activity is mediated by a tool. In the figure, the triangle consists of subject S performing the activity that derived from the object O and that is mediated by tool X. Figure 3-1 (a) shows the tool-mediated activity at the individual level. Engeström (2001) considers Vygotsky's activity theory the first generation of research on human activity.

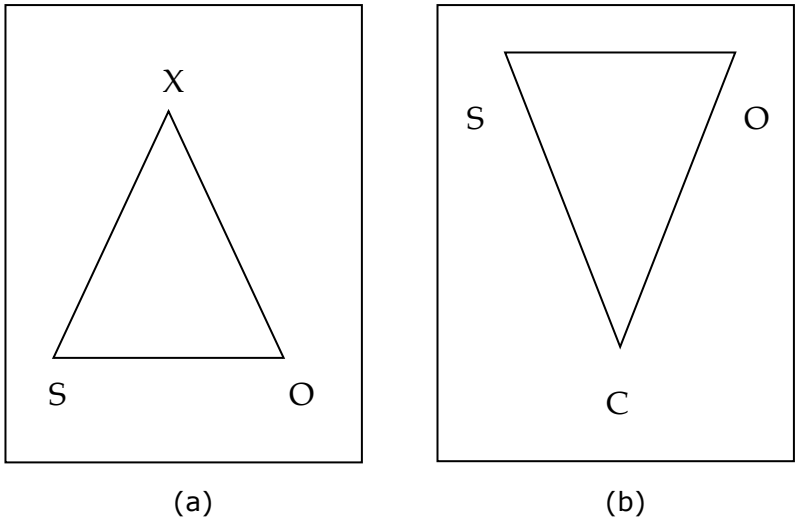


Figure 3-1 (a) Human activity mediated by tools (X) – First generation of Vygotsky's activity theory (b) Human activity with Leont'ev's social activity

The limitation of Vygotsky's first generation of activity was that the unit of analysis only focused on individual aspects (Engeström, 2001). A.N Leont'ev then found that human activities are also socially constructed, even if the activity is in isolation. As a student and co-worker of Vygotsky's, Leont'ev discovered additional information about human activity through a study on that described the natural development of human activity. The finding showed that human activity is a collective activity of social interaction,and thus, the basic triangle of human activity in Figure 3-1(b) shows the relationship between subject S, object O, and community C. The two triangles in Figure 3-1(a) and (b) depict the differences between Vygotsky, who emphasises a more individual context, and Leont'ev, whose focus is the social context.

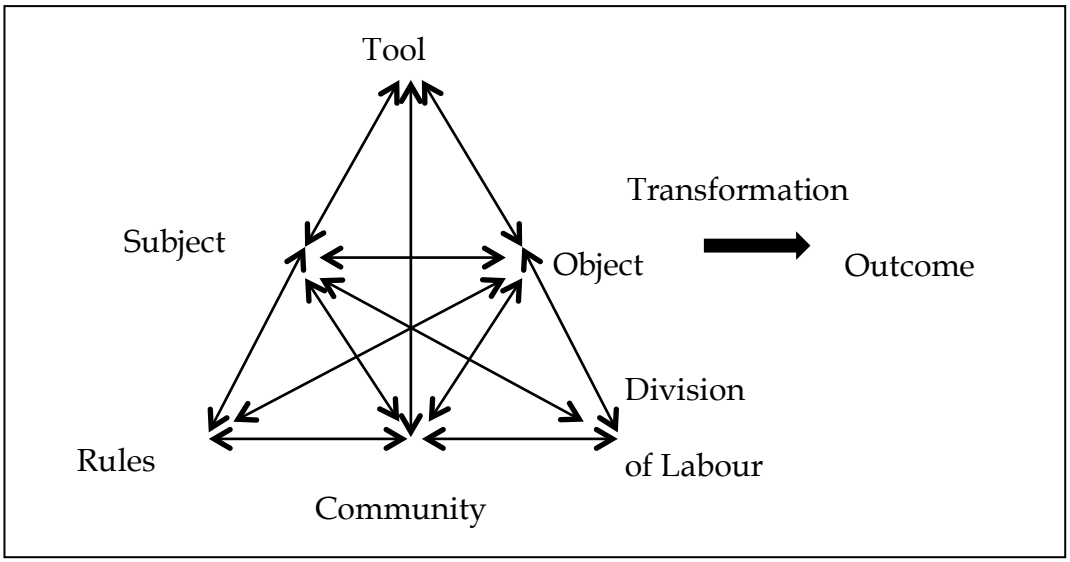


Figure 3-2 Activity Theory System by Engestrom (1987)

Engeström (2001) states that Leont'ev never put his ideas of expanded human activity into a graphic form. It was Engeström (1987) who depicted the ideas of Leont'ev and Vygostky and expanded human activity theory to consider the cultural and historical contexts of activities into account more explicitly in the triangular form shown in Figure 3-2. Engeström's expansion added community, division of labour, and rules, and the triangle in Figure 3-2 shows the relationships between the components (the subject, object, tools and community [socio-cultural context] within one activity. Engeström (2001) labelled this the second generation of activity theory.

3.2.2 The components of activity theory

The second generation of activity theory shown in Figure 3-2 is a framework that aims to understand individual human activity and its relationship with other components in the system. Within activity theory, six components comprise an activity: subject, object, tool, rules, community, and division of labour, and all of these components combine to arrive at a desired outcome or outcomes.

Subject is the central part of activity; it is the individual or group who performs the activity. Any activity depends on the object, and from the perspective of activity theory, object refers to the entities at which the activity is directed. The object can in fact be referred to as the object*ive* (Mwanza, 2002) of the activity, and the individual who performs the activity is aiming to meet that objective. As shown in Figure 3-2, the subject acts on the object with the help of a tool, and this is the initial activity theory as formulated by Vygotsky. He stated that human activity is mediated by tools, and tools can be anything used in the human activity including both material tools and tools for thinking (Kuutti, 2001, p. 28). The relationships between these elements is depicted in the upper part of the triangle shown in Figure 3-2.

The bottom part of the triangle shows three other elements that are involved in activity processes. Rule refers to regulating an activity, and according to Engeström (1987), rules exist in every human activity and help individuals to

shape their activities in order to meet the activity goal. Rules cover both explicit and implicit norms, conventions, and social relations within a community (Kuutti, 2001, p. 28), and the community of a system refers to those with whom an individual shares the transformation of the object, that is, the cultural-historical communities in which an individual's activity is situated. Communities mediate activity through division of labour and shared norms and expectations (Squire, 2002). Division of labour refers to dividing tasks among community members along vertical and horizontal dimensions (Engeström, 1987; Nunez, 2009). The horizontal dimensions are the community members' tasks and responsibilities, and the vertical dimensions depend on the power hierarchy within the community.

3.2.3 Hierarchical levels of human activity

According to Kuutti (2001), any human activity entails a series of processes that are required in order to reach the desired outcome. This is one of the important principles of activity theory, the hierarchical levels of human activity (Barab, Evans, & Baek, 2004). These levels, shown in Figure 3-3, consist of actions, operations, and the activity.

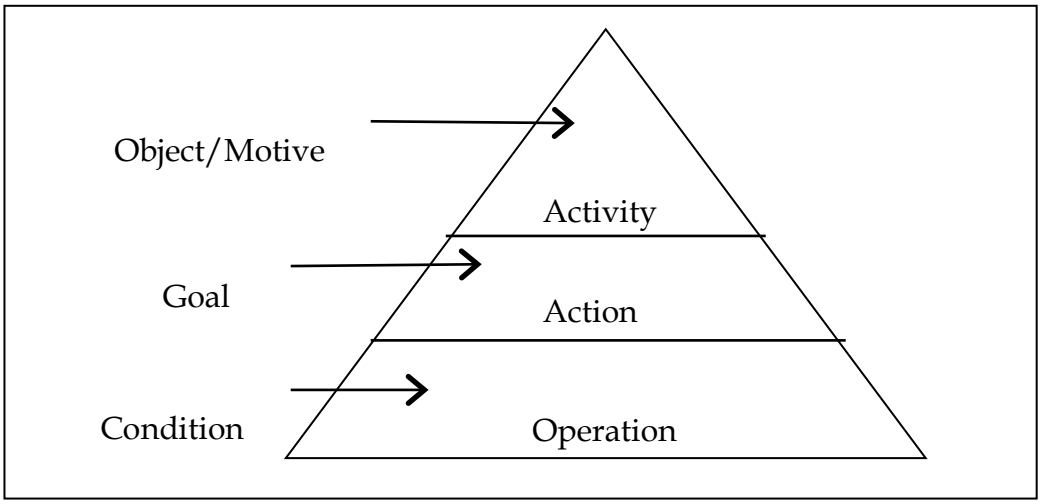


Figure 3-3 Hierarchical Levels of Human Activity (adapted from Hardman, 2007)

Figure 3-3 shows that the activity level is general and high-level (Oliver & Pelletier, 2006a). In this system, activity is the given individual's main activity, including the motive for and object of performing the activity, but motive and object are different. For example, in a game play activity, the player may be playing *Angry Birds*; the object is to win three stars, but that particular player's motive could be to show off to other players.

The second level is action, which derives from activity and is directed at goal achievement. Action is conscious, more than one action contributes to a given activity, and each action is implemented through a series of automatic operations.

Operation, then, is the third level of human functioning; it is more specific compared with activity and action. Operation is a dynamic process and is always driven by conditions. As clarified by Nardi (1996), operations do not have their own goals; rather, they allow for adjusting actions to current situations. Thus, operations are performed without conscious thought; they are usually routine or automatic.

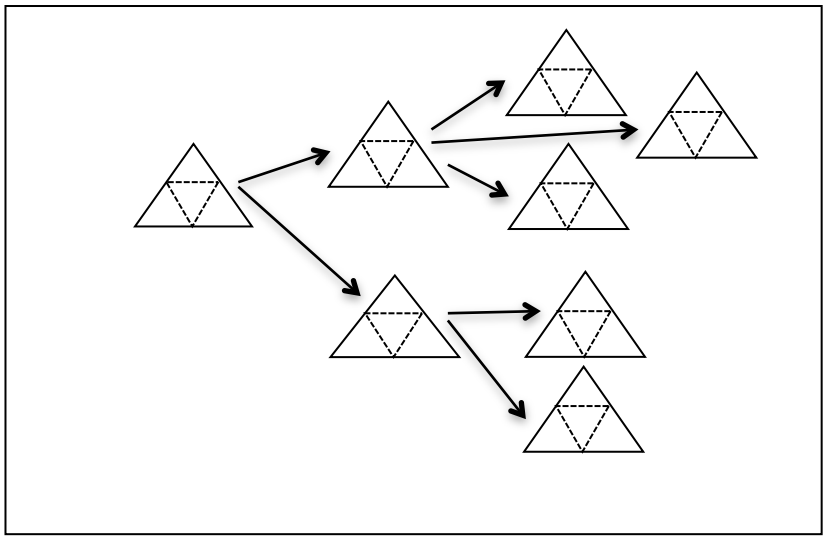


Figure 3-4 Levels of Activity System (Adapted from Oliver & Pelletier, 2006a)

Figure 3-4 shows how levels of systems operate. One activity consists of individual and cooperative actions, and these actions are related to each other by the same overall object and motives. Additionally, each action consists of chains of operation because that depend on current conditions. Table 3-1 clearly shows how the three levels of human activity work; the example is of a PhD student who wanted to present a paper at a conference.

Table 3-1 An Example of Activity Theory in Operation

Activity Level	Action Level	Operation Level
Presenting a paper at a conference The motive is to meet college requirements.	Writing an abstract using Ms Word The goal is to confirm a place to present the paper.	Typing words Counting words Editing
	Preparing a slide presentation using Prezi The goal is to present content to an audience	Selecting presentation format Typing words on each slide Putting images on slides

In Table 3-1, the main activity is presenting a paper at an educational technology conference. The objective is to meet the college's requirement that PhD students should present one paper at at least one conference. For this activity, the actions were writing the paper's abstract and preparing a slide presentation. Each action had its own goal, as is clear in the table, and in order to actualise the goal, a set of operations was conducted. For instance, the student wrote an abstract, which entailed typing words and counting them and also editing the abstract.

3.2.4 Applying activity theory to other game studies

The use of activity theory in game studies is not a new practice; a number of studies have utilised the practicality of activity theory as a framework to

assist in examining game play activities. Kurt Squire (2002), a game-based learning researcher, suggests that activity theory offers a theoretical framework with strong intuitive appeal for researchers who are examining educational games (Squire, 2002, p. 10). He used activity theory to investigate the implications of using a video game called Civilization III to learn history. Although the use of activity theory lacks clarity in the study, Squire (2002) claims that the theory could translate well to analysing game play activities.

Oliver and Pelletier (2006a) used activity theory to study the learning process in the context of playing game. In their study, activity theory was used as an analytical framework to understand how players learn to play games; specifically, the authors utilised Leont'ev's hierarchical model of human activity to analyse their findings of evidence of the process of learning through game play. Figure 3-5 shows an example of how they analysed game play activity using Leont'ev's model. In this figure, activity was analysed, identified, and placed based on actions and operations. Using the table in the figure, the authors were able to connect game play with the learning process. According to Oliver and Pelletier (2006a), this hierarchical model of human activity permits undertaking fine-grained analyses and integrating them with broader, more general studies.

Time index	Activity	Action	Operation	Contradiction between…		Rationale	Evidence of learning (resolution)
07:27	Moving through herbology halls	Get through the room with tree jumping and snapping plants	Moves around platform (and gets bitten by plant)	Subject	Rules	Doesn't realise that the plant can reach her	
			Climbs back up (gets bitten again until she falls back off)	Subject	Rules	Thinks there might be a path past (edging around the tree), when there isn't	Gives up seeking a safe path and tries another route

Figure 3-5 The use of the hierarchical model of activity in analysing game play (Oliver & Pelletier, 2006b)

One study by Barr (2008) focused on the value of video games; the author used activity theory and Leont'ev's hierarchical model to analyse the value of video games, which players perceive and adopt and which shape the play of the game. Based on activity theory, Barr (2008) used five video games as case studies and focused on players' experiences of video game play and their understanding of the interactions. From the game play activities, the author found that the value of the games Paidia and Ludus had influenced all aspects of the game play.

Activity theory was also used in a study of collaborative perspectives on video games. Siyahhan, Barab, and Downton (2010) used the theory to understand the nature of intergenerational play between parents and children ages 9 to 13 in the context of a role-playing video game called Quest

Atlantis. The purpose of activity theory in the study was to identify the components of their activity system that aligned with the theory, and the activity system was the collaborative activity between the parents and children who played the game; the conceptual theory is visualised in Figure 3-6. As the study authors stated, activity theory helped them identify components that mediated the game playing activities; for instance, they identified the subjects as parent-child dyads as opposed to individuals. According to Siyahhan et al. (2010), the function of activity theory in their study was more to guide the components that would be factored into their activity system as opposed to being strictly an explanatory framework.

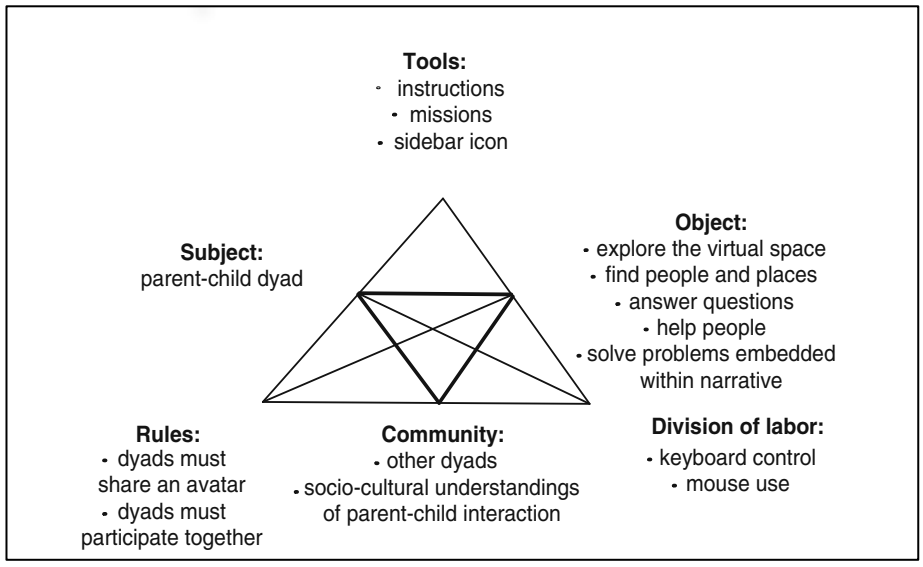


Figure 3-6 Activity system of intergenerational play (Barab et al., 2004)

Similar to Barab et al. (2004) and Ang et al. (2011) utilised activity theory to investigate social interactions while playing video games. Their study aim was to investigate how social interactions would be affected by individual

play, specifically, the interactions among players aged 18 to 25 of both single-player computer games and multiplayer console games. Using activity theory, these authors realised that the component rules of Engeström (1987) activity theory needed to be changed to collective rules, and these collective rules represented the norms that defined the relationships between players.

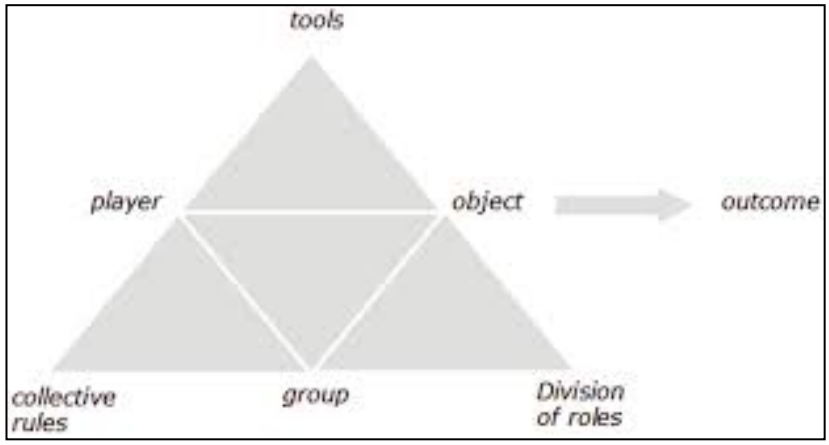


Figure 3-7 The activity theory model of game playing (Ang, Zaphiris, & Wilson, 2011)

Figure 3-7 reflects game play through the activity theory lens based on the study context; specifically, the authors analysed the game play activities based on two activity theory concepts, game as artefact and games as play activities. According to Ang et al. (2011), activity theory helped them by highlighting key concepts and their relationships, such as individual action towards objects, collection action toward objects, and the relationships between individual and collective play activity. At the end of their study, the authors highlighted that activity theory had helped them to meet their

objective, which was to develop theoretical models that could describe and understand the sociability functions in a computer game.

The examples above show the functionality of activity theory in each of the research studies. Thus, following the researchers' suggestions regarding the positive impact of activity theory on game play studies, I adopted the theory to assist in meeting this study's objective because I believe that it provides a powerful theoretical framework for exploring casual game play amongst young people.

3.2.5 Customising Activity Theory

In order to avoid any confusion on the components of activity theory, I utilised the eight-step-model of Mwanza (2002) to customise these components based on the context of this study. The eight-step model is one of the tools that is incorporated in the Activity-Oriented Design Method (AODM) toolkit (Mwanza-Simwami, 2011). AODM presents a method for applying the fundamental principles of activity theory (Engeström, 1987) to investigating a given phenomenon. It consists of four methodological tools: the eight-step-model, the activity notation, technique of generating research questions, and mapping operational processes. In this thesis, I only discuss the eight-step-model.

The eight-step-model refers to eight steps to translating the general components of activity theory based on the activity that is being investigated. According to Mwanza (2002), the model helps researchers obtain a basic understanding of what will be included in each component within the activity system. In Table 3-2, I used the eight-step-model to guide me on what components to include in my activity theory system, and the last column shows the components that were chosen specifically for this study.

Table 3-2 The combination of Mwanza's (2002) eight-step-model and the activity theory components that Were Used in this Study

Identify activity theory component(s)		Question to ask	Theory components of for this study
Step 1	Activity of Interest	What sort of activity am I interested in?	Playing casual games
Step 2	Object	Why is this activity taking place?	The goal of the game
Step 3	Subject	Who is involved in carrying out this activity?	Young people aged 10 to 12 years old
Step 4	Tool	By what means are the subjects performing this activity	Casual games The Internet iPad
Step 5	Rules and Regulations	Are there any cultural norms, rules, or regulations governing the performance of activity?	The game rules and instructions.
Step 6	Division of labour	Who is responsible for carrying out what activity when?	Each player's responsibilities and roles in the game
Step 7	Community	What is the environment in which this activity is carried out?	After-school computer club Online
Step 8	Outcome	What is the desired outcome from carrying out this activity?	Depends on the player Acquiring digital literacy skills

After identifying the components of this study (as stated in the last column of Table 3-2), I incorporated them into the study's activity theory system. Figure 3-8 shows the customised system for game play in this study.

As Kuutti (1996) argued, the basic unit of analysis in activity theory is the activity. Thus, the unit of analysis in this study is the game play activity of young people. As such, the subject in Figure 3-7 is the game player, in this study, young people between the ages of 10 and 12 years old.

Because the main activity of the young people in this study was playing casual games, the games were the tool, which is placed at the tip of the triangle. In this study, however, the Internet was also considered a tool because all participants used it to connect to other players and to find hints for game strategies. The iPad needs to be mentioned here because it was the platform for the casual game play.

In this study, the subject was the young people, and the object was their motive for playing the games. Based on the eight-step model, I found it difficult to establish the object of the game play activity because it was taking place solely for the purpose of this study. In general game play, the object for players is dynamic. For instance, the initial object might be fun and enjoyment, but it might change to winning more points. For now, I just consider completing specific game levels as the object of the activity but acknowledge that this could have changed as the game play progressed,

again because I believe, as stated earlier in this subsection, that a player's object is dynamic.

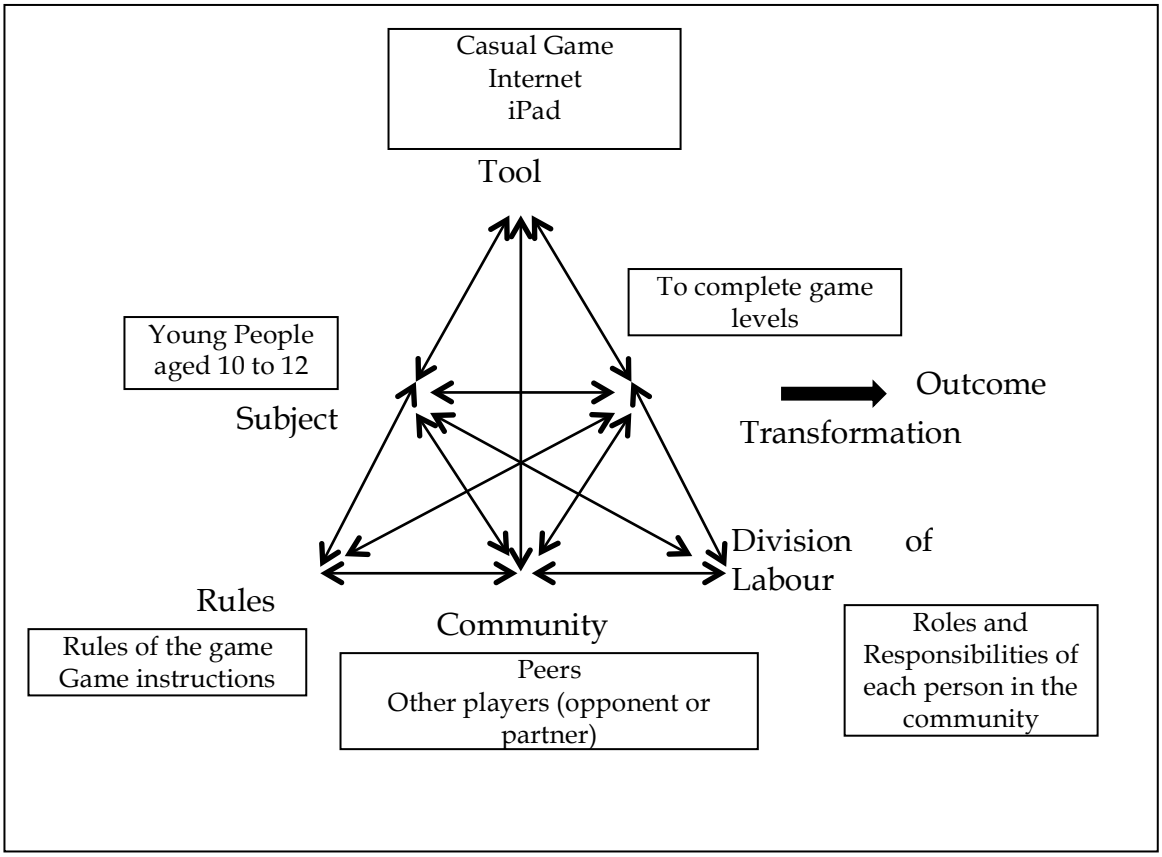


Figure 3-8 Activity theory in this study

In order to meet the object of the game play, the player must follow any instructions or rules of the game, and the rules shape the game play in that without complying with them, the player will not be able to complete the game. The rules in Figure 3-8 are the rules and instructions of the games.

In addition, this study might have involved other people (community) in this interactive gaming activity. As mentioned before, my activity theory system also looked at the collaborative practices within the player-game activity. From the activity theory perspective, these entities form a community, which refers to other players who are interacting with the subject and acting together to complete the game. The community for this study could include peers who are present during the game play (given that the data were collected at the computer clubs, as explained later in Section 4.3.1) and an online game community who act as opponents or partners (division of labour).

In Figure 3-8, activity theory shows that the object then transforms into an outcome, but defining an outcome for the casual game play activity in this study was also problematic with regard to activity theory because the desired outcome for a given subject was different from the overall study objectives. Therefore, to avoid confusion, I divided the outcomes of activity theory into two categories, those that are known to the player and those that are unknown. In this study, the known outcome would depend on the player, for example, the satisfaction of winning, earning a high score, obtaining rewards, etc. The unknown outcome is the enhancement of the six digital literacy skills in that I assumed that developing these skills is not why young people play casual games.

3.2.6 The purpose of activity theory

In this study, I used activity theory for two purposes, the first of which was to formulate study sub-questions. The notion of formulating research questions using activity theory was adopted from a study by Groves and Dale (2004) that investigated young children's use of calculators in mathematics education. Those authors used activity theory to report their study findings by framing each section against the triangle of activity theory. Based on their study, I adopted the idea of looking at each section of the triangle that could possibly contribute to answering the main research question, and through activity theory, I managed to formulate four research sub-questions from the overarching main research question.

Secondly, activity theory is used as the framework for analysing the data from this study; it is a powerful socio-cultural and socio-historical lens through which we can analyse most forms of human activity. This purpose of the theory was influenced by the study by Oliver and Pelletier (2006b). As stated in earlier in this chapter (see section 3.2.4), those authors used the hierarchical level of human activity to analyse how players learn to play video games. The next two paragraphs discuss how the study activity was used for each purpose.

3.2.6.1 Formulating Research Questions

As mentioned above, one purpose of activity theory in this study was to serve as a framework to formulate research questions. As was developed earlier, the study's main question was *To what extent can playing casual game enhance young people's digital literacy?* However, this question was sufficiently broad that it was difficult to specify the particular aspects of game play that I should study. To narrow the study focus, as stated by Creswell (2009), the central question must be divided into sub-questions to help the researcher focus on a specific area of study. Therefore, adopting the idea of Groves and Dale (2004) on framing sections against the activity theory triangle, the main research question was divided into multiple sub-questions. Figure 3-9 shows the sections of the theory that could have contributed to answering the main research question.

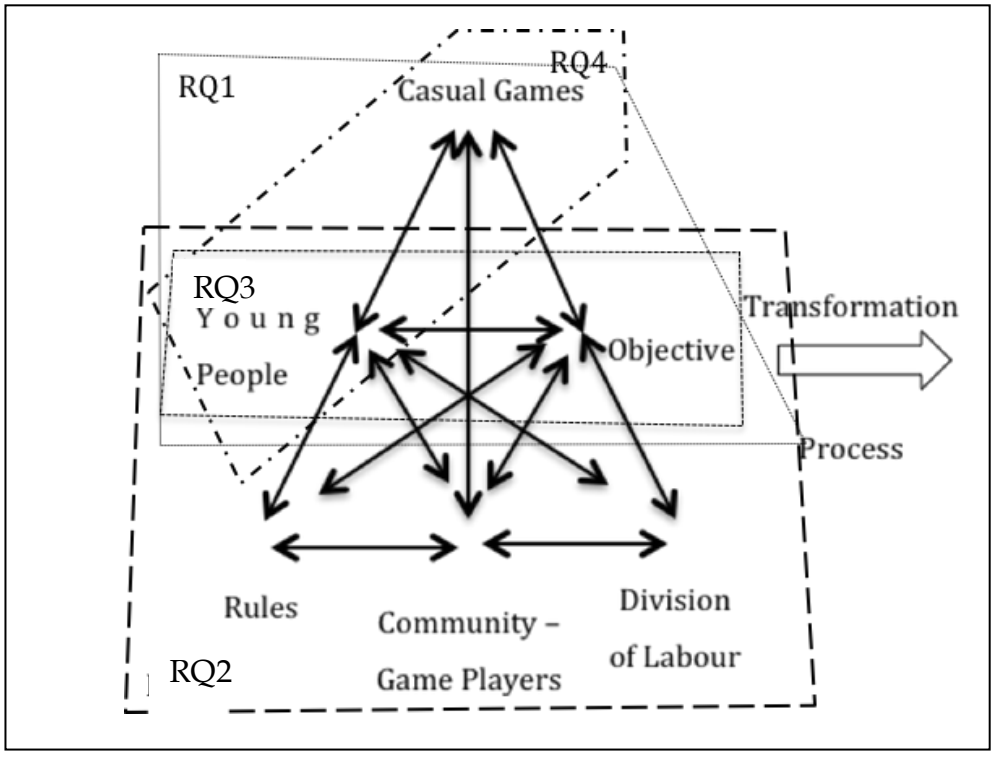


Figure 3-9 Four Sections of Activity Theory that lead four research sub-questions

RQ1: How can the interactions of young people with virtual game environment enhance digital literacy skills?

RQ1 focuses on the upper part of the triangle, which looks at young people's interactions (as individuals) with casual games, and the main study focus was the interactions within the virtual world of the games. This study looked only at interactions that could be observed and clearly reflected, such as interactions with an avatar, with rules, and with text-based objects.

RQ2: How can the social interactions of young people with other players enhance their digital literacy skills?

RQ2 particularly focuses on the lower part of the triangle, which depicts the social aspects of activity theory. These aspects could refer to players who are present in the room or in the virtual world of the game. They could be friends working collaboratively or opponents who are competing with the players.

RQ3: How can completing game levels enhance young people's digital literacy skills?

RQ3 focuses on the young people and the object of activity theory. As stated earlier in this chapter, the object here is to complete any levels of a casual game, and for this purpose, the study investigated young people's strategies

for completing game levels. In order to complete game levels, different players have different strategies such as using boosts, looking for hints, and watching walkthroughs.

RQ 4: How do young people understand the digital artefacts that are presented in casual games?

RQ4 focuses on how young people connect to the tools. This question provides empirical evidence on how well young people comprehend the information and the digital artefacts that are present in the virtual worlds of games. That is, the question aimed to answer whether the participants understood the *story* of the game.

3.2.6.2 As Analytic Framework Analysing Data

Another purpose of activity theory in this study was to act as a framework for analysing the game play, specifically using Leont'ev's three levels of activity theory, the activity, actions, and operations. Using the hierarchical levels of human activity allowed the study to clearly investigate the young people's digital literacy skills through different forms of game play. I will describe further on how I used activity theory to analyse the data in Chapter 4, Section 4.4.1.1.

CHAPTER 4 RESEARCH DESIGN

How you see the world is largely a function of where you view it from, what you look at, what lens you use to help you see, what tools you use to clarify your image, what you reflect on and how you report your world to others.
(Anderson & Anderson, 1998, p. 8)

4.1 Introduction

This chapter describes the methodology used to conduct this research study. Methodology refers to acquiring knowledge and then considering the most effective ways of obtaining the data that will provide the evidence for or against the study hypothesis (Opie & Sikes, 2004, p. 2). Grix (2010) argues that researchers who want to conduct clear, precise studies need to understand the philosophical underpinnings that inform their choices of research questions, methodology, methods, and intentions.

This chapter begins with the ontological and epistemological stance of this study, which influenced the use of qualitative methods to investigate the casual game play activities that could enhance young people's digital literacy skills. For the purpose of consistency, I primarily used Grix (2010) as a reference for the philosophical framework of this study. In the next section, I describe the case study approach, which involved observations, think-aloud techniques, and interviews as the data collection techniques. The data

analysis procedure, using the activity theory framework, is then explained. This chapter will end with a conclusion.

4.2 Research Philosophy

The ways researchers conduct their studies depend upon a range of factors including their beliefs about the nature of the social world and what can be known about it (ontology), the nature of knowledge and how it can be acquired (epistemology), the purpose(s) and goals of the research, the characteristics of the research participants, the audience for the research, the funders of the research, and the positions and environments of the researchers themselves (Ritchie & Lewis, 2006).

4.2.1 Ontology and epistemology assumptions

Ontology is the starting point of a research study. It refers to how we view, claim, and assume the nature of reality or existence. Blaikie (as cited by Grix, 2010) defines ontological claims as claims and assumptions that are made about the nature of reality, about what exists, what it looks like, what units make it up, and how these units interact with each other (Grix, 2010, p. 59). There are two different beliefs that people use to position themselves in regard to their beliefs about the reality of existence, objectivism and constructivism. Grix (2010) makes a clear distinction between the two, stating that objectivism is an ontological assumption that asserts that social

phenomena and their meanings have an existence that is independent of social actors. Objectivists believe that the social phenomena are absolute situations in which facts can be confirmed as facts. In contrast to objectivism, constructivism is an ontological assumption that asserts that social phenomena and their meanings are continually being accomplished by social actors (Grix, 2010). Constructivists believe that any social phenomena co-exist with the actions of other existences.

If ontology is our belief regarding the nature of existence, epistemology is our knowledge regarding the nature of reality or existence; it refers to assumptions about how we know these realities. Epistemology is a way of understanding and explaining how we know what we know (Crotty, 2003, p. 3). In terms of research design, epistemology help researchers decide what kinds of knowledge can be obtained and how we can ensure that the knowledge and sources are both adequate and legitimate (Crotty, 2003). Epistemological assumptions always reflect individuals' ontological assumptions, and following from that, the continuum of ontological assumptions about objectivism and constructivism are the epistemological assumptions of positivism and interpretivism, respectively. Positivists believe that knowledge is real, objective, and independent. In contrast, interpretivists believe that knowledge is subjective and interactively linked to other existences.

As stated earlier, ontology and epistemology are important in designing research studies. Both ontological and epistemological assumptions provide research paradigms (Mack, 2010) and inform the specific methods researchers use to collect and analyse data (Grix, 2010). With regard to the above ontological and epistemological assumptions, research paradigms are positivist and interpretivist. The positivist paradigm refers to the ontological position of objectivism and the epistemological position of positivism. This paradigm assumes that knowledge is real and objective and can be captured by observing, measuring, and quantifying. From a quantitative aspect, the goal of research is collecting *facts* about human behaviour that when they accumulate will elaborate on and verify theories that allow scientists to state causes and predict human behaviour (Bogdan & Biklen, 1998, p. 38).

The interpretivist paradigm refers to the ontological position of constructivism and the epistemological position of interpretivism. This paradigm assumes that knowledge is experiential, personal, and subjective and that thus, the persons involved in a given topic must be directly asked about their experiences (Mack, 2010). Qualitative methodology is thus better suited to this paradigm because its purpose is to better understand human behaviour and experience, to understand the processes by which people construct and describe meaning (Bogdan & Biklen, 1998, p. 38).

As was developed earlier in this thesis, the focus of this study was to explore how casual game play could enhance young people's digital literacy skills. I specifically explored the game play interactions and activities and the extent to which the activities could help to enhance digital literacy. Taking into account the purpose of this research, I considered it appropriate to position within the interpretivist paradigm. The ontological stance of this study states that reality depends on other existences, and I assumed that digital literacy would depend on both different game play activities and the young people's experiences with playing casual games. Knowledge about this assumption is subjective and depends on other factors, and thus, the only accessible way to investigate the assumption was through detailing the young people's actual game play experiences, for which qualitative methods were more appropriate.

4.2.2 Qualitative research

Creswell (2012) states that in qualitative research, there are five approaches to inquiry and that these approaches provide options for conducting qualitative inquiry that help researchers to select what approaches will be best suited to their studies. Table 4-1 summarises Creswell's definition of each approach (Creswell, 2009, p. 13).

Table 4-1 Summary of Qualitative Inquiry Approaches (Creswell, 2009, p. 13)

Approach	Description
Ethnography	An approach in which the researcher studies an intact cultural group in a natural setting over a prolonged period of time.
Grounded theory	An approach in which the researcher derives a general, abstract theory of a process, action, or interaction grounded in the view of the participant.
Case study	An approach in which the researcher explores in depth a program, event, activity, process, or one or more individuals.
Phenomenological research	An approach in which the researcher identifies the essence of human experiences about a phenomenon as described by participants.
Narrative research	An approach in which the researcher studies the lives of the individuals and asks one or more individuals to provide stories about their lives.

Based on the descriptions in Table 4-1, I selected the case study approach to conduct my study. Using this approach, I was able to explore in depth the young people's game play activities, although the next section provides further justification for why I chose case studies for the study.

4.3 Case Study Process

A case study is a qualitative approach in which a researcher explores a bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection (Creswell, 2012, p. 73). According

to Yin (2003), case studies can be used when the study's focus is to answer how and why.

Yin (2003) emphasises that *how* is more explanatory and likely to lead to the use of this approach, which provides detailed information about the case to be studied. I chose case studies because the study aim was to answer the question of how casual game play could enhance young people's digital literacy. This was the case I needed to analyse, and it required in-depth investigation on.

In order to investigate the relevant game play activities, I adopted the instrumental type of case study to investigate a group of young people in Brunei who were aged between 10 and 12 years old. Instrumental case studies allow the researcher to focus on one issue and select one case to support that issue (Creswell, 2012). In addition to instrumental, Stake (1994) identifies two other types of case study, intrinsic and collective. In intrinsic case studies, the researcher wants to gain a deeper understanding of one particular case because of intrinsic interest, such as one particular child or place, whereas collective case studies focus on a number of cases that investigate one particular phenomenon.

4.3.1 Recruiting participants

As stated earlier, I studied a group of young people aged between 10 and 12 years. I used a convenience sample of 20 young people who attended after-school computer clubs. These computer club venues naturally became the research settings in which the study took place. I should mention here that there attempts made to exclude any one type of student in selecting the participants because the computer club students were self-selecting; that is, they were not selected based on any particular criteria. Instead, all students were welcome to attend the clubs.

I had two reasons for selecting participants from after-school computer clubs. Firstly, I wanted to avoid disturbing the students' classroom sessions for my data collection, and the main study aim did not require me to collect my data during their lesson periods. Secondly, I needed to ensure that the students did not perceive their participation as a formal school process. Barendregt and Bekker (2011) distinguished between voluntary participation (in home settings) and mandatory participation (in formal school settings). Activities tend to have less appeal if they are too similar to students' formal classroom activities. Therefore, it was important to conduct this study outside of regular school hours.

Selecting After-School Computer Club

In Brunei, after-school computer clubs are one of the co-curricular activities that are offered by most primary and secondary schools. These clubs

embrace an *open to all* concept, which means that any student of the school can join the club. As an Educational Technology Lecturer from the Institute of Education at the University of Brunei Darussalam, I have a lot of contact with the teachers who are responsible the computer club. After contacting the teachers of 14 after-schools computer clubs in Brunei, I selected four of these clubs. The other computer clubs either lacked Internet connectivity, were in the midst of their examination periods, or were temporary out-of-order due to the computer rooms being under renovation. The selected computer clubs were conducted at two primary schools and two secondary schools in Brunei. These schools are public schools, where students come from different family backgrounds. These were not special schools in anyway and had no specific selection or enrolment criteria. The reason for selecting both primary and secondary schools is because students within the 10 to 12 years range are either in their higher primary or lower secondary level education.

In order to access the after-school computer club members, I needed to obtain permission from the gatekeeper (i.e. head teacher or school principal) of each school. Each gatekeeper received a permission letter (Appendix A). After permission was granted, I went to each computer club for an introduction visit. Table 4-2 shows the number of club members present during the introduction visit.

Table 4-2 Number Of Club Members Present During The Introduction Visit.

	Education Levels	**No. of Club Members**
Site 1	Primary School	10
Site 2	Primary School	12
Site 3	Secondary School	9
Site 4	Secondary School	10

During this visit, all the computer club members were provided with an information sheet (Appendix B) detailing general information about the study and the process to follow if they wanted to participate. The information sheet also detailed how their anonymity, privacy, confidentiality and right to withdraw from the study at any time were guaranteed, including the option to not complete any part of the study. Those who agreed to participate were asked to sign and return the Consent and Authorisation Form (Appendix C). Because they were minors, I also

distributed information sheets (Appendix D) and consent forms (Appendix E) to their parents and guardians. In order retrieve the parental consent forms; I had to make a return visit to the computer clubs.

From each computer club, I managed to recruit five willing participants who had permission from their parents to participate in this study. In total, I had a sample of 20 participants, which is an appropriate sample size for answering the research questions. There were 11 boys and 9 girls, aged 10–12 years, 15 of whom could be categorised as frequent gamers. For the purposes of this study, *frequent gamers* were classed as those who played casual games every day, while the remaining five participants—classified as *infrequent gamers*—played games only on weekends and during school holidays. Detailed information on the frequent and infrequent gamers will be further described in Chapter 5.

Background of the Computer Clubs

Like other after-school computer clubs in Brunei, the selected clubs are conducted twice a week in the afternoon. For the two secondary schools, the clubs always start at 2pm, while the primary school clubs start at 4pm. This is because the primary school students have to attend religious school in the early afternoon. However, this situation did not have any significant effect on the data collection process of this study. The only issue was that I was

only able to observe and interview one to two participants per session due to time constraints

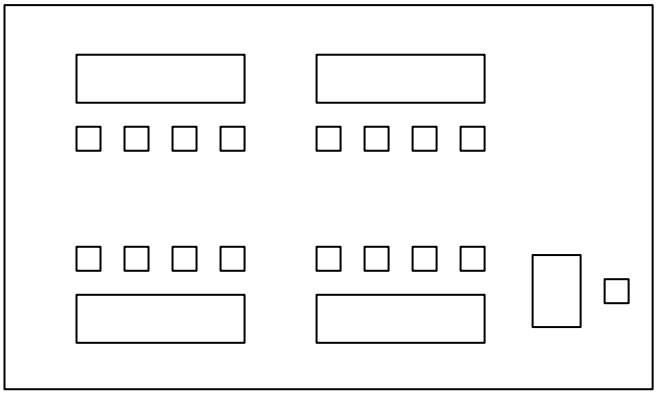


Figure 4-1 Seating Arrangements of Computer Club

The four computer clubs are conducted in the computer laboratory of their respective schools. The seating arrangements were much like a normal computer laboratory. Each table has a desktop (Figure 4-1), with shared cable network connections. In one of the primary school computer clubs (Site 2), there was a carpeted area where students could use tablets or iPads in comfort. According to the teachers responsible for conducting the computer clubs, club activities are generally more flexible than with normal computer study lessons. The aim of the computer club is to provide club members with access to technology to facilitate their use in ways that they might not be able to do during their regular computer studies lessons in class, for example, by playing casual and online games, online social networking and online entertainment. The members of the club are also allowed to do club activities together if they wish. As previously stated, the informal setting of the after-

school computer club is one of the reasons for having selected the computer club for participant recruitment and data collection. The informal setting helped to ensure that the responses of participants were more natural as they played their casual games in their natural environment.

The flexibility of the computer club in allowing the club member to work together also benefits the study in terms of cultural aspects of activity theory. From the perspective of activity theory, this study may involve other people in the community. In this case, the community are other club members present during the observation. During the gameplay activities, there may be situations in which participants are interacting socially with other club members present at the time. This is because other club members will also present at the time of the study and will also be playing casual or online games. In addition, I want participants of this study to play casual games in their natural ways, allowing them to communicate and interact with other club members if they wish to.

Based on the list of activities as indicated by the computer club teachers, most of the activities are focused on designing and creating simple computer and online applications, such as designing and creating images, music and websites. Primary school aged club members are also exposed to the use of online educational applications for learning mathematics and science. In addition, the club members also play video games using iPads, tablets and

desktops. There are also wi-fi connections available for the students to access the Internet. The availability of wi-fi will make the data collection easier. This is because in answering research questions RQ2 and RQ3, participants will require a wi-fi connection to access the Internet.

4.3.2 Selecting the casual games

Before I discuss the research methods, I must explain how I selected the casual games for this study. Selecting these casual games are not purposely implying to any specific research questions; however, the selection process is only based on suitability and popularity of the casual games

Suitability

In regards to suitability, the National Children's Bureau (NCB) states that materials for studies in which young people are the participants need to be age-appropriate. Therefore, I selected a list of casual games that are suitable for participants within the 10 to 12 year old age group. I ensured that there were no M-rated video games depicting violence, sex or other mature

activities. This study uses video games rated 'E' (ESRB)[1], 'U' or 'PG' (BBFC)[2]. According to these rating board agencies (ESRB and BBFC), video games marked 'E' and 'U' are well suited for a general audience and contain no or minimal mature activities.

Popularity

Another criteria used in selecting casual games was their popularity. By selecting popular casual games, it is more likely that these games will have the potential to be playable by the participants of this study. The popularity of the casual games is based on the online ranking listed by gaming websites such as *iTunes*, *Android*, *Gamezebo*, *Appcrawlr*. *Android and iTunes* listing are the two main mobile operating systems used primarily for touchscreen mobile devices, such as smartphones and tablets. Therefore using ranking list from these website are reliable and accurate, in which these websites listed their ranking based on the most downloadable games. *Gamezebo* is a website that provides users with information on how to play newly released and popular video games. The information includes game reviews, walkthroughs, strategy guides and cheat code. *Appcrawlr* is a website that

[1] ESRB – Entertainment software Rating Board (United States, Canada and Mexico)

[2] BBFC – British Board of Film Classification (British)

provides users with popular genre-based applications. Therefore, based on these websites, I combined their game lists and chose the games for use in this study.

During my initial visits to the school computer clubs, I gave the students a list of casual games and allowed them to bring their own devices if they had any of the listed games on their digital devices. The game titles were: *Angry Birds Star Wars Edition* (Rovio Entertainment Ltd); *Battle Monkeys* (Geek Beach); *Cakemania Main Street* (Big Fish); *Cityville* and *Farmville* (Zynga); *Candy Crush* (King.com); *Gravity Guy* (Miniclip); *Shark Dash* (Gameloft); Minecraft (Mojang); *Restaurant Story* (TeamLava); *Sribblenauts* (Warner Bros); *Subway Surfer* (Kiloo Games); and *Scrambble with Friends* (also Zynga). However, at the end of my data collection, the students revealed that they only played a few the listed games: *Angry Birds Star Wars Edition*; *Candy Crush*; *Minecraft*; *Shark Dash*; *Sribblenauts*; *Subway Surfer*; *Scrabble with Friends*; and *Minecraft*. Figure 4-2 shows the casual games that were played by the participants. Each of these games will be descried in greater detail in the next section.

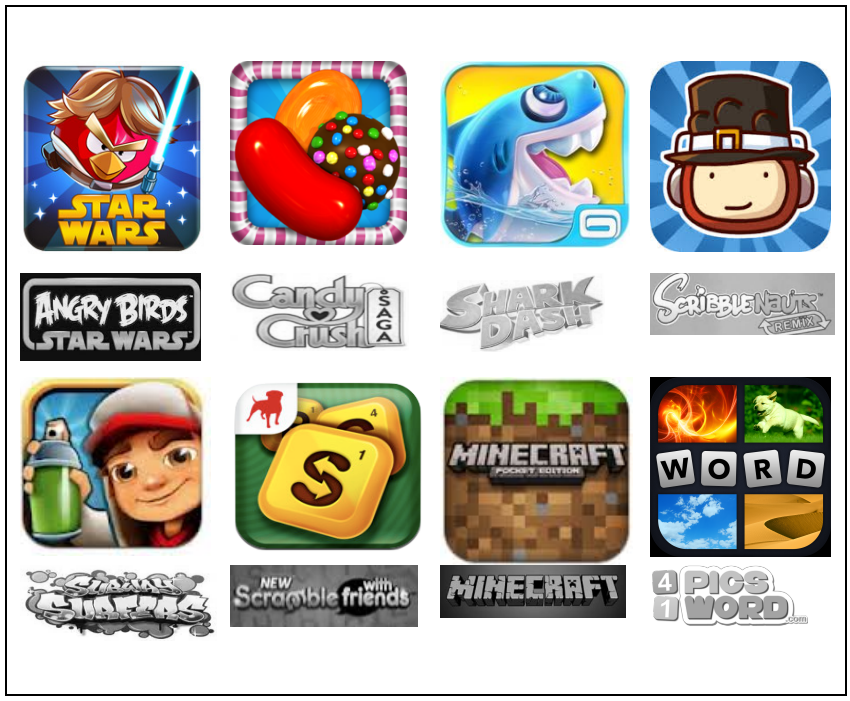


Figure 4-2 Casual games played by the participants of this study

Angry Birds Star Wars Edition

Angry Birds is a very popular casual game for smart phones and tablets that was developed by Rovio Entertainment. It now has different versions, such as *Angry Birds Rio, Angry Birds Space, and Angry Birds Star Wars*. This study used the *Star Wars* version because it was the latest version and was the most widely played at the time of my data collection. The general objective of this game is to eliminate bad piggies. In keeping with the name, the *Star Wars* version comes with Star Wars movie characters such as Darth Vader pigs, Dark Lord pigs, and Skywalker birds.

Candy Crush

Candy Crush is a puzzle game that was developed by a game developer called King.com. The objective is to break any similar three or more candies in order to score points and complete levels, including different requirements, different obstacles, and different boosters. Players have a maximum of five lives and once the lives run out, the players wait 30 minutes to regenerate a life or ask Facebook friends to give a life.

Shark Dash

Shark Dash is a physics puzzle game that was developed by Gameloft. The main character of this game is a shark called Sharkee, and the objective is to eliminate a group of ducks by dragging Sharkee's tail to launch him at the ducks. Apart from eliminating the ducks, players must also grab coins for buying purposes. Similar to other video games, *Shark Dash* has different levels with different positions of ducks, different boosters, and different obstacles. The idea of the game is that players must use physics strategies in order to get direct aim at the ducks.

Sribblenauts

Scribblenauts is an adventure type of video game; it was developed by 5th Cell and published by Warner Bros. The main character of this game is a boy

called Maxwell, who must collect objects called starites (stars) to complete each level of the game. In order to obtain the starites, players must help Maxwell by creating any object, bringing it to life, and using it to solve each challenge. The main idea of this game is that players must use their imaginations to create the objects to overcome obstacles.

Subway Surfer

Subway Surfer: Rome is an endless running casual game that was developed by Kiloo and SYBO game (Wikipedia). The main character is a hoody boy who escapes the inspector who wants to arrest him for painting graffiti on a railway site. The objective of the game is to help the boy evade the inspector by having him jump, roll down, and surf on a hoverboard, and players must also collect coins along the train track. The main idea of the game is to run away as long as you like but while completing missions and daily challenges.

Scramble with Friends

Scramble with Friends is word-challenge casual game that was developed by Zynga. The main objective is to use a jumble of 4x4 letter tiles to spell as many words as you can in two minutes. Players play Facebook friend opponents or are automatically matched with random users. Recently, Zynga changes the title *Scramble with Friends* to *Wordstreak with Friends*. Although

the title had changed, *Scramble with Friends* will be used throughout this thesis.

Minecraft

Minecraft is a create-a-world game that was developed by Mojang. It is an open virtual world in which players control the world by breaking blocks and using them to build things. *Minecraft* is effectively virtual Lego (Overby & Jones, 2015) where the player creates the game themselves by manipulating the world, thus enabling them to construct buildings out of textured cubes in a procedurally generated 3D world.

Minecraft has a unique style of gameplay unlike the other casual games listed in this study. There are no specific steps, objectives or instruction for players to play this games (Overby & Jones, 2015). *Minecraft* provides the player with an empty virtual world, leaving the player with their creativity and imagination to create their own world. As a result, everyone who plays *Minecraft* has a unique playing experience and constructs their own unique virtual world. It is possible that *Minecraft* will provide players with different skills compare to other casual games in this study.

4 pics for 1 word

4 pics for 1 word is a word puzzle video game that was created by a game developer called LOTUM GmbH. It is a casual game that provides players four pictures as a hint to find the correct word. At each level, the players are given a group of scrambled letters and they must choose the letters that spell the best word to describe the four pictures.

4.3.3 Research methods

Yin (2003) suggests that six data collection methods are commonly used in case studies: documentation, archival records, interviews, direct observations, participant observation, and field notes. It was suggested by Richards and Morse (2013) that a given selected research method must be the *best* for answering the specific research questions.

In this study, as stated earlier in Chapter 3, Section 3.2.6.1, I generated four research sub-questions that derived from the main research question and the perspective of activity theory, and these sub-questions provided me with a narrower perspective on what aspects of the game play activities I should investigate. Table 4-4 shows how the purpose of each sub-question related to the research methods

As shown in the table, RQ1, RQ2, and RQ3 aimed to investigate the young participants' game play activities from a particular area of focus. For instance, RQ1 focuses on the individual mode of interaction, RQ2 on the

multiplayer mode, and RQ3 on the young people's tactics and strategies for completing the game objectives.

Based on the purpose of each question, I used observation and the think-aloud technique to answer RQ1, RQ2, and RQ3 and semi-structured interviews for RQ4. The next section will further discuss each method.

Table 4-3 The Research Questions with Their Data Collection Methods

Refined question	Purpose	Data collection methods
RQ1: : How can the interactions of young people with virtual game environment enhance digital literacy skills?	To look at the different interactions of young people with video games that could enhance their digital literacy	Observation Think–aloud
RQ2: How can the social interactions of young people with other players enhance their digital literacy?	To look at young people's interactions with other players as partners or opponents	Observation Think-aloud
RQ3: How can completing game levels enhance young people's digital literacy?	To look at the different strategies young people use to complete video game levels	Observation Think-aloud
RQ4: To what extent do young people comprehend the stories in casual games?	To investigate whether the players could understand the casual game activities.	Semi–structured interviews

4.3.3.1 Observations

Observation is a data collection method that offers researchers the opportunity to gather *live* data from a particular situation (Cohen, Manion, & Morrison, 2007); it allows them to systematically observe and record participants' behaviours, actions, and interactions (Hennink, Hutter, &

Bailey, 2011, p. 170). Because this study's main aim was to observe and record the game play activities of young people, observation was the best-suited data collection method for this study, and I used it to answer RQ1, RQ2, and RQ3.

In this study, I observed each participant for 30 minutes because the first 30 minutes of an activity is considered optimal for obtaining quality data. This decision was based on a pilot study that was conducted earlier (explain in Section 4.3) and also suggested by Ang et al. (2011). According to Ang et al. (2011), the first 30 minutes is the learning curve for most games and time during which the most important activities emerge. During the 30-minute periods, each participant played the casual games that were pre-installed on their portable devices. An iPad was used throughout the study, but participants could also bring and use their own devices with the proviso that one of the games I had selected had to be pre-installed on their devices.

Because the data collection site was done at the school computer-club laboratory, I asked participants to sit anywhere they felt comfortable, which in part helped them to feel that this was not a normal computer club activity that they usually attend to. Participants were also allowed to use the Internet and communicate with their game peers. I instructed each participant to play the games in their natural ways with no rules except that they had to be playing games that were purposely selected for this study. Using one-to-one

observation, I sat next to each participant and observed his or her actions and interactions with the games for 30 minutes.

During the observations, I used a video recorder and field notes to record the activities. For the purposes of this study, I acted as a non-participant observer. Non-participant observation refers to when researchers act as outsiders to groups, observing without direct involvement with the activity. In contrast, participant observation allows researchers to participate in the lives of the study community (Hennink et al., 2011) with direct involvement with the activity. As a non-participant observer, I was more freely able to record, observe, and take field notes.

4.3.3.2 Think-aloud technique

During the observation process, I also used the think-aloud technique to collect data from the participants. Think-aloud is a research method that allows participants to verbalise their actions and thoughts throughout the evaluation activities (Gjøsæter & Jørgensen, 2012, p. 80). It is stated by video game researchers (such as Blumberg & Fisch, 2013; Zhang, Shen, Luo, Su, & Wang, 2009) that game play activities are problem-solving processes that involve players' use of their cognitive skills. The technique is used when simple observation is insufficient for collecting more complete participant data, in this case, on how the students interacted with the casual games.

Therefore, to understand their cognitive processes during the game play, I used think-aloud to let the participants verbalise their actions as they were completing game tasks, including the reasons they selected each action. Think-aloud is also recommended by Gjøsæter and Jørgensen (2012) as suitable for focusing on players' actual experiences with video games. However, based on the results of the earlier pilot study, I found out that it was difficult for participants to discuss their actions and thoughts whilst they played the games. As such, I thought the best method was to guide them by asking questions. Specifically, during the observation phase, I asked the participants about their actions that I thought required more information. All think-alouds were conducted in *Bahasa Melayu*, which allowed participants to respond quickly. Below are some of the prompt questions that I asked (translated into English).

4.3.3.3 Semi-structured interviews

In addition to observation and the use of think-aloud technique, interview was also used as data collection method. In this study, the interview process is purposely designed to obtain more information from the participants after playing casual games. According to McNamara (2006), interview is useful as a follow-up method for obtaining in-depth information, and for further investigate participants' responses. Since I used think-aloud technique, it is important to conduct a follow-up interview with the participants. This

decision was based on the pilot study, in which during the think-aloud technique was conducted, the participants were also playing casual games, and asking too many questions interfered their gaming process. Research studies (such as Aitken & Mardegan, 2000; Young, 2005) use follow-up interview for getting in depth information on their participants' experiences after conducting think-aloud process.

In the main study I have to consider in minimising the number of think-aloud questions asked of participants. Nielsen, Clemmensen, and Yssing (2002) also suggested that it is important to conduct interview to compliment data from think-aloud technique because as Ericsson and Simon (1980) stated that think-aloud data will always be incomplete. The main reason is because many of the thoughts cannot be expressed in real time while the participant is simultaneously interacting with the computer (Nielsen et al., 2002; Tan, Leong, & Shen, 2014).

In conducting the follow-up interview, I used semi-structured type of interview. It is an interview process in which the researcher has a list of guided questions and the researcher may modify the questions during the interview process (Ary, Jacobs, Sorensen, & Walker, 2010; Edwards & Holland, 2013). Unlike the structured interview, which is focused only the set questions,, the semi-structured interview allows the researcher to ask follow up questions which are important for facilitating further discussion.

In this study, the interviews were performed on a one-to-one basis. A total of 20 semi-structured interviews were carried out from a bounded sample of 20 participants. The interviews were also conducted in the school computer club laboratories, immediately after the 30-minute observations. After each observation session, each participant was asked to stop playing the game, after which I interviewed each participant using the interview protocol (Appendix F) as a guideline. These guiding questions were designed to probe the participants about their game play activities during the observation process. The advantage of the guiding questions, as Berg considers, is that these questions are typically asked of each interviewee in a systematic and consistent order, but the interviewers are allowed freedom to digress; that is, the interviewers are permitted (in fact expected) to probe far beyond the answers to their prepared and standardised questions(Berg, 2001, p. 70). The interview protocol was divided into three sections: player experience, understandability and social factors, and each section has its number of questions.

As with the think-aloud technique, all interviews were conducted in Bahasa Melayu. Since Bahasa Melayu is the participants' native language, it was easier for the participant to reply to all the questions and they were better able to accurately articulate themselves in their mother tongue. Each interview was audio recorded, transcribed and later translated into English (example as in Appendix G).

Each interview took 15 minutes and started with a probing question with which to classify the participant as either a frequent or infrequent casual game player; for example:

(*Researcher): How many times a week do you play video games?*

(Zikry): Mmm…once a week, not sure

(Researcher): Everyday?

(Zikry): No…

Following this initial question, the interview continued with other guided questions as stated in the interview protocol. In addition, based on notes taken during the observation process, I also asked questions about their actions on gameplay activities. These questions were asked in order to get a better understanding of participants' actions during the gameplay activities. An example question is shown below:

(Researcher): I can see that you went to YouTube, looking for strategies to solve the level. Did you have any specific reason for choosing YouTube?

(Zara): Yes… I like YouTube...

(Researcher): Why?

(Zara): Mmm… for me it is easy to find how to play each level

Although such question can be asked using the think-aloud technique, as mentioned earlier, I needed to minimise the number of questions asked of participants during the observation process. The guided questions

(Appendix F) helped to establish rapport with the participant; however, most of the information was gathered simply by asking questions based on the notes taken during the observation process. Therefore, it was important that the interviews were conducted immediately after the gameplay sessions so that the participants' had clear memories of their actions. However, it was resulted that some information was missing because all of the questions were asked based on the notes that taken during the observation process. Initially the plan was asking a semi-structured format questions, however, as stated earlier, it was changed to questions that based on the notes taken earlier. I was not able to check and rephrase the questions properly, since the interview was done immediately after the observation. To obtain the missing information, I watched the videos that particular activity repetitively. If I did not get the information through the videos, I went back to the computer club and asked the question that I think important for the study. Therefore, for future research study, it is advisable to conduct the interview after checking and phrasing the questions properly. It will advisable if the researcher and participant are watching the game play activities video while doing the interview process.

4.3.4 Data collection summary

This section summarises how I conducted this case study. As shown in Figure 4-2, the process of conducting the case study began with my

recruiting students who attended the after-school computer clubs. By my disseminating the information sheet and a consent form to each participant and their parents or guardians, I successfully recruited twenty students from four clubs.

At their respective schools, I observed each participant playing casual games using my iPad or their own devices over a period of 30 minutes. During the game play, I used the think-aloud technique with prompting questions to get the participants to verbalise their actions and thoughts throughout their game play activities. The prompting questions were based on any actions or tasks that I thought I needed more information about. All game play activities were recorded on a video camera that was placed over the participant's shoulder.

After the 30-minute observation, as shown in Figure 4-3, the final process was the semi-structured interview, each of which lasted for about 15 minutes.

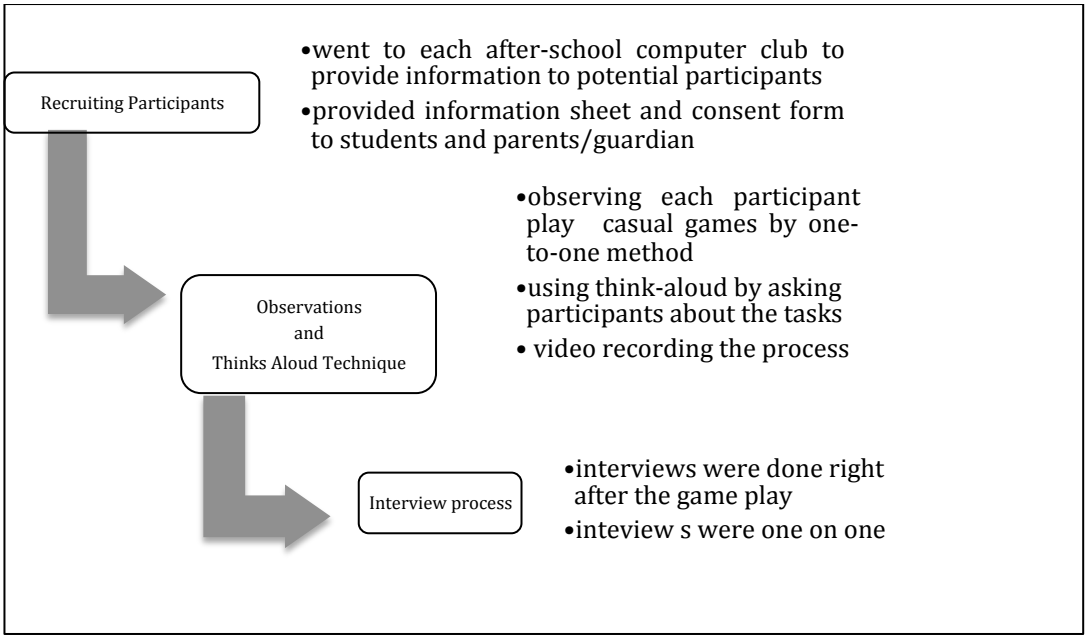


Figure 4-3 Summarisation of data collection process of this study

4.4 Analysing the Data

In this section, I describe the techniques that were used to analyse the data I collected from the observations, think-alouds, and interviews. I need to highlight here that my field notes only recorded the details of the actual setting, date, time, and participant number. Thus, I did not need to analyse any data from the field notes.

Raw data were mainly recorded as video and audio information and analysed using specific techniques in order to answer the main research question of this study. The observation and think-aloud data were analysed using the hierarchical levels of human activity, and the interview data were analysed using summarisation and comparison. The next subsections describe how I analysed the data.

4.4.1.1 Observations and think-alouds

Through my observations process, I obtained 20 30-minute videos, which consisted of the game play activities and the verbal interactions during the think-alouds. All videos were imported to iMovie to allow for editing them (iMovie is a video editing software application that comes installed on Apple devices). Using iMovie, I edited the videos by extracting the activities that could have possibly enhanced digital literacy skills. To extract these activities, I went through an iterative cycle of watching and listening to them, and if a particular activity could potentially enhance digital literacy skills, I cut it out to form a segment of a video.

All videos segments from iMovie were imported to HyperResearch so that I could easily transcribe them. During the transcription, I used an Infinity foot pedal to help me control the playback. These pedals allow for hands-free dictation control. All of the transcribed data are in either Table 4-5 or Table 4-6 depending on whether or not the game required completing levels. *Candy Crush*, for example, requires plays to complete levels in order to keep playing, as shown in Figure 4-4. Games without levels of game usually reflect more of an endless game world. For example, *Subway Surfer* is a game that does not have levels but is instead a game world with different settings, obstacles, and challenges.

Figure 4-4Levels in *Candy Crush*

The table is designed based on the hierarchical level of human activities, and these levels guided me in analysing the data collected from the observations and think-alouds. According to the activity theory perspective discussed in Section 3.2.3, activities are composed of a hierarchy of actions and operations; thus, the tables are divided into columns for activity, actions, and operations.

Table 4-5 is an example of how I transcribed *Candy Crush*, which has levels, whereas Table 4-6 is an example of how I transcribed a game, *Subway Surfer*, that had no levels.

Table 4-4 Sample Transcription - Level-type Game

		Activity	**Action**	**Operations**	**Notes**	**Conversation (if any)**	**Evidence of Digital literacy**
Time 30 seconds	Level 201	Clear all jellies in 42 moves	Finding striped candy Breaking blocks	Combine 3 blue colours Break 4 yellow colours Break green candies	Rules (RQ1)	R: What are you doing now? P: This level must clear all jellies.	PV RT

Table 4-5 Sample Transcription - Non-level-type Game

		Activity	Action	Operations	Notes	Conversation (if any)	Evidence of Digital literacy
Time 30 seconds	Clip 3	Collect coins	Jumping on trains Surfing through the train tracks	Aim the avatar towards rows of coins Get the surfboard Control the avatar Avoid trains	Avatar (RQ1) Rules (RQ1) Strategies (RQ 2)	R: Have you ever played this game? P: No, I haven't R: How do you know how to play this game? P: I don't mmm I just play	PV BR

After entering a given activity into either Table 4-4 or Table 4-5, I used a technique called content analysis to systematically work through each transcript, specifically looking to see how often a given factor arose (Rohrer-Murphy, 1999). In this case, the factors were the six digital literacy skills. The column of Evidence of Digital Literacy placed the digital literacy skill that

emerged during that particular activity. Any interactions and strategies were also identified and placed in the notes column as shown in the tables.

4.4.1.2 Semi-structured interviews

As mentioned above, all the interviews were conducted in and transcribed into *Bahasa Melayu*; there were 20 15-minute audio recordings.

The interview data were categorised based on the three sections of the interview protocol (see Appendix F): video game experiences, recall information, and collaborative practices. Data from this method comprised the participants' stories and views on their experiences with the games.

Using a case summary sheet (Harding, 2013) (see Appendix H), I summarised the interview transcriptions under three headings that were similar to the three sections in the interview protocol. This summary sheet served as a reference for further comparative analysis of the data.

4.5 Validity Strategies

According to (Harding, 2013), some simple techniques can be used to enhance the validity of qualitative studies, such as reading thoroughly through transcripts before beginning any analyses. The iterative process of watching the videos, listening to the audio, and reading the transcriptions helped me make sense of the raw data.

Triangulation is another technique for checking the validity of findings; as suggested by Harding (2013), it can help researchers double-check their findings by using multiple analysis methods and data sources. In the case of this study, combining the data from the observations, think-alouds, and interviews helped me to double-check the validity of my results.

Asking for input from other researchers is another technique used to establish the validity of results. This technique is called *inter-rater reliability*, which means two or more individuals agree by observing and evaluating the same phenomenon in the same setting (Marques & McCall, 2005). In this study, inter-rater reliability acts as a solidification tool (Marques & McCall, 2005), confirming that the game play activities are effective in providing the evidence of contribution to digital literacy skills.

For this study, I asked two experienced researchers to verify my findings. Both researchers are from different discipline background: one was familiar with technology, while the other was not. Having this peer review was important for establishing the consistency of my findings based on their different background. In order to make this technique successful, I explained the aims of this study and described each of the six digital literacy skills to the inter-raters on two separate occasions. Using videos and tables, I asked whether they agreed that a particular game had the potential to enhance the

digital literacy skills. An example of the questions that I used to initiate the inter-rater reliability process is listed below:

(Researcher): *This game play activity provides evidence of photo-visual literacy skill and real-time literacy skills. Do you agree me?*

Based on the question above, both raters either agreed or disagreed with my selection of games. For the most part, the raters approved of the digital literacy skills thought to be associated with particular game activities. However, in some cases, the raters questioned whether a particular game led to the development of particular digital literacy skills. Below is the example (not direct transcriptions) of the discussions:

Inter-Rater*: Looking at this action, why do think this particular action will have this branching skill?*

Researcher: *For this action…this is because when you go to the Internet, there are hyperlinks and hypermedia that you come across. For branching skills, this is a skill that enables individuals to stay oriented, not get lost and to perform actions successfully in the digital environment. For this particular action, the participant managed to go to the walkthrough website that they found through Google search, and then successfully returned to the game.*

Establishing inter-rater reliability is a time-consuming process in which I have to explain certain game play activities to the raters to help them understand how I interpreted the data. However, this process has helped to strengthen the reliability of this study.

4.6 Ethical Considerations

Work with minors requires considering ethical issues. This section discusses the issues that I had to consider while undertaking this study. I used the the National Children's Bureau's ethics guidelines on research with children (Shaw, Brady, & Davey, 2011).

Ethical Approval from the University

For this study, I obtained ethical approval before I upgraded from the MPhil to the PhD examination process. Using reference number: *REF(EM)/12/13-19*, I was given full approval by King's College London to pursue this research.

Access to Participants

As was stated in Section 4.3.1, in order to recruit participants between 10 and 12 years old, I had to consider on how to gain access to them through the different after-school computer clubs. Firstly, I had to ask permission from the school gatekeepers to gain access; I used a permission letter (see Appendix A) that they could sign to grant me access.

Another important aspect was the permission from the parents or guardians of each participant; I gave the students' caretakers an information sheet (see Appendix D) and an informed consent form (see Appendix E), and I also

gave each participant him- or herself an information sheet (see Appendix B) and consent form (see Appendix C).

It was also necessary to consider the participants' anonymity and confidentiality. I have used no personal information such as names and schools in this thesis, only each participant's age and gender.

Casual Game Selection

According to the National Children's Bureau, any material used in research study that involves young people must be age-appropriate. I am aware that playing video games can have a negative impact on young people, so I chose games based on their iTunes content ratings (cited from www.bewebsmart.com). All games in this study were listed as age rating 4+ or 9+:

Age Rating 4+: Games in this category contain no objectionable material: *Angry Bird Star Wars Edition; Cakemania Main Street; Cityville and Farmville; Candy Crush; Shark Dash; Minecraft; Restaurant Story; and Scrambble with Friends*.

Age rating 9+: Applications in this category may contain mild or infrequent occurrences of cartoon, fantasy or realistic violence, and infrequent or mild mature, suggestive, or horror-themed content that might not be suitable for

children under the age of 9: in this study, the age 9+ games were *Gravity Guy; Sribblenauts; and Subway Surfer*.

4.7 Pilot Study

Pilot studies help researchers refine their data collection plans with respect to both the data content and the procedures to be followed Bryman (2012). Their purpose is to test the adequacy of research methodologies that will be used later in the main study.

For this thesis, the pilot study was conducted over two months at the after-school computer club at a lower secondary school in Brunei. There were only 5 participants, 2 girls and 3 boys, because the rest of the students were not 10-12 years old or were not willing to participate in the study. Below are the changes I made based on my experience with the pilot study.

My role changed from participant as observer to observer as participant

When I designed this research, I had intended to be the participant as observer, playing games with the students to record more details of their interactive game play activities. However during the pilot study, I could not obtain sufficient data when I too played the games; it was difficult for me to have verbal interactions with my young participants. Thus, I shifted my role to that of observer as participant.

Think-alouds with prompting questions

As mentioned above, I originally intended to play the games with the participants. However, I decided on the spot that I had to concentrate on only one task, so I used the think-aloud technique to ask emergent questions that would encourage the students to talk while they played the games; the questions were based on their behaviours as they played:

1. What are you playing now?
2. Why are you doing that?

The time period of 45 minutes was reduced to 30 minutes

I had planned for each game play session to last for 45 minutes. However, based on early analysis from the pilot study, I reduced that time to 30 minutes in which I realised that the first 30 minutes was the best period to obtain data. The rest 15 minute just an iterative process of playing casual game.

CHAPTER 5 RESULTS AND ANALYSIS 1: GAME PLAY INTERACTIONS AND DIGITAL LITERACY SKILLS

5.1 Introduction

This chapter presents a series of interactions of young people in game worlds that contribute to the enhancement of digital literacy skills. It presents results that respond to the following research question:

RQ1: How can the interactions of young people with virtual game environment enhance digital literacy skills?

As mentioned earlier in Chapter 3, Section 3.2.6.1, the main aim of *RQ1* is to investigate interactions by young people available in game play activities that contribute to the enhancement of digital literacy skills. From the perspective of the activity theory, as developed in Chapter 3 (see Section 3.2.6.1), RQ1 is derived from the upper part of the triangle. Figure 5-1 illustrates the section of RQ1 in the activity theory of this study.

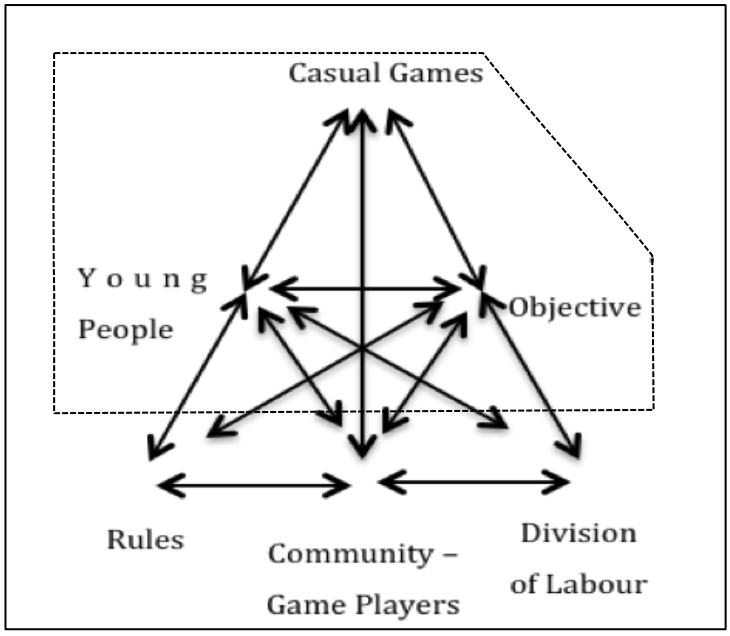


Figure 5-1 RQ1 section in activity theory of this study

From the activity theory perspective, the section of RQ1 in Figure 5-1 is the mediated relationship at the individual level. In the context of this study, the RQ1 section is the relationship between young people and the objective of the game play activity, mediated by casual games. Thus, in this chapter, I present results that focus on the individual interaction with casual games.

Qualitative analysis of the study data confirmed that the interaction forms stated in this chapter contributed to the enhancement of digital literacy skills of the young people in this study. The application of the activity theory (Chapter 3, Section 3.2) and the six digital literacy skills (Chapter 3, Section 3.1) has helped to make sense of the study data and to recognise the

interaction activities. Transcriptions from think-aloud and interviews stated here were all translated from Bahasa Melayu into English.

5.2 Interaction Activities

As mentioned by Ermi and Mäyrä (2005), game play is a an interaction process between the game and the player. Thus, in this chapter, I consider the game play interactions as individual interactions with casual games. In this thesis, I defined individual interaction as young people playing the game in single-player mode interacting with casual games to meet the objective of the activity. In Figure 5-2, I illustrate the interaction of a player of casual games using digital technology, such as an iPad. In this figure, there is an exchange process of information between the player and the casual games. This figure illustrates the two-way communication between casual games and the player. For instance, in *Candy Crush*, the information from player to casual game is to swap place of a yellow candy to a blue candy in order to break three yellow candies and information from the casual game to the

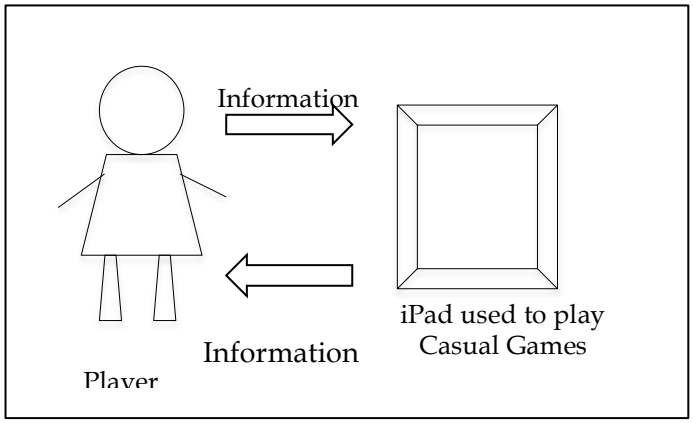


Figure 5-2 Interaction between one player and casual games using an iPad

player is "*break four yellow candies to get a striped-yellow candy*".

Literature suggests that a number of interactions can be found in the interaction model for game and virtual environment design. The interactions are spatial interactions, aural interactions, and representation interactions. In this chapter, all interactions listed here refer to representational aspects of interaction. Representational aspects of interaction refer to interactions regarding all aspects of the appearance of virtual environments (Manninen, 2004), such as characters and other objects presented in a game environment, which are aspects of appearance.

Concerning the definitions mentioned above and the results of the data analysis, the interactions listed in this chapter are categorised into three themes: interaction with introduction scenes, interaction with virtual characters, and interaction with rules. These types of interactions contribute to the enhancement of the digital literacy skills of participants. However, as mentioned earlier in Chapter 3 (see Section 3.2.5), the participants are unaware of the presence of digital literacy skills while they play casual games.

5.3 Interactions with Introductory Scenes

In this thesis and based on the results of this study, I defined an introductory scene to be a scene that usually emerges as an opening scene when players

play the game for the first time. The introductory scene usually provides players with a narrative introduction of the game, which tells the background story about the game. Apart from narrative introductions, some introductory scenes also provide rules, and instructions on how to play the game. From my observations throughout the game play activities, the purpose of an introductory scene is to provide players with information about the game so that players understand how to play the game. Although a casual game is simple and easy to play (Juul, 2010), some casual game titles also provide players with an introductory scene. In this study, *Angry Birds Star Wars*, *Candy Crush*, and *Shark Dash* are examples of casual games that have their own introductory scenes. Consequently, all data extractions used as evidence in this section are taken from participants that play these three casual games titles.

5.3.1 Start to play

Through observation, I have studied the participants' behaviours when starting casual games that they have never previously played. This finding illustrates a relationship between their behaviour and the enhancement of digital literacy skills.

Before describing the results in this section, it is important to explain the presentation of the results of this study. In order to describe them in a meaningful way, I divided the participants into two groups of players:

frequent players and infrequent players. The splitting of participants is based on their responses to an interview question: How many times a week do you play casual games? (Listed below are some examples of their answers.)

Table 5-1 How many times in a week do you play casual games?

Frequent Players	***Infrequent Players***
(Fiqah): *mmm, everyday, I play games on my iPad when I arrived home after school.*	***(Ariz):*** *I play games on Friday and Sunday.and also during school holidays.*
(Hana): *Almost everyday, I love playing games on my tablet before going to sleep. But if my parents saw me with my tablet, they will ask me if I have finished my homework.*	***(Nadia):*** *not everyday, my mum won't let me*

Concerning their answers and for the purposes this study, I defined frequent players as participants who play casual games every day and infrequent players as participants who play casual games only on weekends and on non-school days. As shown in Table 5-2, out of 20 participants, 13 of them are considered frequent players, and the rest are infrequent players. Table 5-2 displays the casual games they played during the observation process.

Table 5-2 Frequent and Infrequent Players in this study

Frequent Players	Infrequent Players
Ali (*Minecraft* and *Scribblenauts*)	Quina (*Angry Birds* and *Scribblenauts*)
Fiqah (*Subway Surfer*, *Candy Crush*, *Scramble with Friends*)	Ariz (*Angry Birds* and *Candy Crush*)
Shima (*Scramble with Friends*, *Candy Crush*, and *4 Pics 1 Word*)	Damia (*Angry Birds* and *Shark Dash*)
Hana (*Shark Dash*, *4 Pics 1 Word*, and *Candy Crush*)	Rafiq (*Angry Birds* and *Scribblenauts*)
Hafiz (*Scramble with Friends*, *Candy Crush*, and *4 Pics 1 Word*)	Adam (*Subway Surfer* and *Scribblenauts*)
Muizz (*Minecraft*, *Scramble with friends*, and *Angry Birds*)	Shaza (*Shark Dash* and *Angry Birds*)
Danial (*Angry Birds* and *Minecraft*)	Nadia (*Candy Crush* and *4 Pics 1 Word*)
Malik (*Minecraft* and *4 Pics 1 Word*)	
Nabil (*Minecraft* and *Scribblenauts*)	
Zikry (*Shark Dash*, *Angry Birds*, and *Minecraft*)	
Zara	

Frequent Players	Infrequent Players
(*Candy Crush* and *Minecraft*)	
Iwan (*Angry Birds* and *Minecraft*)	
Izyan (*Angry Birds* and *Scribblenauts*)	

However, it is not the main objective of this research study to make a comparison of the behaviour of frequent players and infrequent players. Rather, dividing the participants, as in Table 5-2, is only because of their behaviour in response to the introductory scene. During the game play activities, frequent players ignored and skipped the introduction scenes of casual games, whereas infrequent players watched the scenes. Although, frequent players ignored the narrative introduction of casual games, it did not affect their game play activities. They were able to meet the objectives of the game play activities and successfully played the game very well. Their pattern of behaviour in response to the introductory part provides evidence that, despite not having any knowledge of the game, they are able to successfully play the game.

For instance, Table 5-3 shows one example of a frequent player, Hana, playing a casual game called *Shark Dash*. As we can see from the table, she never played this game before this study. Before she proceeded to the actual

starting game play scene, *Shark Dash* provide her with a narrative introduction, which tells a story of a group of ducks attacking the main character (shark) and his female friend. From the scene, the group of ducks grabs the female friend away from the shark. As we can see, the introductory part of this game explains to the player the reasons to eliminate the ducks.

Table 5-3 Example of action of Hana (frequent player) in the introduction of *Shark Dash*

	Activity	**Action**	**Operations**	**Notes (Researcher)**	**Conversation (If any)**	**Evidence of Digital Literacy**
Level 1 (Clip 17)	Playing game called *Shark Dash* Level 1: ONE shot for all ducks	-Go into the *Shark Dash* virtual world -Shoot all the ducks above the shark	-Press skip button -Press start button to play -Drag the shark down -Release the shark	She Skipped the introduction	R: Have you ever played this game before? H: No, never R: Oh, ok. R: Why are you doing that? Skipping the introduction part? H: Mm… wasting time, I don't like the introductory part.	Branching RealTime

Using think-aloud during the observation process, I asked her about her action during the introduction of *Shark Dash*. As shown in Table 5-3**,** she replied by saying that watching the introduction scene wasted her time. To enquire further on this action, I asked her again during the interview session.

(Researcher): *I saw you skipped the intro part of* Shark Dash*. Do you know what kind of information the intro part provides you?*

(Hana): *mmm (laugh),I don't know might be the story of the game I don't know.*

In the same interview session, she also stated that she always skips the introduction scenes of any casual games. According to her, the introduction scene does not help much in completing the game. In addition, her action of skipping the introduction part during the observation process did not affect her gaming activity. She quickly and successfully completed the first level of *Shark Dash*.

The pattern of action during the introductory scene of casual games for other frequent players was the same. Similar to Hana, they also avoided the introductory part by going straight to the game play activity. As this behaviour was interesting, during the interview session, I asked them questions related to this action. According to the frequent players, the reason for skipping the introduction scene was due to the worthless information provided by the scene. They also said that watching the scene was a waste of time.

(Fiqah) *"I usually don't like the introductory part of the game, sometimes it took ages for me to listen or read that part."*

(Shima) *"Wasting time."*

(Muiz) *"I prefer to do the trial and error on the game. If I ignore the introductory part, I just try the game."*

(Zikry) "I know what I am doing...If you skipped that part, the game itself teach*es* you."

The above quotes indicate that they may have been frustrated with the introduction scene of casual games. It seems that they preferred to learn the game by playing it, rather than by instructions given in the introductory scene.

Regarding the infrequent players in this study, they listened to or read the introductory part of the game. Table 5-4 shows one example of an infrequent player who played the same casual game as Hana. Similar to Hana, Shaza was also new to *Shark Dash*, but there was a difference in behaviour during the introduction scene. In Table 5-4, it can be shown that this participant followed the sequence of the game flow by concentrating on the introduction scene first and then proceeded to the actual game play activities.

During the interview process, I asked Shaza about the introduction scene of *Shark Dash*. According to her, the introduction scene provides a preview of what type of game she will be playing.

Table 5-4 Example of an Infrequent player (Shaza) playing *Shark Dash*

	Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital Literacy
Level 1 (Clip 2)	Playing game called *Shark Dash*	- Go into the *Shark Dash* virtual world	- Press start button to play, -Drag the shark down, Release the shark	She is waiting for the narrative scene. She is staring the iPad screen.	R: Have you ever played this game before? P: No, never R: Oh, ok.	Branching

This pattern of action is similar to other infrequent players in this study. During the observations process, I noticed that they looked at the iPad without touching or pressing anything. This shows that they watched the introduction scene.

5.3.2 Digital Literacy

As described earlier in this section, there is a difference between participants' actions during the introduction scene of casual games. The frequent players tended to ignore it, while the infrequent players did not. Despite this dissimilarity, the reaction time in completing the first level of the casual game between these two groups of players was similar. Both groups of players were quickly able to complete the first level of the casual game.

The action of frequent players in this study shows that they were not lost in the virtual world of the casual game. They knew what to do as soon as they entered the game world. They were also able to finish one level of the game in a short time. These results suggest that the interaction behaviour of young

people in this study regarding the introduction scene of casual games indicates that players used branching and real-time digital literacy skills in order to be successful in a hypermedia environment.

Literature defines a branching skill as a skill that enables users to navigate successfully in hypermedia digital environments (Eshet, 2004). The results of this study show that participants, especially the frequent players, are able to navigate easily in the game world without even knowing the story of the game.

This interaction activity also promotes the real-time digital skills of participants. Without knowing the story of the game, the participants, especially the frequent players in this study, were able to perform efficiently and solve the game with a high-speed reaction time. According to Eshet-Alkalai (2008), real-time digital literacy skills are skills that relate to the speed of processing information in the digital environment. With real-time thinking skills, the users are effectively able to process the fast-moving stimuli present in the digital environments.

The observation process has indicated that, in a period of one clip (30 seconds) of video data, frequent players were able to complete either two or three levels of the game. The evidence also shows that without any knowledge of a new game, the frequent players were able to complete two or three levels within a 30 second period. To support these assumptions, below

are two examples of activities that show the real-time digital literacy skill that is involved while playing video games. These two examples involved two frequent players (Fiqah and Hana) playing *Candy Crush* and *Shark Dash* during the observation process.

Table 5-5 Fiqah plays *Candy Crush*

		Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital Literacy
Time: 30 Seconds	(Clip 7) Level 1	Playing a game called *Candy Crush* Level 1: Get 650 With 6 moves	-Break the yellow candy -Break the blue candy	-Press the skip button -Swap orange and yellow candies -Swap red with green -Swap yellow with blue -Swap striped blue with yellow	She skipped the instructions.	R: Is this your first time playing *Candy Crush*? P: Yes, my first time.	Branching Real Time
	Clip 8 (Level 2)	Level 2: Get 1900 with 15 moves	-Break the blue candy -Break the yellow candy -Break the red candy	- Press skip button -Swap yellow with blue -Swap purple with yellow -Swap striped yellow with orange -Swap green with striped red	Again, she is skipping the instruction. How does she know the striped candy gives more points?	R: What are doing now? P: I want to get striped candy to get more points.	
	Clip 9 (Level 3)	Level 3: Score: 4000 with 18 moves	-Break yellow -Break yellow -Get wrapped red candy -Break wrapped red candy	-Press skip button -Swap yellow with green -Swap yellow with blue -Swap red with green -Swap yellow with green -Swap red with blue			

Table 5-6 Hana plays *Shark Dash*

		Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital literacy
Time: 30 Seconds	(Clip 17) Level 1	Playing the game called *Shark Dash* Level 1: 1 shot for all ducks	-Go into the *Shark Dash* virtual world -Shoot all the ducks above the shark.	- Press skip button - Press start button to play -Drag the shark down -Release the shark	She skipped the introductory part.	R: Have you ever played this game before? P: No, never. R: Oh, Ok. R: Why are you doing that? Skipping the introduction part? P: Mm Wasting time, I don't like the introductory part.	Branching RealTime
	(Clip 18) Level 2	Level 2: Under-water Shot (All duck in 2 shots)	- Shoot the duck by dragging the tail Aim to shot the ducks	- Drag the tail - Moving the tail up and down	1st shot and 2nd shot - similar, but the sharks in different direction		
	Clip 19 (Level 3)	Level 3: Collapse the block (All ducks in 2 shot)	-Shoot the duck to one block - Shoot to the block	- Drag the tail - Moving the tail up and down -Let go of the tail - Drag the tail - Move the shark - Moving the tail up and down -Let go of the tail			

Tables 5-5 and 5-6 show examples of two participants playing three levels of the game within 30 seconds. From the tables, it can be seen that these two participants were skipping the introduction scenes, and yet they completed the goals of three levels of the game quickly. All frequent players had similar attitudes as these two frequent players. During the observation process, they completed two or three levels of the game in 30 seconds. This indicates that frequent players have the ability to process information and execute responses at a quick pace in order to complete the levels of the game.

Overall, these findings indicate that the preferred conduct of frequent players in this study concerning the introduction scene may lead to enhancement of digital literacy skills. Branching literacy skills and real-time literacy skills were found when they played games even without knowing the rules of the casual games.

5.4 Interactions with Virtual Elements

This section investigates the interactions of participants with the virtual elements present in a casual game environment. My observations and interview data indicate that the interaction of participants with virtual elements reveals the presence of digital literacy while young people played casual games. To present the results, I divided this section into interactions with virtual characters and interactions virtual icons.

5.4.1 Interactions with virtual characters

Before presenting the two areas of interactions, I must explain the term *virtual characters*. In the context of human-computer interaction, there are two types of virtual characters: avatars and agents. As defined by Bailenson and Blascovich (2004), an avatar is a perceptible digital representation whose behaviours reflect those executed, typically in real time, by a specific human being, and an agent is a perceptible digital representation whose behaviour reflects a computational algorithm designed to accomplish a specific goal or set of goals (Bailenson & Blascovich, 2004, p. 65). From the definitions, we can see that these two digital representations are different in the way they are controlled. In the context of gaming, an avatar is a character that is controlled by a player to perform tasks in order to accomplish the goals of the game. In contrast, an agent is another character that is controlled by the computer program. The agent could be a character, either an opponent or a partner.

In this study, I suggest that participants that played a casual game called *Scribblenauts* may have potential to enhance digital literacy when they interact with virtual characters. *Scribblenauts* is the only casual game in this study with many agents in each world in order to assist or interfere with Maxwell (the main avatar) to achieve the goal (to collect *starite*). For example, in Figure 5-3, there are four agents in World 1 Level 2 in *Scribblenauts*: cook,

policeman, fireman, and doctor. In order to meet the objective of World 1 in *Scribblenauts*, players need their cognitive skills to understand the character agents to help the main character, Maxwell.

Figure 5-3 A Screenshot of *Scribblenauts* World 1 Level 2 (iPad)

During the observation process, Quina played this level of *Scribblenauts* (as shown in Figure 5-3). In this level, the objective is to *give two of them what they (four agents) would use in their hands.* As can be seen from Table 5-7, Quina was able to complete this level quickly by understanding the information provided by the virtual characters. The physical appearances of these virtual characters helped Quina to understand the tools they use. From the observations during that process, she tapped the pencil button without any hesitation to create objects for the cook and policeman. This activity requires

thinking skill to relate objects with the physical appearance of virtual characters.

Table 5-7 Game play activity of Quina showing interaction with virtual characters

		Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital literacy
	World 1-2 (Clip 2)	***Scribblenauts*** Give two of them what they would use in their hands	Cook– Spoon Policeman-Pistol	-Press pencil button -Type word spoon -Give spoon to cook -Press pencil button -Type word pistol -Give pistol to policeman	Very quick in solving the level	R: Have you ever played this game before? Q: No. R: How do you know this (pointing the note pad)? Q: (She paused the game) From the first level…provide instructions	PV (Photo-visual) PV (Photo-visual)

Another casual game used in this study, called *Subway Surfer,* may also provide enhancement of digital literacy skills through interactions with the virtual characters. In this casual game, participants who played *Subway Surfer* must control the surfboard character to collect coins, avoid obstacles, and run away from the security officer and the dog. Figure 5-4 displays a screenshot of *Subway Surfer* with the virtual characters found in the game world. In this casual game, the avatar is the surfer, and the agents are the security officer and his dog.

From my observations, participants who played *Subway Surfer* must act very quickly to meet the objectives of the game play activity. For instance, as shown in Table 5-8, Adam played *Subway Surfer* during the observation process. In this table, we can see that Adam has to interact with the avatar, the surfer, by controlling his movements to collect coins, jumping to avoid hitting trains, and surfing faster to avoid the security officer and his dog. Therefore, in order to play this game successfully, Adam used his thinking skills to process the presence of coins, trains, boosters, and the security officer and his dog. From my observations, Adam was able to play this game quickly and successfully proceeded further into the game play world.

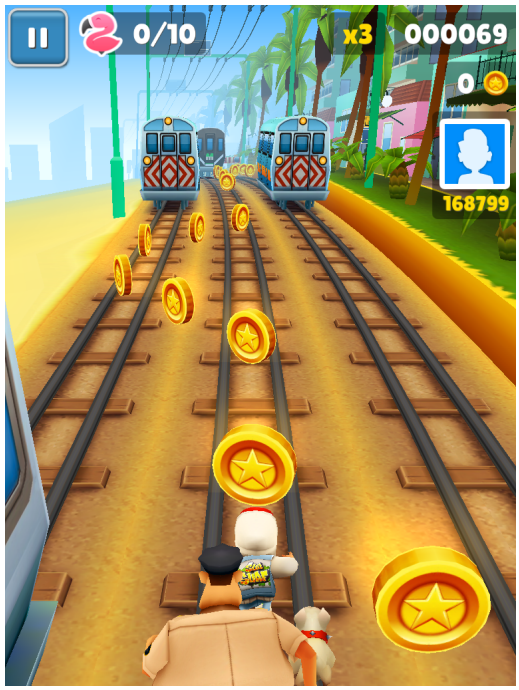


Figure 5-4 Screenshot of *Subway Surfer* (iPad)

Table 5-8 Game play activity of Adam playing *Subway Surfer*

	Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital Literacy
	Subway Surfer Surf away from security and the dog with collecting coins and boosters	-Collect coins -Avoid train -Avoid security and the dog	-Control surfer by moving the coins path -Control surfer by jumping -Control surfer by surfing faster			RT (Real-time)

5.4.2 Interaction with icons

An icon is graphical user interface that represents particular objects, actions, or commands in a digital environment. In casual games environments, icons are also embedded in the game interface so that players can navigate easily within the casual game environment.

From the observation process, I suggest that a player's interaction with icons is another type of interaction with a casual game that may potentially contribute to the enhancement of digital literacy. In this study, all casual games are embedded with icons that represent commands, actions, or objects.

In the *Scribblenauts* game play environment, as shown in Figure 5-3, there are icons of a camera, magnifying glass, pencil and notebook, pause symbol, and question mark symbol. All five participants in this study who played this casual game understand the meaning of these icons. During the interview process, I asked them questions regarding these icons. Below are the excerpts of their answers (one answer from each participant):

***Ali**: This is one for writing the objects (pointing at the pencil and notebook).*

***Nabil:** I don't know maybe question mark is for asking question never used it.*

***Quina:** This one is looking for information (pointing at the magnifying glass).*

***Rafiq:** I know this is asking for objects (pointing at the pencil and notebook).*

Adam: *Question mark is for hints.*

From the above excerpts, we can see that these participants were able to understand the meaning of each icon. All the above-mentioned icons are used to help players in their game play activities, except the camera icon, which is for sharing purposes.

5.4.3 Digital literacy

Results from the data analysis suggest that the two types of interactions mentioned in this section may contribute on the enhancement of digital literacy. For interactions with virtual characters, photo-visual literacy skills and real-time literacy skills might enhance these interaction activities.

As stated earlier, photo-visual literacy refers to the ability of individuals to intuitively and freely read and understand instructions and messages that are presented in a graphic visual form (Eshet, 2012, p. 268). The definition of photo-visual literacy skill reflects the results of the interaction of participants with virtual characters. The results (see Section 5.4.1) indicated that casual games, especially *Scribblenauts,* allow participants to use this skill to understand the virtual characters in an intuitive manner. From my observations, this participant was able to understand the information provided by the physical appearance of virtual characters and react naturally by solving this level of *Scribblenauts*.

According to data in this study, interaction with icons also has a slight possibility of contributing to the enhancement of photo-visual literacy of young people. Excerpts from an example from five participants who played *Scribblenauts* indicate that they were able to identify the use of icons present in *Scribblenauts*. The way the participants are able to understand the meaning and the purpose of icons indicates that the interaction with icons contributes to the enhancement of photo-visual literacy.

In addition, the results regarding this type of interaction also suggest that real-time literacy skills may be enhanced while playing casual games. Real-time literacy skills refer to the ability of an individual to effectively process fast-moving stimuli present in the digital environment (Eshet, 2012). According to Green and Bavelier (2003), when operating in the environment with different fast-moving stimuli, individuals must be quick to execute different tasks that respond to each of these different stimuli. From the results stated in 5.4.1, casual games in this study, especially *Subway Surfer*, require the participants of this study to use real-time literacy skills to successfully play this game. I suggest that interaction with virtual characters by controlling them, like in *Subway Surfer*, might result in the enhancement of real-time literacy skills.

5.5 Interactions with Rules

All games have rules. In order to complete any game, a player must follow the rules of the game. Without complying with the rules, the player will not be able to complete the game. The study data suggests that the interaction with rules may influence the enhancement of digital literacy skills of young people in this study. The interaction of rules is centred on the similarity of the rules of the casual games with other gaming titles.

In this study, based on the think-aloud and interview processes, three casual games are similar to other games according to the participants. The three casual games are *Shark Dash, Scramble with Friends*, and *Candy Crush.* In this section, I use these casual games to present the results of this section. All transcriptions stated in the next subsections are excerpted from the interview process. The questions asked are based on the information during the observation process. All participants mentioned in these subsections were first-time players of the three games.

5.5.1 Shark Dash

Figure 5-5 shows screenshots of *Shark Dash* and *Angry Birds Star Wars*. The figure illustrates the similarities between these two games. As mentioned by Danial during the interview process, he noticed the familiarity of *Shark Dash* and *Angry Birds* as soon as he entered the actual gaming scene of *Shark Dash*.

(Researcher): *How do you know how to play* Shark Dash *if this is the first time you played this game?*

(Danial): *When I entered the game, there is an instruction to drag the tail of the shark in order to knock down the ducks. Then I realised it is similar to* Angry Birds*, where you have to drag the bird in order to knock down the pigs.*

Figure 5-5 Screenshots of *Shark Dash* (above) and *Angry Birds Star Wars* (below) (iPad)

In the excerpt above, Danial stated that the similarity of *Shark Dash* and *Angry Birds* was the dragging concept in order to destroy the enemies. Hana also noticed that *Shark Dash* is similar to *Angry Birds*.

(Researcher): *How do you know how to play* Shark Dash*?*

(Hana): *I just play, and it is also similar to* Angry Birds.

(Researcher): *What do you mean similar?*

(Hana): *The dragging, then aiming the ducks and let go...all the same with* Angry Birds.

According to Hana, the three steps to destroy the ducks were similar to the three steps to destroy the pigs in *Angry Birds*. She made it clear in the excerpt above that the three steps to destroy the enemies were dragging, aiming, and letting go.

5.5.2 Scramble with Friends

As described in the methodology section (Section 4.3.2), *Scramble with Friends* is a word-puzzle game in which players must find words over adjacent letters in two minutes. According to participants who played this game, it is similar to a board game called *Boggle*. *Boggle* refers to a word game in which players attempt to find words in sequences of adjacent letters. Figure 5-6 shows a screenshot of *Scramble with Friends* and an image of *Boggle*. Although *Scramble with Friends* is a casual game and *Boggle* can be considered a board game, they are similar in terms of objectives. This was stated by two participants who played *Scramble with Friends* during the observation process.

Hafiz, for example, mentioned the similarity of *Scramble with Friends* to *Boggle.*

(Researcher): *How do you know how to play* Scramble with Friends*?*

(Hafiz): *It is similar when you play* Boggle*.*

(Researcher): *Similar? Why do you say so?*

(Hafiz): *Finding words in these squares (pointing to the squares). They are similar in that way.*

From the above excerpt, we can see that Hafiz confidently stated that the main objectives of *Scramble with Friends* and *Boggle* are similar in which the objective refers to '*finding words in a 4x4 grid in time limit*".

Scramble with Friends *Boggle*

Figure 5-6 A Screenshot of *Scramble with Friends* (iPad) and an Image of *Boggle* (*Boggle image taken from http://www.hasbro.com)*

Similar to Hafiz, Muiz also commented that the rules for finding words were similar to playing *Boggle*. He stated that the objective was finding as many words as possible within the time limit.

(Muiz): *It's similar to* Boggle*. The rule is finding words just like* Boggle*.*

(Researcher): *Can you explain more on this?*

(Muiz): *You must find words as fast as you can to beat your opponents. In* Boggle*, you also must find words faster. Both games have time limits. You must find many words within the time limit.*

5.5.3 Candy Crush

As described in the methodology section (Section 4.3.2), *Candy Crush* is a puzzle game, in which the objective is to break any similar three or more candies in a row in order to get points and complete the level. According to participants who played this game, they claimed that this game is similar to *Bejeweled*. Table 5-7 shows a screenshot of *Candy Crush* and *Bejeweled*. In Wikipedia, *Bejeweled* is a puzzle game, in which the objective is to swap one gem with an adjacent gem to form a horizontal or vertical chain of three or more gems of the same colour. For example, Shima explained that *Candy Crush* was similar to *Bejeweled*.

(Researcher): *Can you explain how to play* Candy Crush*?*

(Shima): Candy Crush *the rule is to combine three or more same coloured candies to break them. If you combine many same coloured candies, you will get a powerful candy. Just like* Bejeweled*,* Bejeweled *also has these combining rules. If you get more gems to break, you will get a powerful gem.*

Similar to Shima, Ariz also stated the similarity of *Candy Crush* and *Bejeweled*.

(Researcher): *Can you explain* Candy Crush*?*

(Ariz): Candy Crush *is similar to* Bejeweled. *Breaking candies to get points. You have to swap candy with the next candy to break candies, but must be three or more candies.* Bejeweled *also three or more jewels.*

Candy Crush *Bejeweled*

Figure 5-7 Screenshots of *Candy Crush* and *Bejeweled*

5.5.4 Digital literacy

The excerpts above indicate that participants of this study identified that the three casual games played in this study have similar rules as other games. They stated that *Shark Dash* is similar to *Angry Birds* in the way that both games use a catapult action to complete the mission on each level. In addition, *Scramble with Friends* and *Boggle* are similar in terms of finding many words over adjacent letters within a time limit. Meanwhile, *Candy Crush* is similar to *Bejeweled* in terms of swapping tiles, combining three or more tiles, and breaking the tiles.

The recognition of the similarity of game rules by the participants suggests that this skill may refer to a transfer skill. Concerning this situation, I refer to the transfer skill as the ability of young people use information or rules from other games in new gaming activities. Although this skill is not on the list of Eshet's digital literacy model, it may be considered an emergent literacy skill while playing casual games.

Based on the above evidence and claims made by the participants, I suggest that the transfer skill was substantially demonstrated when participants played a new game and made references to previous games they previously played. They claimed that they knew how to play these three games (mentioned above) based on their previous knowledge of other games that have similar rules. The situation of using previous knowledge and applying it to a new game environment has created an emergence of the transfer literacy skill.

5.6 Chapter Summary

In this chapter, I have presented the results and analysis of the data based on the RQ1. It focuses on the individual aspects of the interaction of young people with casual games. In response to RQ1, results of this study indicate that individual interactions of young people with virtual elements may

enhance photo-visual literacy skills, branching skillsand real-time literacy skills.

In this chapter, interactions with rules of the three casual games also suggest an emergent literacy skill, which is called the transfer literacy skill that was created in this study.

CHAPTER 6 RESULTS AND ANALYSIS 2: SOCIAL INTERACTIONS AND DIGITAL LITERACY SKILLS

Games are what we make out of them, speak about them-what we do with them, what we think about them, speak about them and even the ways in which we approach them in scholarly practice have an effect of how the meaning and experience of games becomes constructed.

Frans Mayra – Tampere 2010 (Ermi & Mäyrä, 2005, p. 89)

6.1 Introduction

This chapter presents the second finding of this study. It describes a series of social interactions of young people while playing casual games. This finding responds to the following research question:

RQ2: How can the social interactions of young people with other players enhance their digital literacy skills?

As stated in Chapter 3 (Section 3.2.6), the purpose of RQ2 is to investigate the social interactions of young people with other players while playing casual games. From the activity theory perspective, as shown in Figure 6-1, it shows the research question RQ2 focuses on the bottom part of the triangle, which emphasises the social aspects of an activity. In the context of this study, as

shown in Figure 6-1, this area centres on the social activities of young people while playing casual games. The term *community*, shown in Figure 6-1, refers to other casual game players involved in the game play activities of young people. As developed earlier in this study, all these activities are directed to the objective of the game play activity. Moreover, all social interaction activities are also interrelated with the division of labour and the rules of the social interaction activities.

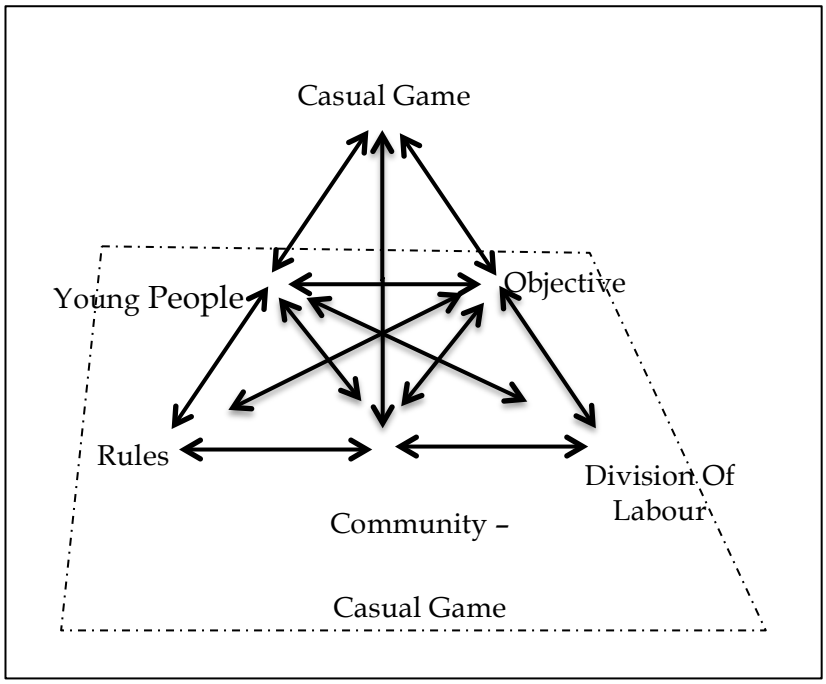


Figure 6-1 Activity theory of Casual Games showing the area of RQ2

This chapter is divided into four main sections. The first section describes the types of social interactions that occurred during game play activities. Based on the literature review, I have selected three forms of social interactions of players while playing video games. The second section provides digital literacy skills that relate to the social interaction in game play activities. The

third section presents the findings of this study that focus on RQ2. The fourth section presents the findings based on the three social interaction forms. The final section summarises the chapter.

6.2 Social Interactions in Game play Activities

Social interaction is not a new topic in research studies on gaming. In game play activities, players are not just playing alone; they are often connecting and communicating with other players, although the casual games played were single or multiplayer types of casual games. I suggest that these connections and communication activities demonstrate social interactions during game play activities. With the help of an Internet connection, video games exist around the social context forming a community of players (Ang et al., 2011).

Empirical evidence from various research has shown that there are social interactions between players occurring during the game play activities, although most research has focused on social activities while playing massive multiplayer online role-playing games (MMORPGs).

Based on the literature review, social interactions are listed in various forms: connection, cooperation, and competition. In the context of this study, I adopt the concept of social interaction as these three forms of social interactions. In terms of connections, this study considers social interactions

as players sharing and discussing knowledge with other players via the Internet. Cooperation is represented as players playing cooperatively with other players, and competition is represented as players playing competitively against other players.

In this study, I describe on how young people take part in social interactions while playing casual games. I would suggest that these social interactions contribute to their social-emotional literacy skills.

6.3 Digital Literacy Skills: Socio-emotional Literacy Skills

As described earlier in Chapter 3 (Section 3.2), there are six digital literacy skills listed by Eshet (2012). He described these six digital literacy skills as a conceptual framework for survival skills in the digital era. The socio-emotional literacy skill is one of the six skills in the conceptual framework for survival skills in the digital era. One of the skills is called a socio-emotional literacy skill. Obviously, the term indicates that this skill relates to the social activities of users in a digital environment. According to Eshet (2002b, 2012), this skill is needed for users in order to work effectively in a digital environment. Socio-emotionally literate users can be described as those who are willing to share data and knowledge with others, are capable of information evaluation and abstract thinking, and are able to collaboratively construct knowledge (Eshet, 2004, p. 10).

During the observation process, out of twenty participants, fifteen of them demonstrated social interactions while playing casual games. The five participants played single-player mode without making any interactions with other players. I assume that the reason is due to the nature of the casual games, which does not require any interactions with other players, or presumably, they just preferred playing casual games in single-player mode.

Table 6-1 shows the fifteen participants and their social interactions forms that were demonstrated during the casual game play activities. These interactions can be characterised as connection, cooperation, and competition.

Table 6-1 Participants of this study with their social interactions

Participants	Casual Games They Played	Type of Social Interactions
Ariz	*Angry Birds* *Candy Crush*	Competition Connection
Ali	*Scribblenauts* *Minecraft*	Connection Cooperation
Fiqah	*Subway Surfer* *Candy Crush* *Scramble with Friends*	Competition Cooperation
Hana	*Shark Dash* *4 Pics 1 Word* *Candy Crush*	Competition Cooperation
Hafiz	*Scramble with Friends* *Candy Crush* *4 Pics 1 Word*	Competition
Shima	*Scramble with Friends* *Candy Crush* *4 Pics 1 Word*	Competition
Muizz	*Minecraft* *Scramble with friends* *Angry Birds*	Competition
Zikry	*Shark Dash* *Angry Birds* *Minecraft*	Competition
Zara	*Candy Crush* *Minecraft*	Competition
Adam	*Subway Surfer* *Scribblenauts*	Competition
Nadia	*Candy Crush* *4 Pics 1 Word*	Competition
Iwan	*Angry Birds* *Minecraft*	Cooperation
Malik	*Minecraft* *4 Pics 1 Word*	Connection
Danial	*Angry Birds* *Minecraft*	Connection
Nabil	*Minecraft* *Scribblenauts*	Connection

As can be seen in Table 6-1, most participants have only one form of interaction, and some have two forms of interactions. This depends on the casual games they played during the observation process. For example, Ariz

has demonstrated two types of social interaction forms of competition and connection. The connection practice is due to the difficulty of *Candy Crush*, which leads him to search for information on the Internet. For the competition social interaction form, he played *Candy Crush* to compete on the *Candy Crush* leader board.

In another example, Muiz demonstrated only one social interaction form because the casual game he played, *Scramble with Friends*, requires him to play against other players. He played the other two casual games, *Angry Birds* and *Minecraft*, in single-player mode.

During the interview process, all participants replied that they have chat rooms to discuss specific titles of casual games. In the interview protocol, one section of the questionnaire related to their social activities. Data from the observation and interview processes of this study demonstrated that social interactions with other people contributed to digital literacy skills. However, all the results in this chapter show only social interactions with other players within the virtual environments. From the data analysis, during the observation, there were no peer-to-peer interactions in the real environments. This might be because during the observation process, I sat next to the participant, which might have constrained them from communicating with their friends online.

6.4 Social Activities

As mentioned above, the social interaction forms found in this study are divided into three types: connection, cooperation, and competition. All findings for this section are described under these three subsections.

6.4.1 Connection

This section describes the social activities in the form of sharing information for a specific casual game. In this study, five participants showed their activities of sharing and discussing information during the observation process. Table 6-2 shows that Ariz, Nabil, Malik, Ali, and Danial exhibited the connection type of social interaction during the observation process.

For Ariz, during the observation process, he played *Candy Crush*. Within the thirty minutes of observation, he had difficulty with one of the levels. He went to one of the many *Candy Crush* websites. Using think-aloud, I asked him about his action.

Table 6-2 Ariz's Game play Activity: *Candy Crush*

		Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital Literacy
Time: 30 Seconds	Clip 10 (Level 453)	Cont: Level 453 Bring all ingredients to the bottom with 48 moves (Level Failed) Went to a website	-Break yellow -Break red -Break yellow -Break wrapped red candy	-Swap yellow with red -Swap red with blue -Swap green with yellow -Swap red with green -Swap yellow with green -Swap red with blue	He went to a website.	**(R):** What are you doing now? **(Ariz):** Going to the Internet. I want to ask other players if they have tricks on solving this level. **(R):** Why? **(Ariz):** This is one difficult level. I have tried this level thousand times **(R):** Oh, Ok. Now, you are on the website. So, what are you going to do next? **(Ariz):** I am going to ask whether others have tricks on how to solve this level.	SE Socio – Emotional
Time: 30 seconds	Clip 11	Cont: Going to a website to ask for help	-Connect iPad to Wi-Fi -Go to a website -Go to discussion room	-Press Wi-Fi connection -Click on Safari -Key in the address -Press on the icon of discussion	He is asking the question "Do you have any tricks on how to solve Level 453?"		SE Socio – Emotional

Table 6-2 shows the social activity of Ariz while he played Level 453 of *Candy Crush*. As seen from the table, he went to the Internet and to a discussion forum room. He interacted and discussed with other players by asking a question: "*Do you have any tricks to share on how to solve Level 453?"*

From my observation, during the interaction, he was provided with various solutions from different players. Within two minutes, he managed to interact with a number of players on how to solve Level 453 of *Candy Crush*.

To obtain more information about his social interactions, I also asked him about this action during the interview process:

(Researcher): *When you played* Candy Crush*, I saw you went to one website to ask other players how to solve Level 453.*

(Ariz): *Yes.*

(Researcher): *Do you always do that?*

(Ariz): *Not really, it depends if I want to ask others about the difficult levels in* Candy Crush*.*

(Researcher): *Oh ok. You go to the website if you need help. How about helping others that need help on a particular level in* Candy Crush *or other video game?*

(Ariz): *Yes, I like to help other players. If I can help, I will try to help them.*

From the interview, we can see how Ariz practises his social interaction activities while playing video games on an everyday basis. According to Ariz, he always shares, gives, and discusses information with other players through websites. Similarly, Nabil and Malik also used websites as a means to share and discuss information with other players. According to them, the other players were not their friends, they just recognised the other players by nicknames. For Ali and Danial, they also demonstrated social interactions during the observation process. Ali, for example, went to the Internet and

shared information with his Facebook friends. In contrast to Ariz, during the observation process, Ali's intention to go to the website was not to ask for any help from others but to share his new invention with others.

Table 6-3 shows the game play activity of Ali during the observation process. In that process, Ali made an exciting creation and decided to share his creation with his friends. If we look at Table 6-3, it can be seen that Ali used a Facebook group discussion page as a means to share his experience with his friends. To obtain detailed information about this particular interaction, I asked him again during the interview session:

(Researcher): *When you played* Minecraft*, somehow during that time you were using the Internet to tell your friends your new achievements.*

(Ali): *Yes*

(Researcher): *Do you always do that?*

(Ali): *Yes.*

(Researcher): *I saw you went to Facebook. Do you have a Facebook group with your friends? Who created the group?*

(Ali): *Yes, we have. My friend created the group.*

(Researcher): *Can you explain the activities you and your friends do in that group?*

(Ali): *Give information about our new findings, update our level in Minecraft, give information if my friends need help.*

The above two excerpts show the social interactions of Ali while playing video games. During the observation process, Ali went to the Facebook

discussion page to share his achievement with his friends. According to him, this discussion page, which was created by his friend, is used for providing and sharing any information about *Minecraft*.

However, from the interview process, almost all young people in this study practice the connection type of social interaction forms.

Table 6-3 Ali's Game play Activity: *Minecraft*

		Activity	Actions	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital Literacy
Time: 30 Seconds	Clip 25	Building a black tower. Putting animals in black tower.	-Stacking black bricks -Putting eggs in the black tower	-Go to library menu. -Click on the black brick -Put black brick on top of other black bricks -Go to the library menu -Click on pig egg -Click on goat egg -Click on sheep egg			SE socio-emotional
Time: 30 Seconds	Clip 26	Cont: Putting animals in black tower Go to Facebook	-Putting eggs in the black tower -Throw in water -Access the Internet	-Throw all eggs in the tower -Go to the library menu -Select water -Throw in water -Click on safari -Key in the address for Facebook	He went to a website.	**(R):** What are you doing now? **(Ali):** I am connecting to the Internet now. **(R):** Why? **(Ali):** I need to tell my friends about this (the iPad shows various types of animals coming out from a black tower). **(R):** Oh, ok.	

6.4.2 Cooperation

Cooperation is another form of social interaction demonstrated by participants of this study while they are playing casual games. As defined above, cooperation refers to a player who plays cooperatively with other players. Through data analysis, I discovered there were two types of

cooperation in game play activities. Therefore, in this study, the concept of cooperation is divided into two aspects: cooperation within the game world and cooperation outside the game world.

6.4.2.1 Cooperation within the game world

This type of cooperation refers to a player who plays cooperatively with other players within the same game world. This means that players need to play as synchronously as team players within the same game world. In this study, the only casual game that can invite other players into the game world is *Minecraft*. Although *Minecraft* is a single-player mode game, it also allows players to play cooperatively with other players. In the world of *Minecraft*, it depends on the player to invite other players to explore the world.

Ali, for example, decided to invite one of his friends to explore his virtual *Minecraft* world. In the case of *Minecraft*, the only way to change from single-player to multiplayer mode is that both parties must be online on the server and connected to the same network. Therefore, Ali invited his friends that were within the compound and connected using the same network as Ali. In Table 6-4, Ali has invited his friend to his *Minecraft* world.

Table 6-4 The game play activity of Ali playing *Minecraft* that shows social interaction activity

		Activity	Actions	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital Literacy
Time: 30 seconds	Clip 40	Invite friend to *Minecraft* world	-Connect to server -Invite friends			**(R):** What are you doing now? **(Ali):** Multiplayer **(R):** Oh, ok. So, what are you going to do? **(Ali):** I let them come enter to my *Minecraft* world	SE (Socio-emotional)
Time: 30 Seconds	Clip 45	Building the castle	-Get the brown brick -Get the door -Get the window	-Go to menu -Pick brown bricks -Go to menu -Pick the door -Go to menu -Pick the window	His friend helped him build the castle	**(R):** What are you doing now? **(Ali):** (point at his friend). This is my friend, he is helping me building the castle. **(R):** Oh, ok.	SE (Socio-emotional)

From Table 6-4, we can see that Ali and his friend built a castle in his *Minecraft* world. According to Ali, by getting help from his friend, he can finish building the castle more quickly.

6.4.2.2 Cooperation outside the game world

Based on data analysis, I defined cooperation outside the game world as a player asking for help from other players, such as requesting lives and boosters (see Chapter 2, Section 2.6). With the help of an Internet connection, casual games allow players to ask for help from other players that played the same game, although this type of cooperation does not require other players to be present in the game world at the same time.

Through my analysis, I discovered that almost all casual games used in this study connected to Facebook, which allows players to attain help from their Facebook friends, except *Angry Birds Star Wars*, *Scribblenauts,* and *Shark Dash*, as these three casual games do not have any connection to Facebook.

One example is *4 Pics 1 Word*. As mentioned in Chapter 4, this is a word game in which the player has to guess the word based on one common term of four pictures. Players can ask a Facebook friend to help in guessing the word. For example, Hana, during the observation process asked her Facebook friends to help her in solving one level of *4 Pics 1 Word*.

Table 6-5 The game play activity of Hana playing *4 Pics 1 Word* that shows social interaction activity

		Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital Literacy
Time: 30 Seconds	Clip 50	Solve level 74	-Ask friends to solve	-Press Facebook icon -Press post icon		**(R):** What are you doing? **(Hana):** Want to ask someone to solve the level for me.	SE (Socio-emotional)

Table 6-5 shows the activity of Hana during the observation process. As shown in this table, we can see that she asked her Facebook friends to work cooperatively in solving level 74 of *4 Pics 1 Word*. From my observation, Hana had to post one of the pictures for her friends to guess the word. Within minutes, Hana had responses from her friends and managed to answer the common word of the four pictures.

Like Hana, another game player that has displayed cooperation outside the game world was Nadia. During the observation process, Nadia played *Candy Crush* and happened to pass to a new world. It is a requirement for players to obtain three tickets to pass into the new world.

Table 6-6 The game play activity of Nadia playing *Candy Crush* that shows social interaction activity

		Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital Literacy
Time: 30 Seconds	Clip 6	Go to a new world with Level 425	Ask Facebook friends to give her tickets	-Press ask Friends icon -Select Facebook friends -Press send button		**(R):** What are you doing now? **(Nadia):** to ask friend for tickets.	SE (Socio-emotional)

Table 6-6 shows the activity of Nadia asking her Facebook friends to provide her three tickets. During the observation process, she managed to get two tickets from her friends.

6.4.3 Competition

Competition is the main motivation of game play activities. It makes the gaming experience more exciting and fun (Garzotto, 2007; Sweetser & Wyeth, 2005). Data analysis reveals that the participants of this study also displayed their emotions on competing with other players. The competition displayed during the observation process is either competing within the game world or competing to be on the top of the scoreboard.

6.4.3.1 Competing within the game world

Competing within the game world refers to participants playing against other players within the same game world. *Scramble with Friends* is the only casual game in this study that needs other players to compete. Since this game can be connected to Facebook, participants can either invite their Facebook friends or ask the game for a random opponent to play in a three-round head-to-head game. It all depends on the participants playing against friends or strangers.

For example, during the observation process, when Shima played *Scramble with Friends*, she selected a stranger as her opponent. Table 6-7 shows how the activity of Shima when she started a *Scramble with Friends* game.

Table 6-7 The game play activity of Shima playing *Scramble with Friends* that shows social interaction activity

		Activity	**Action**	**Operations**	**Notes (Researcher)**	**Conversation (If any)**	**Evidence of Digital Literacy**
Time: 30 Seconds	Clip 2	Play *Scramble with Friends*	-Play a game -Find an opponent to play against	-Press start a new game -Press smart match	Smart match – the game system finds a random opponent	**(R):** What are you doing now? **(Shima):** I am playing *Scramble With Friends* **(R):** Ok. Now what are trying to do? **(Shima):** This one. **(R):** Yes. **(Shima):** Ok. I have to find my opponent.	SE

In order for Shima to play *Scramble with Friends*, she needs to select her own opponent to play a head-to-head word game. In the table, she selected a button called smart match, and this button will let the system automatically select a random opponent for Shima.

To obtain more information on Shima's choice of opponent, I asked her questions during the interview session:

(R): *I noticed that when you played* Scramble with Friends*, you select your own opponent.*

(Shima): *Yes.*

(R): *Can you explain why did you select a random opponent over your Facebook friends?*

(Shima): *I don't know. I like to compete with player that I don't know.*

(R): *Do you have any reason for that?*

(Shima): *mmI don't know maybe because if I lost, I don't feel shame*

(R): *Oh, Ok. Do you always do that? Play a game with stranger?*

(Shima): *Yes.*

From the above quotes, it is clear that Shima prefers to compete with strangers rather than her friends. She explained that if she failed to win against the stranger, she would not feel embarrassment.

In contrast to Shima, during the observation process, Muizz played *Scramble with Friends* against his Facebook friend.

Table 6-8 The game play activity of Muiz playing *Scramble with Friends* that shows social interaction activity

		Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital Literacy
Time: 30 Seconds	Clip 13	Play *Scramble with Friends*	-Play a game -Find an opponent to play against	-Press start a new game -Press Facebook friends		**(R):** What are you doing now? **(Muiz):** playing *Scramble with Friends* **(R):** Ok. Now what are trying to do? **(Muiz):** I have to find my opponent.	SE (Socio-emotional)

Table 6-8 shows the activity of Muiz when he started to play *Scramble with Friends*. From the table, we can see that, during the observation process, Muizz selected his Facebook friends to search for opponent.

During the interview process, I asked questions about the selection of the opponent.

(Researcher): *When you played* Scramble with Friends *just now, I noticed that there were two buttons for you to select your opponent. Can you tell me [about] the two buttons?*

(Muiz): *the two buttons?*

(Researcher): *Yes, one is your Facebook friends and*

(Muiz): *oh, yes, the other button is for random player.*

(Researcher): *yes, can you explain Facebook friends and random player?*

(Muiz): *Facebook friends, you choose your friends as your opponent and random, the game gives other players we don't know the players.*

(Researcher): *Just now, you have selected your Facebook friend, have you ever played with random players?*

(Muiz): *No, I like to play against my friends rather than against people that I don't know.*

(Researcher): *Why is that? You don't like to play with strangers?*

(Muiz): *mm because more fun to win when you play with friends.*

The above quotes tell us that Muiz prefers to play *Scramble with Friends* against his friends rather than strangers. He stated that it is more satisfying to compete and beat his friends.

6.4.3.2 Competing on the leader board

To win and to be ahead of anybody else is one of the player enjoyments in game play activities. During my observations, participants of this study also displayed desires to win and to be ahead of their friends. Competing on the

Figure 6-2 Levels in *Candy Crush*

leader board means that players compete with other players to be on top.

One example is *Candy Crush*, in which one of the objectives is to move to further levels as quick as possible. Figure 6-2 shows some levels of *Candy Crush* in which players try to compete with Facebook friends to move further ahead.

For example, Fiqah played *Candy Crush* on her own iPad. The reason for her to bring her own iPad was to catch-up with her Facebook friends who are already on further levels of *Candy Crush*.

(Researcher): *What level are you in?*

(Fiqah): *Level 328.*

(Researcher): *How about your friends? What levels are they in?*

(Fiqah): *Some of them just a few levels above me, and the furthest is 463. I want to catch-up.*

The above excerpt shows that Fiqah engaged in competition, trying to be ahead of her friends. However, during the observation process, she managed to move five levels up from the level she was on before the observation process. She just went ahead and passed some of her Facebook friends between the levels of 328 and 332.

6.5 Chapter Summary

This chapter has described the results of RQ2, which focus on the social activities of young people while playing casual games. The social activities mentioned in this chapter are likely to contribute on the enhancement of the socio-emotional literacy skill based on the three social interaction forms: connection, cooperation, and competition.

CHAPTER 7 RESULTS AND ANALYSIS 3: TACTICS AND DIGITAL LITERACY SKILLS

"Winning makes you happy, losing makes you unhappy".

(Juul, 2009, p. 237)

7.1 Introduction

This chapter presents a series of game tactics used by young people in this study that contribute to the enhancement of digital literacy skills. It presents results that respond to the following research question:

RQ3: How can completing game levels enhance young people's digital literacy skills?

As I have discussed in Chapter 3 (Section 3.2.6), the main aim of RQ3 is to explore the tactics that young people in this study used to accomplish the goals of casual game play activity. My investigation of these tactics centres on its potential in contributing to the enhancement of digital literacy skills.

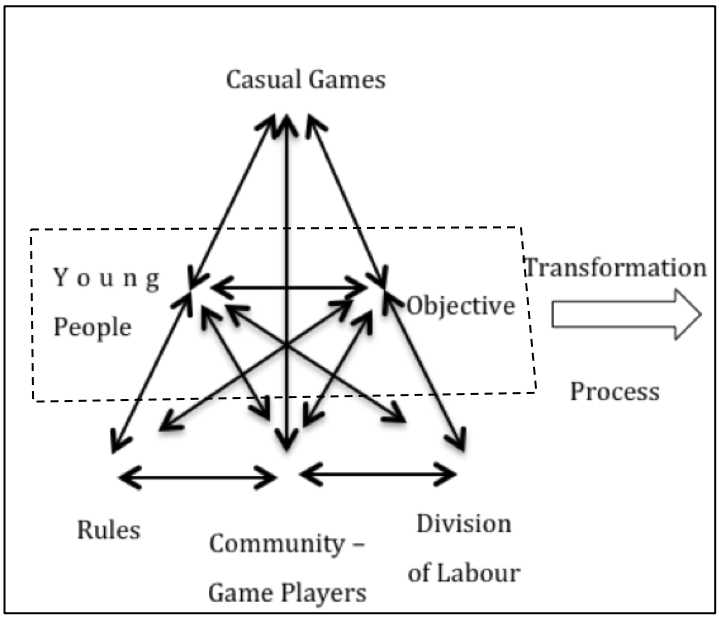


Figure 7-1 Section of RQ3 in Activity Theory of this Study

Using the activity theory perspective, this research question is derived from the middle part of the activity theory triangle of this study, as shown in Figure 7-1, the area that centralised young people and the object of the game play activity. In order to meet the objectives of the game, players will find techniques on how to accomplish it. By completing the goal of a game level, players will be able to progress to another level, and this will lead players to a feeling of satisfaction. This assumption is based on the flow theory (Csikszentmihalyi, 1988), in which people are willing to do anything to achieve goals, and this leads to a sense of satisfaction and enjoyment.

From the observation process, I found that young people in this study were determined to complete and achieve the goals of the casual games. The

immersion of young people in game play is derived from the feeling of satisfaction on completing a level, being a leader on ranking systems, and winning against the opponents. Concerning their determination, during the observation and interview processes, I discovered that participants in this study had tried different tactics to meet their objectives in playing casual games.

In response to RQ3, the qualitative analysis of this study suggested that the tactics employed by participants in this study regarding completing levels of casual games contributed to the enhancement of digital literacy skills. Their competencies on searching for and selecting these tactics have been demonstrated while playing casual games.

Through the observation and interview processes, I discovered that young people in this study utilised walkthroughs, objects in a game world, and cheats in achieving the goals of casual games. All quotes from observations and think-aloud have been translated from Bahasa Melayu to English.

7.2 Walkthroughs

In the gaming context, a walkthrough is a detailed guide on how players should play a game sequentially to find all of the hidden bonuses and surprises, how to avoid certain death, and how to advance past difficult puzzles or trouble spots to best play and win the game (Consalvo, 2003, p.

327). It was created to provide players with a step-by-step demonstration on how to play a particular game title and how to achieve the goals of the game. Based on the data analysis, the activities of searching and selecting suitable walkthroughs on the Internet by young people in this study suggest that the activities contribute to the enhancement of digital literacy skills.

Today, we can find walkthroughs not just in the printed version but also on the Internet. On the Internet, many websites offer walkthroughs of a video game to players. For instance, if we searched Google and keyed in '*walkthrough Angry Birds Star Wars*', the search produces 1,190,000 hits (recorded on 6th February 2014). Due to the massive amount of information provided as walkthroughs, it is up to the players regarding which websites they wish to follow. Concerning data, I found three sources of walkthroughs that young people used in this study. These three sources are from the official game developer site, YouTube, and fan sites. The next three sections will further describe the results of this study that relate to each of these three sources.

7.2.1 Official game developer site

In this study, I describe an official developer site as a walkthrough website created by a game developer for a specific game. However, there are also sites created by third-party individuals or companies that have been granted permission by the game developer to create a walkthrough in relation to a

specific video game. In this study, I also consider this type of walkthrough as an official developer site since they have been given permission to publish it on the Internet.

The data obtained from this study have shown that one participant in this study used walkthroughs from the official creator site to assist him in completing the goal of the game. Nabil, who played *Scribblenauts,* used this walkthrough because he found one of the levels in *Scribblenauts* was too difficult to solve. Table 7-1 shows the activity of Nabil playing Level 4 World 4 of *Scribblenauts*. As shown in this table, Nabil has difficulty climbing the high land; therefore, he accessed the website and went to the walkthrough webpage.

Table 7-1 Example of participant (Nabil) going to a Walkthrough

	Activity	**Action**	**Operations**	**Notes (Researcher)**	**Conversation (If any)**	**Evidence of Digital literacy**
Level 4 World 4 (Clip 2)	To Release Mountain climber	-To break the ice -To climb high land -Break boulders -Go to walkthrough	-Press pencil button to write hammer -Press pencil button to write ladder -Press Safari button	Repeatedly trying to climb the highland He went to the website looking for the walkthrough	R: What are you doing? Nabil: Internet. Looking walkthrough	PV (photo-visual) IL (information) PV (photo-visual)

After the observation process, I asked Nabil regarding his action on finding and selecting the walkthrough:

(Nabil): *If I can't proceed to the next level of* Scribblenauts*, for a very long time, that is the time when I Google on how to solve the particular level. I actually I like a walkthrough website designed by the creator of the game.*

(Researcher): *Why is that?*

(Nabil): *mm I assume, they create the game and they will know how to create walkthrough.*

As shown in the above quote, according to Nabil, he searched the game solutions of *Scribblenauts* if he repeatedly failed to complete one level. He searched Google for the information on the Internet and selected a website he claimed was suitable for him. For Nabil, he preferred a walkthrough designed by the game developer because he assumed that the game developer provided accurate information on how to solve a specific level of *Scribblenauts*. I further asked him how he recognised a walkthrough created by the developer. From the conversation, as shown below, it indicates that that he believes the word *official site* signifies that the game developer created the walkthrough.

(Researcher): *How do you know that the game developer creates the walkthrough?*

(Nabil): *The website will say official site.*

7.2.2 YouTube

Apart from walkthroughs designed by the game developer for specific game titles, YouTube is one of the popular sites that provide players with walkthroughs on how to play a specific level of a game. From the YouTube website, players can find selections of videos, which have been recorded and uploaded by other players.

Some walkthrough videos on YouTube are not just showing screenshots of the game but also have descriptions and humour. For example, during the interview process, Fiqah mentioned that she preferred video walkthroughs from her favourite broadcaster.

(Fiqah): *I love watching guidelines from YouTube. There is one guy who uploading his own video while paying video game. I always check out his videos.*

(Researcher): *On YouTube. Do you know the name?*

(Fiqah): *Pew Die pie. I will go to his YouTube channel if I don't know how to play new game. I even subscribed his YouTube Channel.*

(Researcher): *Why do you like his YouTube channel?*

(Fiqah): *I understand his descriptions well, and he is so funny.*

The above excerpt shows that Fiqah preferred using YouTube if she did not know how to play a new game. For this action, she was looking for information with entertainment. She found that the videos uploaded by *PewDiePie* were reliable to her needs; that are the descriptions of a game and

entertainment. *PewDiePie* is one of the *vloggers* who created walkthrough videos for popular games, such as *Minecraft*. This example also shows that this participant has the ability to find information that is within her understanding.

Similarly to Fiqah, Muizz also preferred YouTube as a source for finding walkthroughs. However, he does not have any specific favourite YouTube channel. He selects any YouTube broadcasters that are suitable to his needs.

(Muizz): Minecraft *is one difficult game. I will go to YouTube to look for videos that offer guides.*

(Researcher): *Do you have any specific YouTube channel that you prefer?*

(Muizz): *No, I don't have any.*

(Researcher): *So, how do you choose videos from YouTube? For example,* Minecraft*, I know they are a lot of YouTube videos regarding this game. So how do you choose?*

(Muizz): *I will select popular videos, because I know if a lot people like these videos, these videos have good quality. Then, if I understand the videos, I will subscribe [to] the channel.*

The above interview excerpt shows that Muizz selected his walkthroughs from YouTube by looking at the popularity of the video for a specific game. For *Minecraft*, he searched videos with *Minecraft* as a keyword, and from the lists, he selected the most viewed videos. According to Muizz, it was better to choose the popular videos because he assumed that these videos might have advantages. He also selected these videos based on the way they

conveyed information; if he understands the information well, he selects these videos as sources for a walkthrough.

7.2.3 Fan sites

A fan site (Consalvo, 2003) is another walkthrough source utilised by participants in this study. According to Consalvo (2003), a fan site is a website created by enthusiastic players for a specific video game. This website is designed based on their experiences. *Candy Crush*, for example, has its own walkthroughs created by its players. Figure 7-2 shows one of the walkthrough websites created by *Candy Crush* players.

From Figure 7-2, we can ensure that this walkthrough has created by its passionate players. It is created based on their experiences playing *Candy Crush*, and their main aim on publishing the walkthrough on the Internet is to help other *Candy Crush* players.

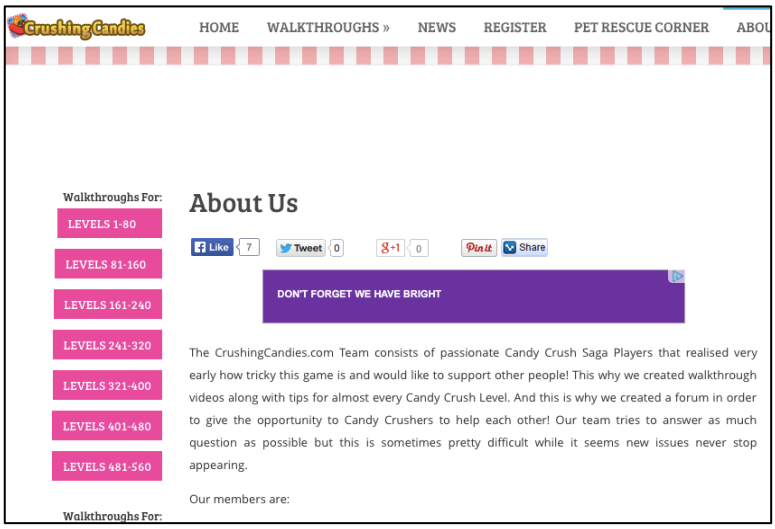


Figure 7-2 Walkthrough Created by Players (taken from http://www.crushingcandies.com)

The data obtained from this study have shown that one participant of this study used a walkthrough from a fan site. During the observation process, Ariz played *Candy Crush* and used a fan site walkthrough to find a solution for a particular level for *Candy Crush*. Table 7-2 shows the game play activity that details Ariz going to a walkthrough created by a fan site. For this level, Ariz repeatedly played the game by doing a series of different actions and operations in order to meet the objectives of that level: clear all jellies in fifty moves.

Table 7-2 Game play activity of Ariz to solve a level of *Candy Crush*

	Activity	**Action**	**Operations**	**Notes (Researcher)**	**Conversation (If any)**	**Evidence of Digital literacy**
Level 488 (Clip 8)	Clear all Jellies in 50 moves	-Break red candy -Find walkthrough	-Swap green with red -Click Safari to go the Internet for a walkthrough	This level was repeatedly played, but he cannot solve it	R:What are you doing? A: I want to look for solutions	IL (information) B (branching)

(Ariz): Candy Crush*, if you are in higher levels, more difficult levels. Sometimes I have to go to the Internet to look at the walkthrough.*

(Researcher): *Do you have any specific websites that you usually go?*

(Ariz): *Yes (turning on the iPad, and going to a website), this is the one. I normally go to this website to get solutions.*

(Researcher): *Why do you like this website?*

(Ariz): *I guess because* Candy Crush *players created this website, and they are more experienced on how to solve specific levels. I just follow whatever the website told me to do.*

From this quote, we can see that Ariz would go the Internet to obtain solutions for *Candy Crush* if he failed to progress to another level. He mentioned that he would go to the website (shown in Figure 7-2) to look for the walkthrough of a specific level. He claimed that the website created by experienced players gave him clear and precise instructions on how to solve a particular level of *Candy Crush*.

7.2.4 Digital Literacy

From the results mentioned in this walkthrough section, information literacy skills may be enhanced while playing casual games through searching, selecting, and evaluating walkthroughs found on the Internet. As stated in Chapter 3 (Section 3.1.1), Eshet (2004) defined information literacy skill as a skill that enables users to search for and filter information available in digital technologies.

However, the results of this study suggest that the information literacy skill should be taught to young people because not all of them are capable of selecting and evaluating a walkthrough. In this study, only one participant demonstrated his information literacy skill using the official game developer walkthrough because he believes the game developer created a genuine walkthrough.

The results of this section also suggest that the branching literacy skill may be enhanced through searching, selecting, and evaluating walkthrough activities. As defined by Eshet (2012), the branching literacy skill is a skill that enables individuals to use cognitive strategies to stay oriented, avoid getting lost, and to perform successfully in a hypermedia environment. Based on the results of young people in finding a walkthrough, they managed to go to their selected websites although they were performing these search activities in a hypermedia environment. With the presence of

hypertext and hyperlinks of a series of webpages, young people may get lost if they do not have the branching literacy skill.

7.3 Using Objects in the Virtual World

Using objects in a casual game environment is another method of young people in this study to meet the objectives of the game play activities. Analysing the data, I found that this method has contributed to the enhancement of digital literacy skills.

According to Jensen (2001), objects in a virtual world consist of two basic components. First, a model that determines what the object looks like and second, the characteristics that determine where it is placed and which action can be carried out (Jensen, 2001, p. 28). Looking at the two components, objects and their functions can be identified by appearances and characteristics. The objects placed in the game world have their own functions to assist players in achieving the goals of a game. However, most game developers conceal information regarding these objects, and players need to identify them. In addition, players must select the objects wisely because there will be a limitation in attaining these objects. Most video game developers create a system that can minimise the number of objects used by players in one play. In this regard, players must select which objects wil

provide greater power ability. Examples of the objects can be seen in Figure 7-3.

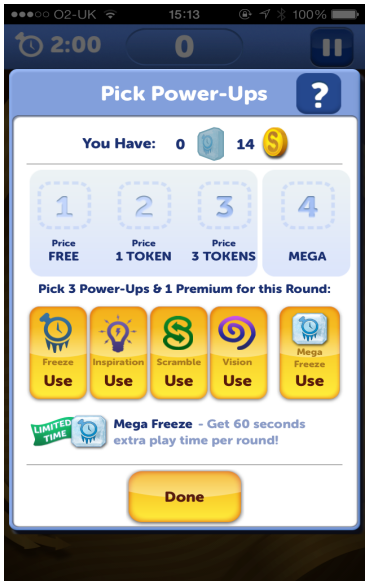


Figure 7-3 A Screenshot of Power-Ups in *Scramble with Friends*

Figure 7-3 presents a screenshot of *Scramble with Friends* with a pop-up window of power-ups. In *Scramble with Friends*, before a player proceeds to the actual game screen, there will be a pop-up window showing 'Pick Power-Ups' (Figure 7-3). Obviously, from the words, we can tell that the objects appearing in the pop-up window can be utilised by players to achieve the goal in *Scramble with Friends*. However, in order to use these power-ups, players must have enough tokens to acquire them.

In Figure 7-3, we can see that there are five power-ups for players to choose for assisting them in winning a game. These five power-ups are presented in a graphical presentation of symbols and keywords for players to understand them.

For instance, during the observation process, Shima was playing *Scramble with Friends* and utilising the power-ups to assist her in achieving more points to beat her opponent. Using think-aloud, I asked her about her actions concerning using these power-ups:

(Researcher): *What is the purpose of power-ups (pointing at power-up words?*

(Shima): *They help me in winning the game.*

(Researcher): *Do you know the purpose of each of these (pointing at he power-ups?*

(Shima): *Yes.*

Shima had not played *Scramble with Friends* before the observation session. However, she did not experience any problems in winning the game because she selected objects that provided her power to stop the timer. Before she chose the object, she had to define the meaning of each power-up presented in *Scramble with Friends*.

(Shima): *Freeze, if I look at the image, clock, and might be stop the time. Inspiration, bulb, giving hints. Scramble, from the word scramble, we can scramble the letters. Vision, might be like giving hints too. Mega freeze, like freeze but longer, extra playing time.*

The above excerpt shows how Shima read and understood the meaning of power-ups presented in *Scramble with Friends*. Even though she never played this game before, we can see that she managed to define each power-up shown in Figure 7-3. As can be seen from her answer, she associated the symbols with her understanding. For instance, she associated the word freeze and the icon clock with stopping the timer of *Scramble with Friends*. She knew if she picked the freeze power-up, she would be granted power to stop the timer, and with this power-up she could possibly win the game.

Like Shima, Malik also showed his ability in interpreting objects presented in a game world. During the observation process, Malik played a casual game called *4 Pics 1 Word*. In this game, two objects can be utilised by players in achieving the goal. As shown in Figure 7-4, we can see that the two objects are designed in a graphical representation of a symbol: a symbol rubbish bin and the letter *A* with a brush symbol. For this game, players can select these objects to assist in achieving the goal; however, players must have enough coins to buy these objects.

During the observation session, Malik used one of these objects to help him in solving the game. Using think-aloud, I asked him about his action:

(Researcher): *What are doing now?*

(Malik): *I am going to use this one (pointing the button "A") to solve the word. I don't have any clue what the word is.*

(Researcher): *Do you know the purpose of that symbol? Can you explain the symbol?*

(Malik): *This is my first time playing this game. I am not really sure, but I will try to explain, I think this symbol (pointing at A) is a hint to solve the word, and this (pointing at the Bin) can help us in throwing off unwanted letters. This Facebook symbol (pointing letter 'F'), mmm might be getting help of Facebook friend.*

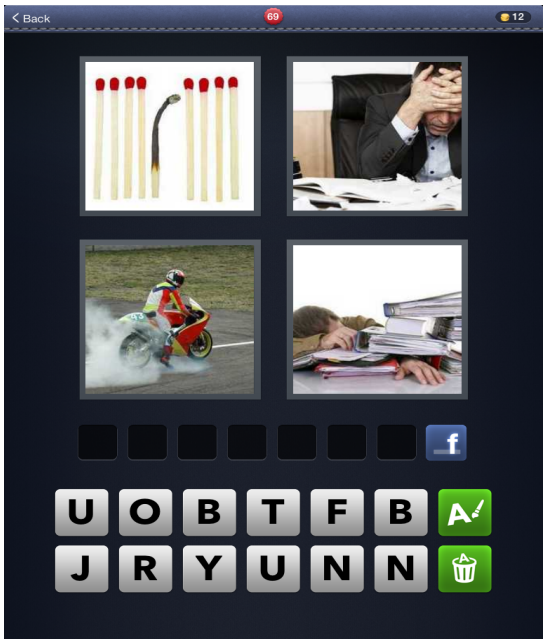


Figure 7-4 Screenshot of *4 Pics 1 Word*

The above excerpt shows how Malik wanted to use one of the objects to solve a level in *4 Pics 1 Word*. However, before using any of these objects, Malik needed to identify them. As can be seen from the excerpt above, he explained the symbols based on his understanding. For example, he associated the rubbish bin symbol with the action of removing unwanted letters. His action showed that he was able to identify the objects, and being able to identify the objects, he could select a significant one to solve a level in *4 Pics 1 Word*.

7.3.1 Digital Literacy

With the two examples mentioned above, participants in this study utilised the objects in the game world to achieve the goal of the game. For some casual games, the objects are presented in graphical representations of symbols, and the players have to know how these objects can assist them in achieving the goal. In this study, as can be seen from the above examples, the participants were able to identify the objects in the game world. Even though they never played the game before, they tried to comprehend the symbols of the objects with their own understanding.

These findings suggest that the tactics of using objects in the game world has proven that digital literacy skills can be enhanced through playing casual games. The photo-visual literacy skill is a type of skill that can be enhanced through this action. As mentioned in Chapter 3 (Section 3.1.1), Eshet (2004) defined the photo-visual literacy skill as a skill in which users are able to read and understand information represented in a graphical manner. From the examples above, it can be suggested that Shima and Malik were able to read and understand the information represented in a symbol form. Consequently, during the game play activity, they were able to select which objects were worthwhile to assist in achieving the goal of the game.

7.4 Using Cheats

Another tactic used by participants of this study in order to achieve the goal of a game is using cheats. My observations suggest that this activity, searching for and selecting cheats, may promote the enhancement of digital literacy skills of young people.

In a gaming context, according to Prensky (2004), cheats refers to actions that typically change the original rules of the game. It is not merely breaking the rules but also bending and re-interpreting the rules for the benefit of the players (Consalvo, 2005). Cheats helps players to acquire extra elements that can help players to achieve the goal of a game. The extra elements are in the form of extra lives, extra objects, and extra powers.

With the proliferation of video games played on portable digital technologies, the Internet has served game players with hundreds of websites regarding cheats, hints, unlock codes, and Easter eggs. Consequently, game players have to select which of these websites are going to be an excellent provider of cheats, and it all depends on players to choose those that are suitable for them.

From the observation and interview process, I found that young people in this study used cheats to get more points, to stay in the game, and to proceed

to higher levels as quickly as possible. In this study, two types of cheat sources were utilised : cheat code sites and using their own strategies.

7.4.1 Cheat codes and hint sites

A cheats and hints website is a website that provide players with information on cheats and hints, which often allows players to gain advantage in order to proceed further on a game level. Apart from the Internet, cheats and hints can also be found in printed form, such as in game magazines. However, the data analysis in this study indicated that young people utilised the Internet to obtain cheat codes and hints.

For example, during the observation process, Izyan was playing *Scribblenauts* on her own iPad. She was playing in World 4-2 when she stopped and went to the Internet. Using think-aloud, I asked her about this action.

(Researcher): *What are doing now?*

(Izyan): *I am going to the Internet. It is difficult to solve this level.*

(Researcher): *What are you going to do on the Internet?*

(Izyan): *I am looking for techniques on how to get this level solved. I have tried this level many times. I can't solve it.*

(Researcher): *Do you have any specific website to look for your cheating techniques on how to solve a problem?*

(Izyan): *I always go to IGN.*

From the above excerpt, we can see that Izyan went to the Internet to get cheat codes on how to solve a level in *Scribblenauts*. To obtain further details on this action, I asked her again during the interview session.

(Researcher): *I saw you went to IGN website looking for cheat codes?*

(Izyan): *Yes.*

(Researcher): *Do you always to go to IGN website?*

(Izyan): *Yes. When I'm stuck for a long time.*

(Researcher): *Do you have any reasons why you select this website?*

(Izyan): *Because it is a popular website if want to look for cheat codes.*

(Researcher): *How do you know that?*

(Izyan): *I heard from my brother and when I Googled for cheating technique, this website is on the top Google list. So, I think this is the best one.*

The above excerpt shows how Izyan searched for tactics to stay in a game. She has selected a website to acquire cheat codes to solve a level in *Scribblenauts*. As indicated by her reply, she preferred the IGN(formerly known as Imagine Games Network) website to look for cheat codes. Moreover, it is a website that provides massive information on entertainment, video games, cheats, and news. According to her, there were two reasons that she selected IGN as the information provider of cheats. First, this website is regarded as a popular website among the game players, and the second reason is that this website displayed as the first link on the

Google search engine results. During that session, she managed to obtain codes in order for her to proceed to another level of *Scribblenauts.*

Apart from cheat codes, hints are also utilised by young people in this study. For example, Rafiq used hints during his game play activities. During the observation process, Rafiq played *Angry Birds Star Wars* and used hints to open bonus levels. Using think-aloud, I asked him regarding this action.

(Researcher): *What are you doing now?*

(Rafiq): *I want to unlock bonus level. But I have to destroy this one (showing the golden object). It either you get all levels with three stars or destroy this one.*

(Researcher): *Oh, ok. So how are young going to do that?*

(Rafiq): *It is difficult to break this thing. I have to go to the Internet to look any hints on how to break this.*

(Researcher): *Do you have any specific website to look for these hints?*

(Rafiq): *No, I just Googled. Then, go to the website.*

According to the above excerpt, we can see that Rafiq used hints from many websites in order for him to unlock a bonus level in *Angry Birds Star Wars*. He stated that he preferred to find websites using the Google search engine. During that session, he continued his game play activities by going to the Internet. Through the Google search engine, he managed to find one website that gave him hints on how to destroy the golden objects. Using the hints, he managed to unlock the bonus levels in *Angry Birds Star Wars*.

These two examples show how Izyan and Rafiq utilised cheat codes and hints in order to complete the goals of the games.

7.4.2 Using their own strategies

Apart from relying on the sources from the Internet, participants in this study also used their own cheating strategies during the game play activities. In this section, they used their own thinking skills on how to stay in the game. From my observations, I suggest that this activity promoted the enhancement of digital literacy skills of young people while playing casual games. During the observation process, this strategy occurred with participants who were playing *Candy Crush*.

Candy Crush provides five lives for one round of play to a player. If the player runs out lives, the player needs to wait for 30 minutes to get one new life. This waiting leads to frustration for some players who want to move on to other levels that are far ahead of their friends. From the observation process, I discovered two strategies utilised by participants in this study. This occurred with participants who played *Candy Crush* on their own iPads.

Nadia, for example, played *Candy Crush* on her own iPad. Her reason for playing casual games on her own iPad was because she wanted to continue where she left off before the observation session. Table 7-3 illustrates how Nadia used her own strategy to continue *Candy Crush* gaming activities. In

this table, I have excluded some activities between these levels that are unrelated to this finding.

Table 7-3 Participant named Nadia playing *Candy Crush* with different technologies

		Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital literacy
	Level 270 (clip 20)	Playing *Candy Crush* Level 270 Clear all Jellies	-Clear blue -Clear purple -Clear orange -Clear striped blue	-Swap yellow to blue -Swap orange to purple -Swap orange to yellow -Swap orange to striped blue			B RT
	Level 270 (clip 23)	Playing Candy Crush Level 270 Clear all Jellies	-Clear blue -Clear purple -Clear orange -Clear striped blue	-Swap yellow to blue -Swap orange to purple -Swap orange to yellow -Swap orange to striped blue		N: Can I use my phone to play *Candy Crush*? R: mmm Why do you need phone? N: I ran out lives. I don't want to wait 30 minutes to get a new one.	B RT
	Level 275 (clip 28)	Playing *Candy Crush* Level 275 Clear all jellies	-Go to *Candy Crush* on mobile phone. -Clear orange -Clear yellow -Clear striped blue	-Swap orange to blue -Swap yellow to green -Swap blue to red		N: I want to use computer. Can I? R: You need lives. N: yes.	
	Level 276 (clip 29)	Playing *Candy Crush*	-Go to Facebook -Clear red	-Log in to Facebook -Click on candy crush icon -Swap red with green	(Access Facebook and go to *Candy Crush*)		

Table 7-3 shows Nadia playing *Candy Crush* in three different digital technologies during the observation process. We can see that this participant used an iPad, smart phone, and Facebook via a desktop computer, one after the other, to play *Candy Crush*.

According to her, the rationale of using three different technologies to play *Candy Crush* was to acquire more lives. During the observation process, she managed to get fifteen lives: five lives when she played through the iPad, five lives when she played through the smart phone, and five lives when she played through Facebook. These activities show how this participant used her own tactics to stay in the game. With more lives, she was able to complete three difficult levels (according to Nadia) of *Candy Crush*. Concerning this action, I discovered that this skill is a kind of cheat that enables users to find ways to stay in the game.

Another participant also demonstrated a different kind of cheat while playing *Candy Crush*. When asked about her actions during the observation process, she indicated that one tactic for her to continue playing *Candy Crush* was changing the date of the iPad. Similar to Nadia, during the observation process, Hana was also playing *Candy Crush* on her own iPad. Table 7-4 shows how Hana used her own tactic to stay in the game.

Table 7-4 Participant named Hana playing *Candy Crush* with her own tactic

		Activity	Action	Operations	Notes (Researcher)	Conversation (If any)	Evidence of Digital literacy
	Level 110 (clip 4)	Playing *Candy Crush* Level 110 Clear all Jellies	-Clear blue -Clear purple -Clear orange -Clear striped blue	-Swap yellow to blue -Swap orange to purple -Swap orange to yellow -Swap orange to striped blue		R: what are you doing now? P: I want to get lives, by changing the dates, I will get new lives.	B RT
		Some activities between these levels were removed due to being unrelated to this finding.					
	Level 110 (clip 6)	Playing *Candy Crush* Clear all Jellies	-Clear blue -Clear purple -Clear orange -Clear striped blue	-Swap yellow to blue -Swap orange to purple -Swap orange to yellow -Swap orange to striped blue	(She is changing the date again)		B RT
		Some activities between these levels were removed due to being unrelated to this finding.					
	Level 110 (clip 28)	Playing *Candy Crush* Clear all jellies	-Clear blue -Clear purple -Clear orange -Clear striped blue	-Swap yellow to blue -Swap orange to purple -Swap orange to yellow -Swap orange to striped blue			

From Table 7-4, it can be seen that Hana changed the date of the iPad to acquire more lives for her to continue playing *Candy Crush*. To obtain more information on this action, I asked her again during the interview process.

(Researcher): *Why did you change the time on your iPad?*

(Hana): *I wanted to get more lives. I want to play more to proceed to another level.*

(Researcher): *Where do you get the idea?*

(Hana): *I remember when I played games that need lives.I mean you have to wait a certain period of time to get new lives. Then I tried it on* Candy Crush.*Successful!*

The above excerpt shows how Hana used her own tactic to continue playing *Candy Crush*. She used the tactic from her previous game play experience and applied it when she played *Candy Crush*. As mentioned by her, by changing the date of the iPad to a future date, she will gain more lives in *Candy Crush*, and by gaining lives, she can pass her friends that are already on higher levels.

7.4.3 Digital Literacy

The above examples show how young people in this study utilised cheats to stay in the game. There were two sources of cheats employed by young people in this study. First, they used cheat codes and hints, which the participants obtained through websites. Second, the participants employed their own tactics to achieve the goal of the game.

Based on the data analysis, I suggest that using cheat codes, hints, and the participants' own strategies to achieve the goals of the game lead to the enhancement of their digital literacy skills. In the first findings, in which Izyan and Rafiq searched for and selected cheat codes and hints on the

Internet, their activities contributed to the enhancement of information literacy skills. In Chapter 3 (Section 3.1.1), Eshet (2004) defined information literacy as the ability of an individual to make an educated information assessment (Eshet, 2012, p. 271). This definition reflects to the activities of Izyan and Rafiq, in which they were able to find and select information concerning cheat codes and hints on the Internet, and with this information, they were able to achieve the goal of the game.

In the second results in this subsection, in which Nadia and Hana employed their own strategies to achieve the goal of the game, their activities portray their smart thinking skills on how to stay in the game. Based on this second result, I suggest that young people in this study were able to think critically about how to handle and control digital devices to meet the objectives of game play activities. This finding shows that they have the ability to take advantage of the potential of digital devices and make connections with the situations of game play activities. I suggest that this type of literacy is a digitally intelligence skill. In this study, I defined the digital intelligence skill as a skill that enables individuals to use cognitive skills to manipulate the function of a digital device in order to meet the objectives of game play activities.

7.5 Chapter Summary

This chapter has described the results of RQ3. This research question focuses on the tactics and strategies of young people in this study to meet the objectives of game play activities. Overall, participants in this study have different ways of discovering tactics on how to win a game and to stay in a game such as finding walkthroughs, using objects, and using cheats. In finding and selecting techniques and tactics, young people in this study are exposed to the following digital literacy skills: information literacy skills, branching literacy skills, and photo-visual literacy skills. In addition, this chapter also proposed an emergent literacy skill called the digital intelligence literacy skill.

CHAPTER 8 DISCUSSION: COMPILING DIGITAL LITERACY SKILLS

8.1 Introduction

In this chapter, I discuss the findings based on the data analysis from the previous chapters (Chapter 5, Chapter 6, and Chapter 7) by compiling all six literacy skills in Eshet's model. In these previous chapters, I have presented the results of the data collected from twenty young people as they play casual games. In each chapter, the results and data analysis based on each research question, RQ1, RQ2, and RQ3, are presented. With the help of the activity theory, the main research question of this study is answered:

To what extent can playing casual games enhance young people's digital literacy?

Before answering the main research question, this chapter begins with an overview of the study with a brief discussion of what this study concerns. In the next section, the features of casual games that are discussed in this study are reviewed. Subsequently, the six digital literacy skills that are enhanced during the casual game play activities are discussed. In addition to the six digital literacy skills, two emergent literacy skills are also discussed. These emergent literacy skills occur during casual game play activities and are not listed in the Eshet's (2012) model.

8.2 This Study Revisited

The study details the investigation of casual game play activities of young people. My argument is that these activities may contribute to the enhancement of digital literacy skills. As developed in this thesis, I used a digital literacy model called the *Conceptual Framework for Survival Skill in the Digital Era* (Eshet, 2004) as the framework for identifying the game play activities of young people. These activities are analysed based on their relation to the enhancement of digital literacy skills that are listed in this model. The set of digital literacy skills consists of photo-visual, reproduction, branching, information, socio-emotional, and real-time. As Eshet (2012) argued, these six skills are the main skills for individuals to possess in order to survive in a digital technology world.

I adopted the activity theory to detail the interaction activities as young people play casual games. This system provides a systematic documentation of game play activities to identify the extent these activities may enhance the digital literacy skills of young people. This coincides with a claim made by Oliver and Pelletier (2006a) using activity theory to analyse game play activities. They claim that activity theory successfully provides evidence to substantiate claims about learning from playing video games. Figure 8-1 illustrates how this study works. As we can see from this figure, the activity theory of this study represents the game play activities of young people. The

activity theory in this study focuses on the interactions of young people with the elements in the triangle, and these interactions produce a series of game play activities that may lead to the enhancement of digital literacy skills.

8.3 Features of Casual Games

According to the literature (Section 2.3.1) quick access and ease of learning are two of the features of casual games (Cheng, 2011; Juul, 2010). Although investigating the features of casual games is not the main focus of this study, it can be mentioned here as evidence that these two features are demonstrated during the observation process. These two features are listed by Juul (2010) as the characteristics of casual games, and I confirm that the casual games used in this study are quick access games and that it is easy to learn how to play them.

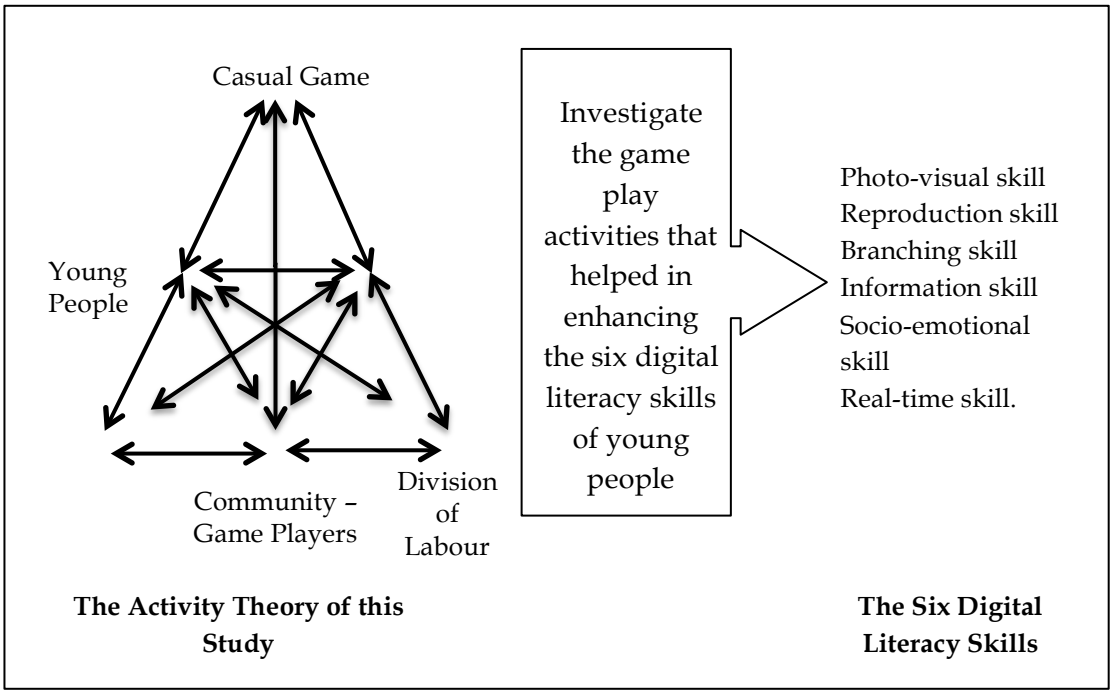


Figure 8-1 The Framework of this study

In terms of accessibility, casual games can be played very quickly. Without setting up any video game equipment, in just a few seconds, young people in this study started playing casual games that have been pre-installed on an iPad. According to the data analysis, within a 30 second period young people were already able to complete the first level of a casual game. Compared to other types of traditional video games, the casual games used in this study are easily accessible.

Another feature of casual games is the simplicity of the games, which allows young people to learn on how to play the games in a short time. This feature is clearly shown when young people in this study played a new casual game. According to the data, within 30 seconds, they completed at least two to

three levels of a casual game. This coincides with the argument made by Kultima (2009) and Juul (2010) that casual games are very easy to follow. Both researchers argued that casual games involve simple rules that allow game completion in a short time. The simple rules of casual games was demonstrated when young people in this study were able to follow the game story without following the instructions. The casual games are designed with minimal elements, and the user interfaces make it easy to get into the game as quickly as possible (Kultima, 2009). However, casual games used in this study are increasingly challenging at higher levels. The challenging levels appear to be a factor that led young people to do activities that relate to the enhancement of digital literacy skills. The next section further describes game challenges.

8.4 Casual Game play Activities and Digital Literacy Skills

From the literature review, playing digital games is part of the digital literacy acquisition process. As mentioned by Beavis (2012a), digital games is as an example of *multiliteracies of the wild*. When young people play digital games, they engage in a mix of emergent textual forms and form new familiarities with literacy and literacy practices. In Steinkuehler (2010) analysis of the massively multiplayer online game *Lineage*, she states that game play activities expose players to a *constellation of literacy practices.* According to

Steinkuehler (2007), these do not replace literacy activities but rather are literacy activities.

The findings of this study support the claims made by Beavis (2012a) and Steinkuehler (2007). They reveal that game play activity is a process in which players may obtain skills related to digital literacy as listed by Eshet (2012) in a conceptual framework for survival skills in the digital era. In line with the aim of this study, which is to investigate casual game play activities that may enhance digital literacy skills, the data analysis indicates that casual game play activity has a significant relationship with the acquisition of digital literacy skills.

The acquisition of digital literacy skills is closely related to game challenges and difficulty levels. Data from 20 young people who engage in casual game play show that digital literacy skills were enhanced when they searched for solutions to meet the objectives of game play activities. An increase of difficulty in casual games caused an increase in the motivation of young people to find solutions. This motivation behaviour may be related to the feeling of being challenged. Young people demonstrated their determination to find solutions to solve tasks in casual games.

The challenge of various missions in casual games is a factor that contributes to the enhancement of digital literacy of young people. Even though casual games are easy to play (Juul, 2010; Kultima, 2009), as the level increases, the

games can be very challenging and difficult to solve, and this makes players eager to meet the objectives of the game play activities. Their behaviour when solving the casual games confirms the assumption made by Gee (2007) that players persist to complete challenging video games. This reflects the findings of this study, which indicate that young people are persistent on when completing challenging casual games. This is similar to findings from a study conducted by Gumulak and Webber (2011). Their participants, aged between 11 to 17 years, were also persistent when completing a game.

The findings of this study also suggest that game play objectives change throughout game play activities. In this study, the objectives of young people playing casual games varied within one session of game play activity. In other words, the objectives of gamers are dynamic and can change depending on the nature of the video game. During the observation process, all the young people's initial objective was to participate in this research; however, at a later stage, the objectives changed to getting ahead of friends (in the game leader board) and obtaining more points. This shows that their objective of playing casual games kept changing throughout the activity. Some objectives stated by young people in this study were attaining a high score and winning more stars (e.g., *Angry Birds Star Wars* and *Shark Dash*). Their intrinsically motivated behaviour (Przybylski, Rigby, & Ryan, 2010) and feeling of being challenged (Gumulak & Webber, 2011) drove them to find solutions to meet the objectives of game play activities. Figure 8-2 shows

the activity theory of this study with the factors that may lead players to complete game play activities.

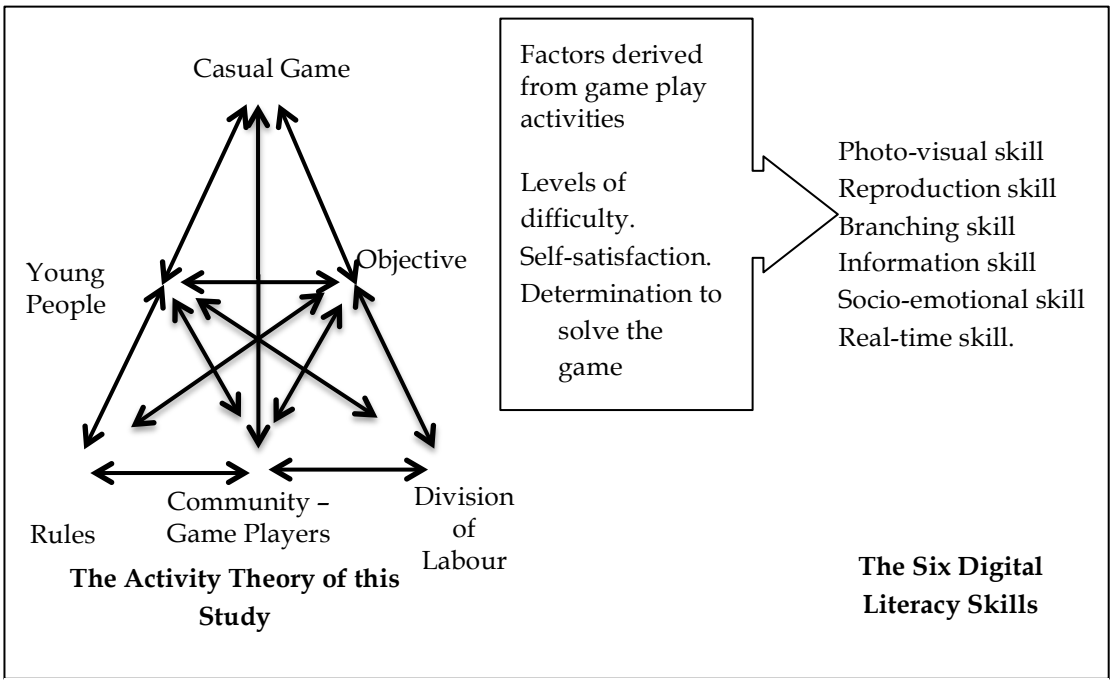


Figure 8-2 Activity Theory with Factors that Contribute to Activities that May Enhance Digital Literacy Skills

As shown in Figure 8-2, factors that drive young people to complete game play activities may lead to the enhancement of digital literacy skills. Based on the findings, I believe that casual games provide challenges to players through levels of difficulty. These challenges and levels of difficulty are significantly related to the need for self-satisfaction of the game player. According to Przybylski et al. (2010), self-satisfaction is an intrinsic motivation that relates to doing activities for enjoyment and fun. In relation

to challenges and enjoyment, Gumulak and Webber (2011) also state that challenges are the main factors that leads to enjoyment of game players.

Although the findings of this study indicate that digital literacy skills may be enhanced through playing casual games, young people in this study were not aware of the acquisition of digital skills. Unfortunately, I did not ask participant about their acquisition of digital literacy skills while playing casual games. This lack of awareness is merely my assumption based on Appel (2012) study on the acquisition of computer literacy among heavy users of computer games and social media. According to Appel (2012), computer literacy can be considered *en passant*. *En passant* is similar to a situation of incidental learning and refers to unintentional learning resulting from other activities. Therefore, I consider that participants of my study were unaware of potentially obtaining these digital literacy skills. This is because enhancing digital literacy skills is not the main intention of young people when playing casual games.

The findings also reveal that not all six digital literacy skills frequently appeared during the gameplay activities. However, the branching literacy skill, real-time literacy skill, socio-emotional literacy skill, and photo-visual literacy skill frequently appeared during the gameplay activities of young people. From my analysis, I suggest that the main reason is because these skills were required in gameplay activities.

8.4.1 Photo-visual literacy skills

In this study, using Eshet's definition, photo-visual literacy refers to the ability of the user to intuitively and freely read and understand instructions and messages that are presented in a visual-graphical form (Eshet, 2012, p. 268). Based on the data analysis, the photo-visual literacy skill occurred the most while the young people played casual games. A probable explanation is due to the nature of casual games, which are designed in such a way that players get information from multiple visual objects that appear on the screen. In terms of interaction forms within the digital game environment, Klastrup (2009) states that the process of getting information is called the information retrieval process. Players need to understand and make sense of visual objects. Just like normal digital games, casual games also offer players multimodal elements, which combine visual elements such as words, characters, objects, and icons. Therefore, they require players to use their cognitive ability and visual skills to complete the task. As reported in the findings chapter, during the observation process, young people in this study were able to interpret, understand, and recognise images presented in casual game environments. This finding reflects the definition stated by Eshet (2002a, 2004), in which this refers to a skill that enables user to understand, recognise, and interpret the meaning of images displayed in the digital environment. From the correlation on findings and definition of photo-visual

literacy skill, it is safe to say that playing casual games may help individuals enhance their photo-visual literacy skills.

Regarding the main research question: *To what extent can playing casual games enhance young people's digital literacy?*, the findings suggest that digital literacy skills, especially photo-visual literacy, may be enhanced while young people play casual games. This study suggests that there are three types of interactions of young people with virtual game environments that are significantly related to the enhancement of photo-visual literacy skills. These three interactions are interaction with virtual characters (or agents), interaction with virtual objects, and interaction with icons. Figure 8.3 shows an activity theory with the three types of interactions that may enhance the photo-visual literacy of young people

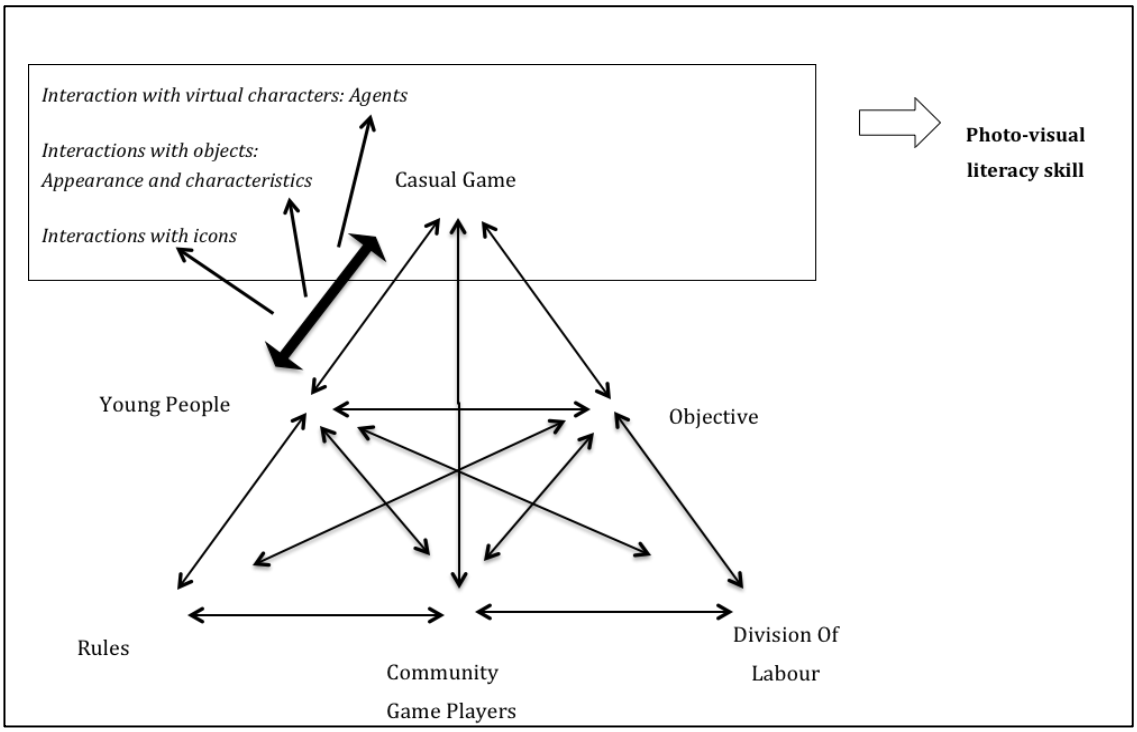


Figure 8-3 The Activity System of Game play Activities that Contribute to the Enhancement of the Photo-Visual Literacy Skill

Figure 8.3 demonstrates that three types of interactions of young people (subject) with casual games may contribute to the enhancement of photo-visual literacy skills (outcome of this activity system). These interactions are activities that act upon the object of the activity system; in this case, the object is varied and depends on the player's motives. To meet the object of the activity system, young people need to understand the *meaning* of virtual characters, virtual objects, and icons present in the virtual game environment. The findings indicate *understanding the meaning* can be called information retrieval activity (Klastrup, 2009). Literature suggests that information retrieval is the form of interaction activity that consists of providing, obtaining, and storing information. It was seen during the

observation process, when young people obtained information from virtual characters, virtual objects, and icons to assist them in completing the task. These game elements were designed so that they can be used to store and provide information to players.

Interaction with Virtual Characters: Agents

In gaming activities, agents are another character besides the main character or avatar. In Chapter 5 (5.4.1), Bailenson and Blascovich (2004) defined agents as digital representations whose behaviour is controlled by the computer system and are designed to accomplish specific goals or objectives. In this study, I indicate that playing casual games like *Scribblenauts* may enhance photo-visual literacy skills. The agents present in this game environment help young people practice using photo-visual skills to be able to intuitively understand the information provided the agents by looking at their appearances to meet the objectives of game play activity. Kujanpää and Manninen (2003) stated that physical appearance, including clothes and other adornments, provides information about personality, status, and attitude that influence the game and communication with players. For instance, in one level of *Scribblenauts*, there are three embodied agents: a doctor, a fireman, and a policeman. For this level, the player needs to know these characters to create new objects that are suitable for the embodied agents to use according to their professions. Without any information provided by other elements in *Scribblenauts*, players are required to

understand the characters based on the physical appearance of clothes in order to solve the level. This finding supports the claim made by Kujanpää and Manninen (2003) that the appearance of characters provides information to players to complete the game. Playing *Scribblenauts* is one example in which individuals use photo-visual literacy to perform successfully in a digital environment.

However, for this particular interaction, the young people in the study tended to demonstrate a low level of cognitive ability in recognising the virtual characters. This may be because the virtual characters were designed and modelled as realistically as possible as in a real situation to make players automatically use their prior knowledge to recognise them. In this study, it can be suggested that there is a connection between the previous knowledge of young people and how they obtained information from the virtual characters. Beavis (2012a) also states that young people in her studies used previous knowledge in a new game environment.

Interaction with Objects

In gaming, objects can be identified by appearance and characteristics as well as which actions they can carry out (Jensen, 2001). In this study, I consider that these objects can be used to assist in meeting the objectives of game play activities. These objects provide instant benefits and add extra abilities for players during the games.

Similar to virtual characters, interaction with virtual objects also requires players to understand their meaning so they can select the best object to provide benefits during game play activity. Based on the data analysis, selecting these objects requires photo-visual literacy skills because some casual games, for example *Scramble with Friends*, have several virtual objects that provide extra benefits to players. The game design of *Scramble with Friends* provides limitations for players to select such objects, for example, players must choose only one object or make a payment. Object selection strategies require photo-visual literacy skills for player to understand the meaning and purpose of each object provided in the game environment.

Interaction with Icons

Icons refer to graphic representations of data or processes within a gaming system that are designed to replace commands and menus for players to communicate and navigate within the system (Gittins, 1986). From the findings, I suggest that to understand the meaning of an icon, individuals must use their photo-visual literacy skills to read its meaning intuitively. Based on my observations, almost all casual games played in this study used two forms of icons to interact with players. Therefore, players need to understand the meanings of these two icons to assist them in completing game tasks. One is an icon that is commonly used in other digital environments, such as the *Facebook* logo or *Home* symbols; the other type is an icon specifically designed for a game.

For instance, in a casual game called *4 pics 1 word*, there is an icon of the letter *f* with a dark blue coloured background (see Figure X). This icon is a logo for *Facebook* and allows players to connect and communicate with their *Facebook* friends to solve the word problem. In this study, all young people who played this game already knew that this symbol is associated with *Facebook*. This interaction required the young people to use their previous knowledge to understand the meaning of the icon.

Apart from these commonly used icons, there are also icons specifically designed for a particular casual game. For example, in *Scribblenauts*, a pencil and notebook icon designed specifically for this game allows players to go to another window to type any words that the player needs to present in the game environment. In this study, I realised that the meanings of icons are situated in the embodied digital environment. This coincides with Gee's theory of video games, in which the meanings of signs such as objects, icons and characters are situated in the embodied experience (Gee, 2007).

From the findings of this study on the use of photo-visual literacy skills in interaction activities when playing casual games, I suggest that photo-visual literacy may be enhanced as young people play casual games. It is important to note that this finding is consistent with other research studies, such as those by Achtman, Green, and Bavelier (2008) and Castel et al. (2005), which point out that there is a positive relationship between visual skills and game play activities.

8.4.2 Branching literacy skills

The branching literacy skill refers to a skill that enable users to navigate through different areas of knowledge present in a nonlinear and unordered manner using skills and cognitive strategies to stay oriented and so avoid becoming lost in a hypermedia environment (Eshet, 2004, 2012). The findings of this study indicate that the branching literacy skill can be enhanced while playing casual games. This was clearly shown when young people, especially the infrequent players, who played a new casual game title successfully navigated the game environment very quickly. Observing the gameplay activities of young people, this study indicates that the young people were able to stay oriented in the game world. One indication of not becoming lost in a virtual game environment is when young people complete the task of a casual game in a short period of time. From my opinion, if they failed to solve the problems, it can indicate that young people are unsuccessful in navigating the virtual game environment. In addition, the findings of this study also indicate that the young people were also able to create a linkage of hypermedia elements within or between multiple digital environments. This action is reflected in the definition of the branching digital literacy skill of Eshet (2004, 2012), in which he states that branching literate users are individuals who have the ability to remain oriented and avoid becoming lost in a hypermedia digital environment (Eshet, 2012).

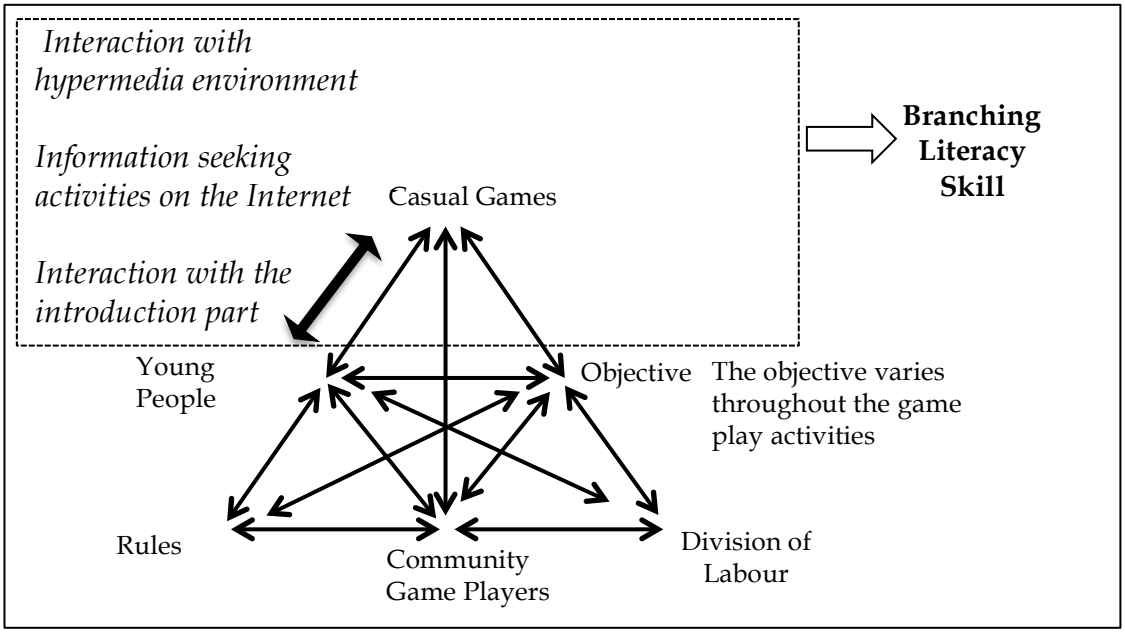


Figure 8-4 The Activity System of Game play Activities that Contribute to the Enhancement of Branching Literacy Skills

In regards to the main research question: *To what extent can playing casual games enhance young people's digital literacy*? For the branching literacy skill, I suggest that there are three types of gameplay activities that contribute to the enhancement of this literacy skill. Figure 8-4 presents these three activities. In this figure, we can see the three gameplay activities that have the potential to contribute to the enhancement of the branching literacy skill. In this figure, I include the Internet as a mediated tool of activity, since the activity of information seeking will be done on the Internet. In the next paragraphs, I will discuss the gameplay activities.

Interaction with the hypermedia environment

The results of this study suggest that the interaction of young people with the hypermedia elements present in the virtual worlds of casual games may enhance their branching literacy skills. Hypermedia elements consist of hypertext (text linked together by multi-linear nodes) and multimedia, for example, photo, video, art, audio, and text (Myers & Beach, 2001, p. 234), which link one digital domain to another domain. All the casual games used in this study provided players with hypermedia elements, which required players to use their branching literacy skill to navigate successfully and so solve the tasks in the casual games. In gaming, players need to navigate within the game path in order to play successfully. In terms of the casual games used in this study, hypermedia elements linked to either Facebook or to elements within the respective game world that thus provided assistance in completing the game tasks.

The findings of this study indicate that the branching literacy skill can be enhanced while playing casual games. Young people, especially the infrequent players, who played new casual games clearly demonstrated successful navigation of the game environment very quickly. Observing the gameplay activities of young people, this study indicates that the young people were able to stay oriented in the game worlds. One indication of not becoming lost in the virtual game environment is when young people complete the tasks of casual games in a short time. In my opinion, if they failed to solve the problems, it indicates that the young people were

unsuccessful in navigating the virtual game environment. In addition, the findings of this study also indicate that they were able to link hypermedia elements within or between multiple digital environments. Young people in this study were able to navigate successfully in a hypermedia casual game environment. These findings support Marsh (2014) findings regarding the navigation skill of young people in her study. Marsh (2014) found that while young people were in the virtual world *Club Penguin*, they knew what to do and where to go perform specific tasks.

Information seeking activities on the Internet

The findings of this study suggest that young people's engagement in information-seeking activities on the Internet while playing casual games may enhance their branching literacy skills. During casual gameplay, young people's main source for information regarding walkthroughs, cheat codes, and hints, is the Internet. Steinkuehler (2007) and Gumulak and Webber (2011) also state that the Internet was the main source for their participants when looking for this information. As we know, the Internet provides individuals with a hypermedia environment that includes hypertext, hyperlinks, and graphic displays. From the findings, young people demonstrated their ability to navigate webpages and successfully searched for and found information.

Interaction with the introduction

The information seeking finding of this study was also clearly demonstrated when young people of this study skipped the introductory parts of the games. In this study, the trend of young people, especially the frequent players, in skipping the introductory scene clearly shows the enhancement of their branching literacy skills. As stated in Chapter 5 (Section 5.3), the introductory scenes, which usually appear in the earlier part of the video game, provide information such as a narrative introduction and instructions on how to play. This study plainly shows that without knowing the information concerning the video game, frequent players still know how to play casual games. This is an indication that without prior knowledge, frequent players are able to stay focused on a virtual game environment, which leads to the completion of the objectives of the game.

Here, the skills and habits developed by playing many video games may be very useful. For this skill, the findings of this study clearly show a trend through playing video games; the young people of this study were able to enhance their skill on not becoming lost in the hypermedia video game environment. The more exposure that young people have to these types of gameplay activities, the better they might be in enhancing the branching literacy skill. As mentioned in the literature, branching literacy skill is important for young people to have since almost all modern technologies have included hypermedia elements that require young people to employ branching literacy skill in order to navigate successfully in the digital world.

8.4.3 Real-time literacy skill

Findings of this study suggest that there is a relationship between playing casual games and real-time literacy skills. Analysing the findings, it is suggested that the young people in this study showed their ability to process these digital elements in a quick time. The findings reflected on the definition of the real-time literacy skill. Defined from the literature, the real-time literacy skill is a skill that helps users to perform effectively and to create knowledge from large volumes of information presented simultaneously and at high speed (Eshet-Alkalai, 2008). It can be seen that during the observation process young people were able to obtain information from virtual characters (avatar and agents), virtual objects, text and, images at a fast rate.

In regards to the main research question: *To what extent can playing casual games enhance young people's digital literacy*? The findings suggest that navigating the avatar and interaction with introductions may enhance real-time literacy skills. Figure 8-5 shows these two gameplay activities.

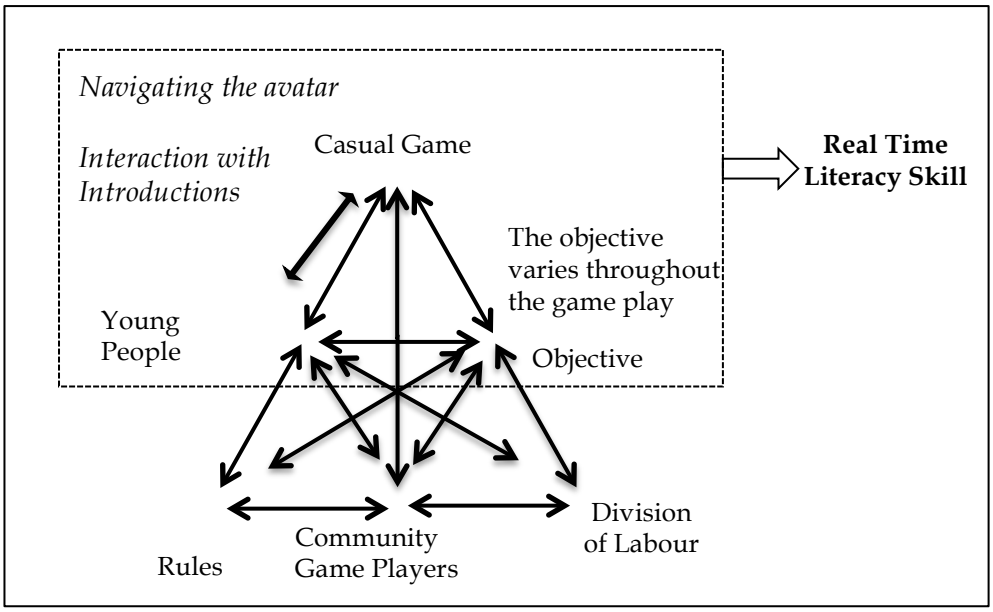


Figure 8-5 The Activity System of Game play Activities that Contribute to the Enhancement of Real-Time Literacy Skills

Navigating the avatar

According to Klastrup (2009), navigation is a form of interaction in which the player moves and takes actions in the game world by moving the avatar. Navigation of the avatar, for example in *Subway Surfer*, may also lead to the enhancement of real-time literacy skills. The findings of this study suggest that young people who play this casual game demonstrated their abilities in quickly processing the elements present in the game environment, and simultaneously they managed to control the movements of the avatar. During the observation process, young people were able to obtain

information from virtual characters (avatar and agents), virtual objects, text, and images at a fast rate.

The results suggest that the interaction of young people with a combination of stimuli, such as virtual characters and objects, can possibility boost real-time literacy skills. In this study, the young people were able to combine all the information needed to solve the tasks of the casual games. Interacting with the stimuli present in the digital environment helped them to enrich their real-time literacy skills.

Interaction with the introductions

From my observations, young people were very quick in processing the information from different types of stimuli presented in the game environment. As soon as they entered the game world, they knew what to do and how to play. Being able to play and solve a casual game indicates that they were able to process the auditory and visual stimuli. As stated by Gopher, Well, and Bareket (1994), a major factor in players' performances is their ability to synchronise the parallel, independent channel of stimuli present in the digital game environment.

This finding is more significant for the frequent players, as they successfully completed the tasks of the casual games without experiencing the introductory part of the tested casual games. As stated in Chapter 5 (Section 5.3), frequent players tend to skip the introductory parts of casual games.

This indicates that without knowing about the story of a casual game, they still know how to solve at least three levels in a 30-second period. This indicates that young people are able to process information from different element sources quickly in order to meet the objectives of gameplay activities.

It is not surprising that real-time literacy skills may be enhanced while playing casual games given that casual games are embedded with a large volume of fast-moving digital elements, such as sound, images, and text. Eshet (2012) also claimed that the real-time digital literacy skill is associated with video games, this is because video games are embedded with large volumes of fast-moving digital elements, such as sound, images, and text.

The findings of this study seem consistent with other research (Marsh, 2013) in which players were found to exhibit faster responses in processing information present in the game environment. According to Marsh (2013), the young people knew what to do in the *Club Penguin* as soon as they entered the virtual world.

Concerning the time span to complete the task of a casual game, in this study young people were able to complete at least three levels in a casual game in a 30-second period. However, it is difficult to determine whether they were comparatively fast in solving a casual game as there is no empirical research on the average time for players to solve a task in a casual game to use for

comparison. Ease of play is one of the key features of casual games (Cheng, 2011; Juul, 2010) which makes it more difficult to determine whether young people in this study were relatively quick in solving at least one level of a casual game. Nevertheless, this study provides evidence that young people managed to complete at least three levels of a casual game in a 30-second period. With this kind of gameplay activity, young people have the opportunity to increase their ability to process information from different stimuli simultaneously and rapidly, not just in the video game environment but also in other digital environments.

8.4.4 Socio-emotional literacy skill

Socio-emotional literacy skill is a combination of sociological and emotional skills that enable users to share information and knowledge with others, possessing the capabilities for evaluating data, abstract thinking, and designing knowledge in collaboration with others (Aviram & Eshet-Alkalai, 2006, p. 5). Regarding the research RQ3: *To what extent can playing casual games enhance young people's digital literacy?* The findings of this study suggest that the socio-emotional digital literacy skill was involved when young people in this study played casual games. I indicate that there are three forms of social interactions of young people while playing casual games that may enhance the socio-emotional literacy skill. These are called connection, cooperation, and competition. Garzotto (2007) also stated that these interactions act as a medium for learning collaboration attitudes and skills. It

is not surprising that playing casual games have the potential to contribute to the enhancement of the socio-emotional literacy skills of players. As stated in the literature review chapter, it has commonly been anticipated (such as by Di Loreto & Gouaïch, 2010; Hou, 2011) that casual games integrate social elements, such as links to the social network of Facebook and the online multiplayer social gaming network of Game Centre. These findings confirm what Kowert and Oldmeadow (2013) claimed about the positive relationship between playing games and social practices.

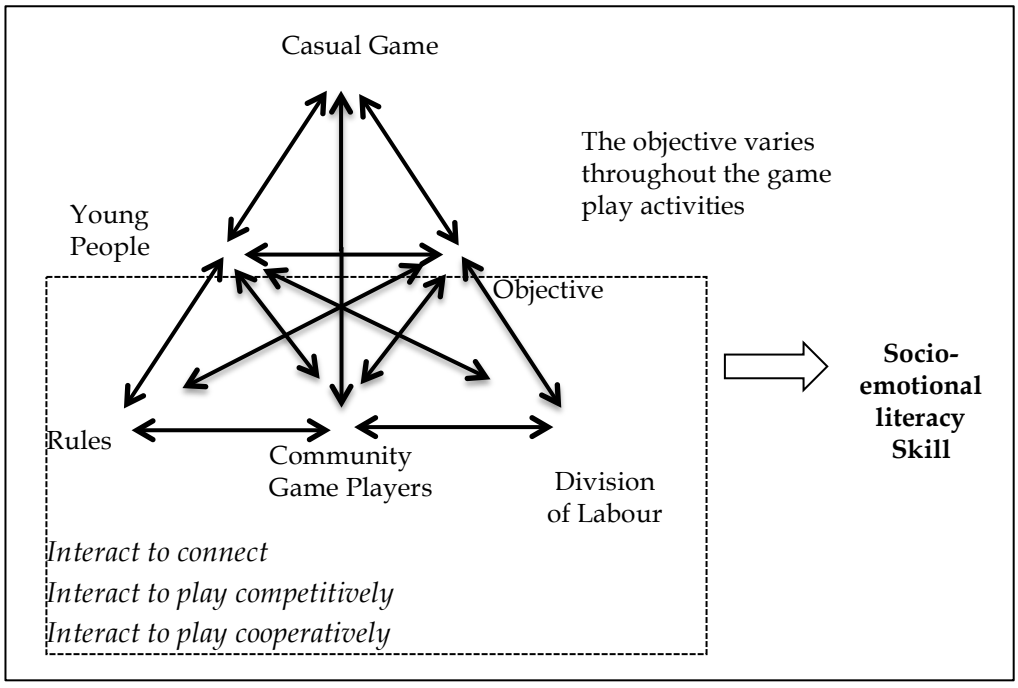


Figure 8-6 The Activity System of Game play Activities that Contribute to the Enhancement of Socio-Emotional Literacy Skills

Figure 8-6 is an activity theory that shows a social activity within the casual gameplay activities of young people. From the perspective of activity theory,

social practices happen at the bottom of the triangle, where rules, community, and division of labour are placed. In this part of the triangle, we can see three different forms of the social interaction activities of young people that may contribute to the enhancement of socio-emotional literacy skills

Connection to Interaction

Based on the findings of this study, I refer to connections as the sharing of knowledge and the gaming experiences with other players, and this is also reflected in the social practices of young people when they ask for help from the online community. This happened when they were stuck on one level of a casual game and required assistance from other players regarding how to solve the level. According to some participants in this study, they have their own online communities that share common interests concerning each game title. These online communities provide members with news and information about in-game changes and strategies. The findings have demonstrated that this social practice is reflected in the community of practice. As defined by Lave and Wenger (1991), community of practice is a group or community that shares a concern or a passion for something they do and learn how to do it better as they interact regularly (Wenger, 2011, p. 1). Gee and Hayes (2010) defined this community of practice as a *Passionate Affinity group*.

However, only five participants in this study demonstrated this practice during the observation session. A probable explanation is that only these participants had experience of playing the higher levels of casual games, compared to others who had experience of playing only lower levels of casual games, as the higher levels are more challenging to solve. One limitation of this study is the discontinuation of gameplay activities. In other words, the observation process was done for only one session for each participant. This provides no chance to continue playing the higher, more difficult, levels of casual games. Even though there were only five participants that demonstrated this practice during the observation session, it can be used as empirical evidence regarding how the connection mode of interaction may enhance players' socio-emotional literacy skills. However, in the interview session other participants stated that they too have their own online communities to discuss and share gaming experiences. This community of practice has also been mentioned by video game scholars in that players often organise themselves into communities of practice (Ang et al., 2011; Bogost, 2008; J. P. Gee, 2003), where players create social identities to share experiences and discuss information with other players to achieve goals and solve the problems present in particular video games.

From the findings, it can be assumed that the young people in this study accepted the knowledge sharing practices of other people. The interviews revealed that the participants enjoyed sharing and discussing whatever

information they obtained when playing casual games with other players. This finding coincides with the findings of the research study by Abrams (2009) concerning how collaboration and knowledge sharing appear to be accepted practices among adolescent gamers.

Interact to play Collaboratively

The findings of this study also indicate the presence of play with and against other players, which this study identified as cooperative and competitive forms of social interactions. Playing collaboratively refers to players playing hand-in-hand with other players in order to complete the objectives of casual games. Based on the data analysis, two aspects of social interactions are related to playing casual games collaboratively: collaboration within the game world and collaboration outside the game world. As stated earlier (Chapter 6), playing collaboratively within the game world refers to a player playing synchronously with other players and working as a team within the game world, while collaborative play outside the game world refers to players requesting help from other players that may not be concurrent in the game world. Requesting help is something that Di Loreto and Gouaïch (2010) considered a materialistic need, in which players obtain objects (such as extra lives, boosts, and gifts) from their Facebook friends. The findings suggest that some participants in this study actively performed this form of social interaction by asking their Facebook friends to send objects (extra lives, boosts, and gifts). Therefore, this strongly indicates that the casual games

used in this study allowed players to communicate with their Facebook friends in order to complete the game tasks. With respect to socio-emotional literacy skills, the cooperation mode of casual gameplay experience may increase the collaborative attitudes and skills of players through their play together and their communication with Facebook friends for materialistic needs.

Interact to play competitively

Apart from cooperative game mode experience, the findings of this study also indicate that young people competing against other players may also enhance their socio-emotional literacy skills. Competitive gameplay experience can be either in a co-located setting or in a leader-board setting. Again, with the help of the Internet, players are able to compete with other players from around the world. Regarding the socio-emotional literacy skill, playing casual games in competitive mode may increase the feeling of being competitive though playing casual games head-to-head with other players both within the same game world and on a leader-board ranking system.

With these three forms of social interactions, casual games are rich in social activities, and playing casual games may contribute to the enhancement of socio-emotional literacy skill. The role of the Internet is the main contributory factor that makes it possible for players to create a space beyond geographical restrictions where players who have common interests and

skills can easily interact and communicate with each other no matter where they physically are (C. Cheng & McFarlane, 2006).

Although there is a positive relationship between playing casual games and socio-emotional literacy skill, if we compare this to the definition of socio-emotional literacy skill defined by Eshet (2002a), the social interactions found in this study only partially meet the definition. Eshet focused on the three social activities of knowledge sharing, data evaluation, and collaboration. With regards to the definition, it is important to state here that the findings are consistent with only two areas of socio-emotional digital literacy skill as defined by Eshet (2002a). The socio-emotional digital literacy skill stated by Eshet (2002a) is a more holistic approach to socio-emotional literacy skill, and the findings of the present study suggest that young people showed only a portion of this skill; as during the observation process, they shared gaming experiences and collaborated with others. However, the findings of this study indicate that in casual gaming activities, playing competitively can be considered a social activity (Emmerich & Masuch, 2013; Garzotto, 2007) that may contribute to the enhancement of socio-emotional literacy skill. Therefore, during casual gameplay activities, the three forms of social interactions of connection, cooperation, and competition may enhance socio-emotional literacy skill. The findings of this study extend the idea of Garzotto (2007) on the three forms of social interactions, which he mentioned

may promote educational effectiveness. For this study, the three interactions may also contribute to the enhancement socio-emotional literacy skill.

8.4.5 Information literacy skill

Researchers have suggested that information literacy skills are skills that assist users to find, use, evaluate and select information in the digital environment (Eshet, 2012; Gumulak & Webber, 2011). With regard to this definition, playing casual games may enhance the information literacy skills of gamers. However, this study suggests that only the ability to find and use information may be enhanced when young people play casual games. This is because, during the observation process, young people only presented their ability to find and use information in an effective manner. They were able to recognise where to find the information and to use it effectively. For example, on one occasion, the participant made a decision to search for information concerning how to obtain more stars in *Angry Birds*. The findings indicate that the participant recognised when information was needed and then applied it to the situation. These findings are in line with the findings of Gumulak and Webber (2011), in which they revealed that their participants also displayed the ability to know when and why information was needed. They indicated that their participants could be considered to be information-literate individuals. However, in this study, I do not consider young people with the ability to find and use information to

be information-literate individuals. Information literacy entails more than just these abilities. In this study, an information-literate individual is defined as a person who has the ability to not only find and use information, but who also has the ability to evaluate and select the information effectively. Eshet (2004) argued that individuals who possess this skill are able to identify good-quality, non-biased information. However, the findings of this study provide inadequate evidence to suggest that young people are able to recognise good-quality information. They seem to select information based on the popularity of a website, which is in the form of popularity within their circle of friends or the first few lines on the first page of results from a search engine. From the interviews, they believe these popular websites provide accurate information that can be used for them to achieve the goals of casual games. This finding shows that the young people in this study were poor at selecting on-line information in an educative and effective manner. According to Eshet (2012) and Geck (2007), a user is only information literate if he or she thinks critically when selecting and evaluating information by filtering biased information. Therefore, it can be stated here that the young people in this study were biased when selecting the information; they evaluated the information based on its popularity.

With regard to research question RQ3, *To what extent can playing casual games enhance young people's digital literacy?*, the findings of this study suggest that the information-seeking activities while playing casual games may enhance

the information literacy skills of young people, as mentioned above, but only in terms of finding and using information. It is important to state here that, while playing casual games, the young people in this study were persistent to complete the goals of the game-play activities. Their persistence drove them to find information about tactics and strategies concerning how to meet their game-play objectives. As recognised by Gee (2007) and (Gumulak & Webber, 2011), game players are determined to complete challenging video games, and they will go to extreme lengths to complete the levels of video games. This persistence was clearly shown during the observation process when the young people had difficulty completing the games. From the data analysis, this difficulty led the young people to seek information on the Internet regarding how to solve the games. It is important to mention here that, during the observation process, the young people made full use of utilised on-line resources to help them to solve the problems.

The findings of this study indicate that the young people searched for information to complete the objectives of the casual games based on two main factors. These two factors were included in the list by Consalvo (2005; 2014) as reasons to cheat in order to meet the objectives of the game-play activities. During the observation process, the first factor emerged when the participants had difficulty progressing to the next level in a casual game. In this study, as shown and stated by the young people, they do to complete a particular task in a casual game several times before seeking help from

others. As stated by Consalvo (2005), 'getting stuck' was the most frequently cited reason for the players in her study to cheat when playing video games, this was also the main reason for players to find solutions on the Internet in this study. It is also important to mention here that the participants tried very hard to complete the levels in the casual games. Their determination led them to seek information concerning how to solve the problems in the casual games by visiting websites that provided discussion boards and walkthroughs for a particular casual game title. One interesting point to mention here is that, despite the massive amount of web-based information that can be accessed easily, the young people in this study attempted to complete the casual games by themselves before seeking help from other sources. This is similar to the research findings of Gumulak and Webber (2011), in which the participants also resorted to obtaining information from other sources after several attempts to solve the problems in the video games by themselves.

Another reason is young people's determination to be ahead of their friends. This reason occurs when they compete with other players on a leader board. One interesting finding regarding this practice was the participants' persistence to be at the top of the leader board for a particular casual game. Based onthe observation process, the young people played the same level in a casual game repeatedly in order to obtain the highest score. According to the participants, they sought information about how to obtain more points in

casual games. Therefore, information literacy skills, in terms of finding and using information, can be enhanced while playing casual games through information-seeking activities in order to complete challenging levels and to be at the top of the leader board.

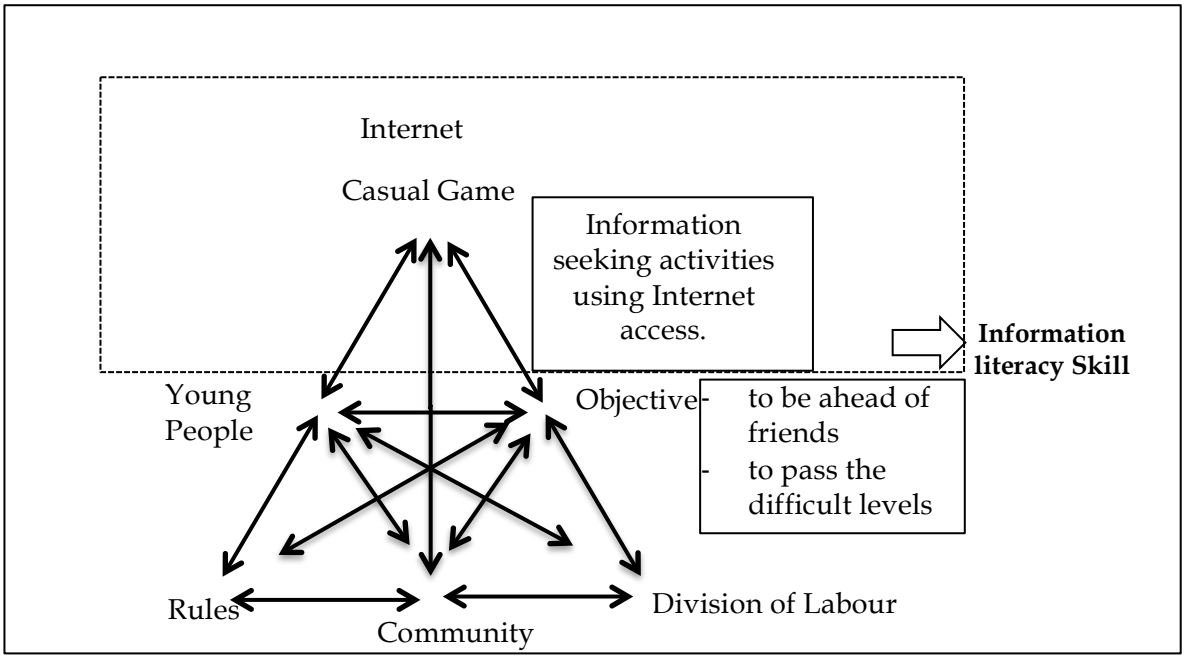


Figure 8-7 The Activity System of Game play Activities that Contribute to the Enhancement of Information Literacy Skills

Figure 8-7 illustrates the game-play activities that are derived from the objectives that may enhance the information- literacy skills of young people. In this figure, I also included the Internet as a mediated tool of the activity. It

was mentioned above that the Internet is also one of the tools that mediates the information-seeking activities of young people.

However, in this study, only two participants practiced each activity, respectively. The reason may be due to the methodology of this study, as the participants were only observed on one occasion. In fact, this is one of the limitations of this study. There is a need for similar types of studies in the future in order to perform a series of observations of the same participants to investigate their gaming behaviour in more depth. One important finding was that the young people selected a website based on the most frequently viewed website. This study indicates that the popularity of a website influences the young people's selection of a website. Based on the findings, it was surprising that the young people in this study continued to use the same website that they had accessed prior the observation session.

8.4.6 Reproduction literacy skills

This study reveals that reproduction literacy skills never occurred during the game play activities of young people in this study. As stated in Chapter 3 (Section 3.1.1), reproduction literacy skills enable players to create a meaningful, authentic, and creative work or interpretation by integrating existing independent pieces of information (Eshet, 2004, p. 98). A reproduction literate person can use his or her thinking skills to modify and produce new forms of information by combining sources of existing

information. Based on this definition of reproduction literacy skills, the young people did not exhibit activities that required thinking skills to produce new meaning from existing information during game play activities. A probable explanation for this may be the nature of this research study, which investigated only one occasion of game play activity for each participant. Consequently, it was difficult to record whether any reproduction of information occurred during game play activity since this would require at least two sessions of game play activities.

However, during game play activities, some participants exhibited activities of re-applying rules from one game to a different casual game. This finding, the re-use of rules, is not considered reproduction of information because this activity does not create new meaning from previous information. This activity is described in more detail in the next section.

8.5 Emergent Literacy Skills

This section focuses on the skills that emerge when young people play casual games. From the data analysis, these skills are not listed in the digital literacy skills model referred to by this study. Nevertheless, they are significant and should be mentioned here because I consider these skills to be a requirement for young people to survive in digital environments.

8.5.1 Transfer skill

In addition to the six digital literacy skills outlined by Eshet (2004), one unanticipated finding of this study was the ability of young people to transfer information learned in one context to another context. From the findings, young people in this study were able to apply rules from previously played games to a new casual game. This type of transfer is called specific transfer (Royer, 1979), whereby both games have a clear similarity of elements. In this case, young people recognised the similarity of the two contexts and transfer their knowledge.

In this study, the transfer activity was based on the genre recognition of games. For example, the genre of *Candy Crush* is similar to that of *Bejeweled*. Both games have similar rules – a match-three puzzle game and similar digital environment – and a colourful board with candy tiles (*Candy Crush*) or jewels (*Bejeweled*). Genre recognition was also observed in other games with different platforms. For example, in *Scramble with Friends* (a casual game) and *Boggle* (a board game), one participant was able to identify the similarity of these games in terms of their genre: a word puzzle.

This type of gameplay activity may enhance the transferability of skills in the two situations. This finding can be interpreted as follows: casual gameplay activity may enhance the ability of young people to transfer information from one context to another. This finding coincides with the notion of the

transfer learning theory by Perkins and Salomon (1992), which refers to an activity in which learning in one context or with one set of materials affects performance in another context or with other related set of materials (p. 3). Although this is not about the learning process, the findings of this study may suggest that information obtained from one context can be used in another context. Transferability skills may assist young people in transferring and using the information obtained from playing video games to a different context, for example, the learning process.

In this study, the transferability process was demonstrated when young people applied another game's rules to a different game. From observations, this situation occurred only when the nature of the casual game was similar to video games that they had previously played. One example is the casual game *Scramble with Friends.* The rules of this game are similar to the board game *Boogle.* Therefore, any tactics and strategies to win *Scramble with Friends* are similar to those used for *Boogle.* Young people who played this casual game applied the tactics and strategies of playing *Boogle* to *Scramble with Friends*.

This type of transfer is called specific transfer (Royer, 1979), in which both games have a clear similarity of elements. In this case, the rules of the game are the similar element. This type of gameplay activity may enhance the transferability of skills between two situations. In this case, young people

were able to recognise the similarity of the two contexts and use transfer their knowledge from one context to another.

8.5.2 Digital intelligence

Interaction with casual games also involves physical modes of interaction, in this case the physical interaction of young people with an iPad. Although the purpose of this study is to investigate the game play activities of young people, it is important to discuss their interaction with the iPad. One interesting finding was their ability to manipulate the iPad to stay in the game and meet the objectives of game play activities. In this study, I define manipulation as handling or controlling a machine in a successful manner. As stated in Chapter 7 (Section 7.4.2), young people in this study were able to use their own strategies by controlling the settings of an iPad and using different digital devices to stay in the game and to obtain more points. Manipulation activity is clearly presented when young people play the casual game Candy Crush, which requires lives to initiate game play activities. To gain lives in a short time, the player changed the time settings to advance time. Changing the time settings to advance an hour results in a full of set lives to play the game.

Another interesting finding that I relate to the physical mode of interaction is the use of different technologies to play a single casual game. In this study, young people use different digital devices, such as smart phones and laptops to play *Candy Crush* in order to obtain 10 extra lives by playing the game with different technologies.

Regarding these findings, young people in this study were able to think critically and creatively concerning how to handle and control digital devices to meet the objectives of game play activities. This finding shows that they have the ability to take advantage of the potential of digital devices and make connections with the situations of game play activities.

Based on Gardener's definition of intelligence, I suggest that the ability of young people to use their knowledge concerning the potential benefits of digital technologies in their game play activities can be regarded as digital intelligence. In a simple definition by Adams (2004), Gardner's intelligence refers to the ability of individuals to use knowledge in a personal way to successfully interact with their environment (Adams, 2004, p. 94). If we refer back to the findings, they indicate that young people use their knowledge in a personal way (by changing time settings and using multiple devices) to successfully interact with their environment (to stay in the game and successfully meet the objectives of game play activities).

8.6 Chapter Summary

In this chapter, I have compiled all six digital literacy skills that are listed in Eshet's model of digital literacy and further discussed how playing casual games may enhance young people's six digital literacy skills. Using the activity theory framework, I listed the casual game play activities that have potential to contribute to the enhancement of digital literacy skills. The next chapter presents implications of this study, including limitations, recommendations, and contributions of the findings of this study to the knowledge base.

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CHAPTER 9 CONCLUSIONS

9.1 Introduction

This chapter concludes this thesis by summarising my findings. This chapter also presents the contributions to knowledge, implication of the study, limitations and recommendations, and future potential research.

9.2 The answer to the main research question

The overarching research question developed by this thesis was: *To what extent can playing casual games enhance young people's digital literacy*? From the literature review undertaken in Chapter 2 (see Section 2.2.4), certain researchers claim that constant exposure to the usage of digital technology makes young people acquire a certain degree of digital literacy. Based on the data analysis (Chapter 8) results suggest that playing casual games may enhance the digital literacy of young people, if certain activities of game play are performed. In Chapter 8, I have listed the game play activities that have potential in enhancing the digital literacy skills listed in Eshet's (2012) model, with Figure 9.1 summarising all these activities.

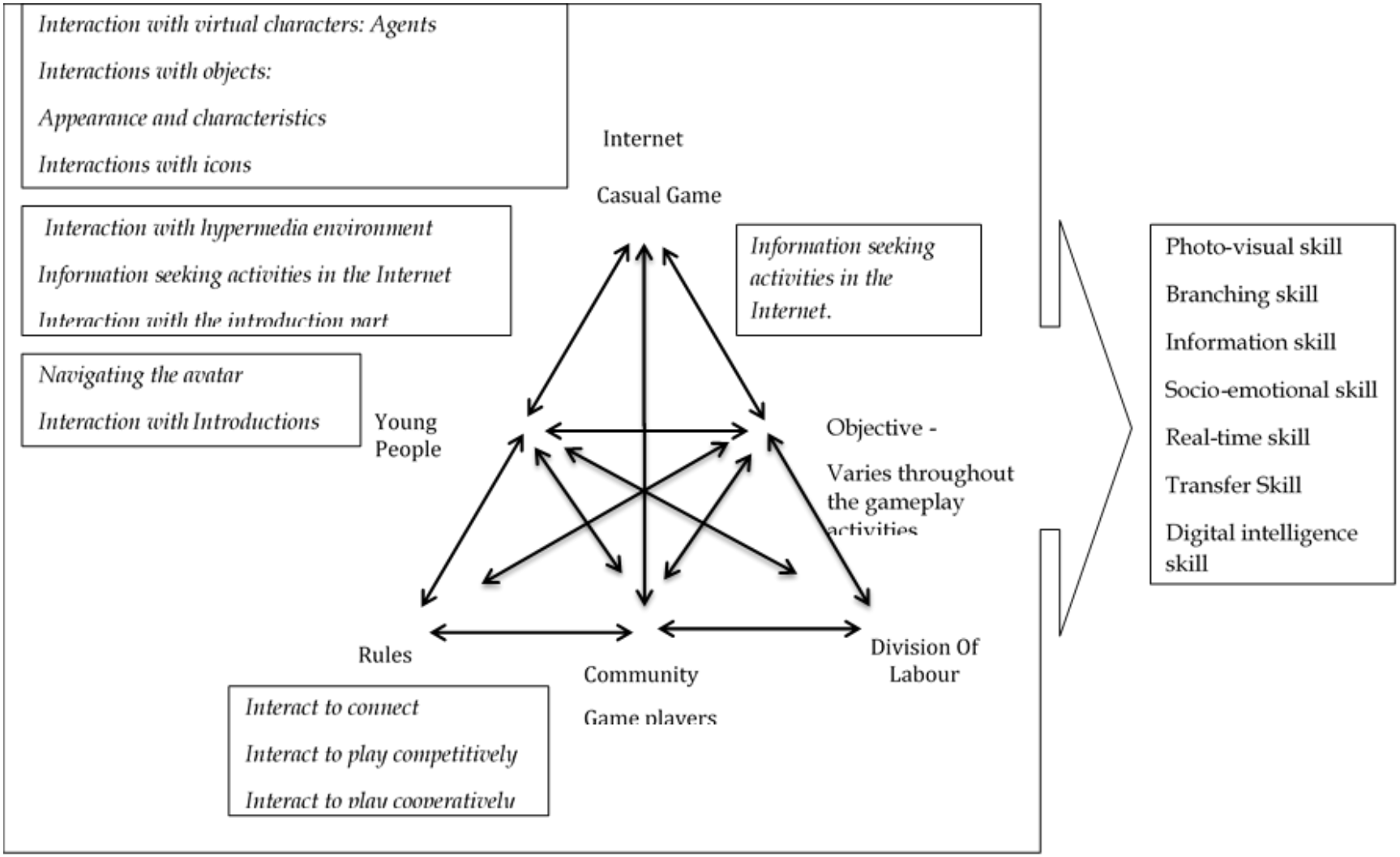

Figure 9-1 Activity Theory show the game play activities that may enhance digital literacy skills

With regards to the main research question, I conclude that playing casual games may enhance branching, information, photo-visual, real-time, and socio-emotional literacy skills. In Figure 9.1, reproduction literacy is not listed, which means that this skill is not enhanced during the casual game play activities. Findings of the study suggest that young people did not demonstrate any game play activities that reflected the definition of reproduction literacy skill. This might be due to the nature of the casual games played in this study, which probably did not require players to demonstrate this skill. Eshet (2004) defined this literacy skill as one that enables an individual to create meaningful, authentic and creative work, or interpretation by integrating existing, independent pieces of information.

Furthermore, findings of this study suggest that young people were only able to find and use information they found on the Internet. They selected the information according to the popularity of the websites and their preferences, without questioning the reliability of the information. I claimed their behaviour did not reflect the evaluation process of information. My claim is based on Eshet (2004) definition, where he refers to this skill as one that enables an individual to use cognitive strategies to find, evaluate, and select appropriate information and use it effectively. Individuals with information literacy skills are critical thinkers who always question information and never take it for granted. However, only one participant was able to demonstrate the evaluation process effectively.

In addition to the five literacy skills, I have discovered two emergent literacy skills were also discovered: transfer skills and digital intelligence skills. Transfer skills enable the individual to recognise and understand the information in one game environment and use this information successfully in a new game environment. Digital intelligence skills are the ability of an individual to use their thinking strategies in manipulating digital devices, in order to meet the objective of the game play activities.

9.3 Contribution to existing knowledge

This thesis provides a significant contribution to the area of digital literacy skills. In this study, the main aim is to investigate the enhancement process of digital literacy skills while playing casual games. Therefore, this thesis provides a potential list of game play activities that might contribute to the enhancement of digital literacy skills. As stated in the literature review, there has been minimal research on how are they developed, and this thesis provides rich descriptions of the enhancement process of each digital literacy skill.

This thesis also sheds some light on under-developed information literacy skills. Based on the findings, adults need to teach information literacy skills,, especially in terms of evaluating the reliability of the information. This finding relates to the existing knowledge about the information literacy skills

of young people – namely, that they are not fully information literate. This study illustrates that young people are unable to evaluate information from online resources.

This thesis contributes to the current discussions on the popular activities of young people all around the world. As stated in literature, casual gaming will continue to be a popular activity for young people. This thesis demonstrates the positive effects of playing casual games with the enhancement of digital literacy skills.

According to the literature, with the extensive use of technology by young people, it has been claimed that they have obtained a certain degree of digital literacy. This thesis provides evidence that when young people are immersed in the world of technology, they are in fact developing such skills. The findings prove that while playing casual games, young people can acquire digital literacy skills. Moreover, while involved in a casual gaming activity, young people are also participating in other activities, such as communicating (e.g. via online discussion platforms), reading walkthroughs and cheat codes and seeking online information.

9.4 Implications

9.4.1 Casual games and digital literacy

This study reveal that playing casual games is more than just game play activity, but may also be considered a productive activity. By playing casual games, young people are likely to obtain different types of digital literacy skills. In this thesis, the skills developed by playing casual games may be very useful for young people to adapt such skills to other digital practices. For instance, young people were able to enhance their skills in not getting lost in the hypermedia game environment, a skill this study termed the branching literacy skill. The more exposure of young people to these types of game play activities, the better they might be in enhancing the branching literacy skill.

As mentioned earlier, educators and education policymakers have modified pedagogy practices and education systems to integrate digital technology across curricula. Indeed, it is important to do so if digital literacy is one of the main reasons why digital technology should be used in classroom practices. With the findings of this study, especially educators or education policymakers pay serious attention that playing casual games, which sometimes considers as wasting time activity, can be used as on possible tool for teaching digital literacy in the classroom.

In Chapter 4 Section 4.3.3, I stated that *Minecraft* is different from the other casual game titles used in this study. In regard to that, it might be possible that players will obtain different skills compared to the skills acquired from other casual games. However, based on the findings related to *Minecraft*, I can conclude that there were no difference skills obtained from this casual game. One reason might be because of the nature of this research; I solely focused on Eshet's six digital literacy skills. Therefore, for future research, *Minecraft* should be studied separately for further investigation.

9.4.2 Working with Computer Club members

For this research study, I have recruited students attending the after-school computer club as participants in order that I may investigate their casual game play activities that have potential for enhancing digital literacy skills. Notably, students who are computer club members are often the ones who are interested in technology, and they may well be immersed in using technology for their routine practices. According to scholars (such as Oblinger & Oblinger, 2005; Sefton-Green, Marsh, Erstad, & Flewitt, 2016), young people who have been exposed to the use of digital literacy in their everyday life will have developed a degree of digital literacy skill. Similarly, young people in this study could also have a degree of digital literacy due to the usage of technology in their everyday life.

In regards to this matter, findings described in this thesis could be limited by this selection of participants. This needs to be taken into consideration when data were taken from participants recruited from the general school population. These participants might have less interest in technology and therefore findings related to them might possibly differ from those related to digitally literate students in this study. The game play activities that I have listed in previous chapter (Chapter 8) in relation to the enhancement of digital literacy skills may have less lists of game play activities. This is mainly due to the participants may spend times on one level of the games without *getting out* from the game world. For example the participants may not access to the Internet to obtain help from other players (online communities websites) since they are not within the online community.

On the other hand, the findings of the study if using participants from the general school population can also be similar to the findings of this study. A reason for making this assumption is the claim made by scholars (such as Oblinger, 2003; Prensky, 2001; Rosen, 2010; Tapscott, 2008) regarding young people as high users of technology. According to these scholars, these young people are the new generation who have grown up with technology. Although the claims were made for generation between 1990s and 2000s, the situation still be the same, the young generation are still immersed in technologies. The only different is the type of technologies that the young generation used in their early age. For example, as stated in the literature

review (section 2.21), the latest young generation is called iGeneration (Rosen, 2010), young people who born within the year 1995 and the new millennium, and this generation used portable technologies at young age. Through observation, in Brunei, the young generation can be claimed as iGeneration. This is because at young age, they are also exposed on the use of portable technologies such as iPad, smart phones and tablet. In regards to this claim, findings with the sample involving these students might be similar to the study in this thesis. Therefore, further research in this field would be of great help in recruiting a different group of students apart from those students attending the after-school computer club.

9.4.3 The application of activity theory as an analytical framework

The activity theory provides a different way of thinking about, analysing, interpreting, and understanding game-playing activities, and the components affected by, and affecting, the success of the game playing process. It provides a powerful analytical framework to analyse game play activities.

In this study, activity theory enabled the process of analysing the game play activities. In analysing the data, activity theory has provided a basis for selecting these game play activities. This is because systems within the context of activity theory state that any activities of a subject are always dependant on the objective (object). Therefore, in this study I selected any

game play activities of young people (subject) that were driven by objectives, and have potential to enhance the digital literacy of these young people

9.5 Limitations and Recommendations

One limitation of this study may be found in the observation process undertaken; in that each participant was observed playing casual games only once. The one-time observation process limited the data to a single game play activity. In order to obtain detail-rich information in future studies of game play activities and digital literacy, a series of observations of a smaller number of participants would be recommended. Furthermore, as indicated previously, certain digital literacy skills, such as information literacy and reproduction literacy, require a series of investigations.

Another limitation of this study regards the participants, especially the frequent players, as mentioned in Chapter 5. They stated that they had issues playing casual games on other people's devices, preferring their own, personal, digital devices. The reason for this is a lack of continuity between game sessions, and an inability to continue on the same level of the game they played on their own device. Therefore, a policy of Bring Your Own Device (BYOD) is recommended for future research. If BYOD was employed, a different enhancement process of digital literacy skills may have been observed.

As stated earlier in Chapter 3, this study only investigated 20 young people, aged between 10 and 12 years old, playing casual games. Therefore, the findings generated may only be applicable to this group of young people. It limits this study's ability to generalise the findings to other age groups, or those from other places.

9.6 Further Research

More research is needed in the fields of digital literacy and casual game play in young people, based on the findings of this study. Firstly, from the results, two emergent literacy skills have been presented in this study, opening new directions of digital literacy and gaming activities. As stated earlier in this chapter, these two skills are called transfer skills and digital intelligence skills. For further research, it is important to investigate if these two skills may be considered digital literacy skills that can be applied to other digital environments.

As I already listed the enhancement process of digital literacy skills while playing casual games, in further research I would make suggestions as to how these digital literacy skills would be enhanced from other informal activities, such as social networking activities, online entertainment activities or playing with applications on tablets.

Unfortunately, as indicated previously, generalisation of these findings to different groups of young people is limited. Therefore, for further research, it is worth considering investigating the enhancement process of digital literacy in different groups of young people.

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APPENDIX A

Juraidah Hj Musa

King's College London

Address

Principal

Name of School

Address of the School

Date

Dear Sir / Madam,

I am a MPhil/PhD student of Department of Education and Professional Studies at Kings College London and as a requirements of my studies I am required to conduct a piece of research. I have identified a need for research into "*Developing Digital Literacies of Young Generation through Playing Casual Games"*. I am writing to ask if it would be possible to recruit participants for this study from your schools. I am approaching your school since your school have an after school computer club

I have prepared a description of the study and what is involved in it for potential participants, and I have attached a copy for you to read. Ideally, I would like to begin the data collection on February 2013 (exact date will be confirmed later) but I am very happy to be guided by you on this.

To conduct this study, I would need to use a computer room that are available in your school. I will make sure that no disruption on the computer class timetable since this study would be conducted during a period of computer club activity (after-school hour).

I would anticipate that the project would take less than 2 hours and it would be conducted in 3 sessions. I will endeavour to keep the disruption to your working day to an absolute minimum.

I would to ask for your permission to recruit your students as the participant of this study and conduct the study here in your school. I hope that you find the attached project of interest and will be interested in working with me on it. Please feel free to contact me if you have any queries. Alternatively, you may wish to contact my supervisor (mentioned below), if you would like a reference or other information.

DR IAN STEVENSON
Department of Education & Professional Studies
Franklin Building
Waterloo Road
London SE1 9NH
Tel: +44 (0)20 7848 3117
Fax: +44 (0)20 7848 3182

Many thanks for taking the time to read this and I hope to hear from you soon.

Yours Sincerely,

Juraidah Hj Musa

✉ **juraidah.musa@kcl.ac.uk**

☎ +673 8973897

APPENDIX B

INFORMATION SHEET FOR PARTICIPANTS

REC Reference Number: REF(EM)/12/13-19,

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Enhancing Digital Literacy skills while playing Casual Games: Young People in Brunei As a Case Study

We would like to invite you to participate in this postgraduate research project. You should only participate if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, it is important for you to understand why the research is being done and what your participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

AIMS OF THE STUDY.

This study aims to determine on what extent the digitally literacy of iGeneration and investigate more on the skills, competency and knowledge through playing Casual Games. We will make a further investigation on the ability of young people negotiate such literacies to create their own learning contexts.

We hope that this study will provide a clarification on the digital literacy skills of young generation.

RESEARCH STUDY PLAN.

This research study will recruit young people aged 10-12 years old as participants. If you are willing to take part on this study, you will play Casual Games in your own school computer-club room and it will be after-school hour. There will be 3 sessions and all activities will last for 1 hour 15

minutes/session. Throughout the playing Casual Game process, we will observe your interaction activities with the Casual Games. You can ask any information regarding on how to play the Casual Game to us. We will provide a selection of Casual Games titles and you can choose any titles from the selection. There will be another interview session after the playing Casual Game session and this will be in the computer room too. For your information, we will use audio and video recorder to record all tasks and interview sessions, subject to your permission. Interviews will be recorded, subject to your permission

If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form.

CONFIDENTIALITY.

All data from this study is confidential and only we will have access to. Your personal information will not mention in any writing forms. For the purpose of this research study, I will only mention gender and age. We will use different names to differentiate you and your friend in the final report Any audio and video captured throughout this study will be destroyed once data is analysed for the final report. Once the report has completed, you, as a participant can request a copy of this report for you to keep. Recordings of interviews will be deleted upon transcription.

WITHDRAW PROCESS.

It is up to you to decide whether to take part or not. If you decide to take part you are still free to withdraw at any time and without giving a reason. Once you decide to withdraw from this study, we will destroy your data. You may also withdraw any data/information you have already provided up until it is transcribed for use in the final report (April 2015). A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive. If you agree to take part you will be asked whether you are happy to be contacted about participation in future studies. Your participation in this study will not be affected should you choose not to be re-contacted.

If this study has harmed you in any way, you can contact King's College London using the details below for further advice and information:

Supervisor:

DR IAN STEVENSON

Department of Education & Professional Studies

Franklin Building

Waterloo Road

London SE1 9NH

Tel: +44 (0)20 7848 3117

Fax: +44 (0)20 7848 3182

APPENDIX C

CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Enhancing Digital Literacy skills while playing Casual Games: Young People in Brunei As a Case Study

King's College Research Ethics Committee Ref:_____

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

- **I understand that if I decide at any time during the research that I no longer wish to participate in this project, I can notify the researchers involved and withdraw from it immediately without giving any reason. Furthermore, I understand that I will be able to withdraw my data up to the point of publication.** ☐

- **I consent to the processing of my personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the UK Data Protection Act 1998.** ☐

• **The information you have submitted will be published as a report; please indicate whether you would like to receive a copy.**	**Yes**	**No**
I understand that confidentiality and anonymity will be maintained and it will not be possible to identify me in any publications.	**Yes**	**No**
• **I agree to be contacted in the future by King's College London researchers who would like to invite me to participate in follow up studies to this project, or in future studies of a similar nature.**	**Yes**	**No**
• **I agree that the research team may access my academic/membership/medical records for the purposes of this research project.**	**Yes**	**No**
• **I consent to my interview being audio/video recorded.**	**Yes**	**No**
• **I agree that the research team may use my data for future research and understand that any such use of identifiable data would be reviewed and approved by a research ethics committee.**	**Yes**	**No**

Participant's Statement:

I -
_____
_____agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed Date

Investigator's Statement:

I _____

Confirm that I have carefully explained the nature, demands and any foreseeable risks (where applicable) of the proposed research to the participant.

Signed Date

APPENDIX D

INFORMATION SHEET FOR PARENTS/GUARDIANS

REC Reference Number: REF(EM)/12/13-19,

YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

Enhancing Digital Literacy skills while playing Casual Games: Young People in Brunei As a Case Study

We would like to invite your child to participate in this postgraduate research project. Your child should only participate if your children want to and of course from your permission; choosing not to take part will not disadvantage you and your child in any way. Before you decide whether your child want to take part, it is important for you to understand why the research is being done and what your child participation will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

AIMS OF THE STUDY.

This study aims to determine on what extent the digitally literacy of iGeneration and investigate more on the skills, competency and knowledge through playing Casual Games. We will make a further investigation on the ability of young people negotiate such literacies to create their own learning contexts.

We hope that this study will provide a clarification on the digital literacy skills of young generation.

RESEARCH STUDY PLAN.

This research study will recruit young people aged 10-12 years old as participants. If your are willing to give permission for your child take part on this study, your child will play Casual Games in your child own school computer-club room and it will be after-school hour. There will be 3 sessions and all activities will last for 1 hour 15 minutes/session. Throughout the playing Casual Game process, we will observe your child interaction activities with the Casual Games. We will provide a selection of Casual Games titles and your child can choose any titles from the selection. For your information, the Casual Games titles have been selected based on the suitability of your child age group.

There will be another interview session after the playing Casual Game session and this will be in the computer room too. For your information, we will use audio and video recorder to record all tasks and interview sessions, subject to your permission. Interviews will be recorded, subject to your permission

If you decide your child to take part on this study, you will be given this information sheet to keep and be asked to sign a consent form.

CONFIDENTIALITY.

All data from this study is confidential and only we will have access to. Your child personal information will not mention in any writing forms. For the purpose of this research study, I will only mention gender and age. Any audio and video captured throughout this study will be destroyed once data is analysed for the final report. Recordings of interviews will be deleted upon transcription. Once the report has completed, you, as a parent of the participation can request a copy of this report for you to keep.

WITHDRAW PROCESS.

It is up to you and your child to decide whether to take part or not. If you decide to give permission for your child to take part your child still free to withdraw at any time and without giving a reason. Once your child decides to withdraw from this study, we will destroy your child data. You may also withdraw any data/information your child has already provided up until it is transcribed for use in the final report (April 2015). A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care your child receive. If you agree your child to take part you will be asked whether you are happy to be contacted about your child participation in future studies. Your child participation in this study will not be affected should your choose not to be re-contacted.

If you have any questions or require more information about this study, please contact the researcher using the following contact details:

Researcher;
JURAIDAH HJ MUSA
Department of Education & Profressional Studies
Franklin Building
Waterloo Road
London SE1 9NH
Contact Number: +44(0)7538076906
Fax Number: +44(0)20 7848 3182
Email: juraidah.musa @kcl.ac.uk

APPENDIX E

CONSENT FORM FOR PARENTS/GUARDIANS IN RESEARCH STUDIES

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Enhancing Digital Literacy skills while playing Casual Games: Young People in Brunei As a Case Study

King's College Research Ethics Committee Ref: *REF(EM)/12/13-19,*

Thank you for considering your child taking part in this research. The person organising the research must explain the project to you before you agree your child to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide your child to take part. You will be given a copy of this Consent Form to keep and refer to at any time.

- **I understand that if I decide at any time during the research that my child no longer wish to participate in this project, I can notify the researchers involved and withdraw from it immediately without giving any reason. Furthermore, I understand that I will be able to withdraw my child data up to the point of publication.** ☐

- **I consent to the processing of my child personal information for the purposes explained to me. I understand that such information will be handled in accordance with the terms of the UK Data Protection Act 1998.**

- **The information of your child have submitted will be published as a report; please indicate whether you would like to receive a copy.**

Yes	No

- **I understand that confidentiality and anonymity will be maintained and it will not be possible to identify my child in any publications.**

Yes	No

- **I agree to be contacted in the future by King's College London researchers who would like to invite my child to participate in follow up studies to this project, or in future studies of a similar nature.**

Yes	No

- **I agree that the research team may access my child academic/membership/medical records for the purposes of this research project.**

Yes	No

- **I consent to my child interview being audio/videc recorded.**

Yes	No

- **I agree that the research team may use my child data for future research and understand that any such use of identifiable data would be reviewed and approved by a research ethics committee.**

Yes	No

Participant's Parents/Guardian Statement:

I _____as a guardian of _____agree that the research project named above has been explained to me to my satisfaction and I agree mu\y child named above to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed Date

Investigator's Statement:

I _____

Confirm that I have carefully explained the nature, demands and any foreseeable risks (where applicable) of the proposed research to the participant.

Signed Date

Appendix F

Number:.....

INTERVIEW PROTOCOL

Name _____ **Date**_____

Gender _____ **Age** _____

Title of Video Game:

Interviewed by_____

Note to Interviewee:

The information you provide in this interview will be used to complete my data collection. My interest is your interaction with video game that you have played just now.
The interview takes about 15 minutes. The interview will tend to focus on the interaction of young people with video games, which specifically more on recalling information.

VIDEO GAME EXPERIENCE

1. To begin, I'd like to ask your video game habits?
   a. How many times a week do you play video game?
   b. What kind of platforms? Console, Handheld console, online or game apps from handheld device?
   c. What type of video game do you play? Interviewee can give titles of video game?

2. I'd like to learn about your perceptions on the video game that you played just now:
   - What do you think about the video game you have just played?
     In terms:
     a. The reason they choose the video game?
     b. Level of Difficulty? Ask the interviewee, why?
     c. Level of enjoyment? Ask the interview, which part of video game give him/her enjoyment/not?

RECALL INFORMATION

1. Do you still remember what kind of video game that you played just now? I will ask based on the video game they choose? This is more on visual graphics.
   a. Avatar?

1

b. Other characters in the video game world?
c. Simulation world?

2. Do you understand very well on the visual graphics? Further questions will be based on the answer given by the interviewee for each element.
   a. Avatar?
   b. Other characters in the video game world?
   c. Simulation world?
   d. Others

COLLABORATIVE PRACTICES

1. How do you prefer playing video game: by yourself or play with your opponents?
2. With reference with your playing video activity just now, I saw you were playing by yourself or with opponents/partner?
3. What do you think about "getting any help from your in order to complete the level?"
4. What do you think about "helping others"?

Comments after the Interview

Appendix G

Interview Transcript

Name: FIQAH

Gender: Female

Age 11

Time: 3.00pm

RESEARCHER: First question… How many times a week do you play casual games?
FIQAH:….mmm…(laughing) mmm, everyday, I play games on my iPad when I arrive home after school.
RESEARCHER: Okay, everyday…
FIQAH: But that everyday…mmm…must be after school.
RESEARCHER: What types of video games do you always play?
FIQAH: aaaa…(thinking)
RESEARCHER: I meant…on your iPad, smartphone or psp?
FIQAH: Usually everyday …I always play games [on my] iPad and Samsung

TaFiqahlet
RESEARCHER: oh okay…from your iPad or Samsung tablet... what games do you always play?
FIQAH: Subway Surfers….ahhh…Cooking Mama…
RESEARCHER: Wow.. I love those games, too.
FIQAH: I love any word game…mmm (thinking)….like 4 Pics 1 Word …I love Ruzzle …especially if [I] play with other players.. … (excited)
RESEARCHER: Why?
FIQAH: Why?
RESEARCHER: I meant, why do you like to play with other players?
FIQAH: Because I love competing with others…especially when you score high ..you feel proud.
RESEARCHER: What games did you play just now?
FIQAH: ahhh…(thinking)…Subway Surfers, Scramble.. mmm, Candy Crush, …ahhh

RESEARCHER: Are there any reasons why you choose those games?
FIQAH: No…I don't know.
RESEARCHER: What characters did you play just now?
FIQAH: ahhhhh….(thinking)
RESEARCHER: Subway Surfers?
FIQAH: ahh…Subway Surfers. Many characters …my character [is] wearing [a] HOOD…that's the main character…but you can unlock [a] character.
RESEARCHER: Okay
RESEARCHER: Any of the games that you played just now….you never played before?
FIQAH: yea…Scramble
RESEARCHER: Do you understand those games?
FIQAH: Ya…easy to play…word game… …
RESEARCHER: Can we go back to the game? I realized that you skipped the

introduction.
FIQAH: “I usually don’t like the introductory part of the game; sometimes it takes ages for me to listen [to] or read that part.”.
RESEARCHER: When playing a game …do you prefer to play …alone or to compete with others?
FIQAH: I don’t know..
RESEARCHER: If, for example, ah…you are stuck on the same level over and over...
FIQAH: ahhhhhh…just try…if not, I will go to [a] website.
RESEARCHER: What website?
FIQAH: YouTube… [I] love watching guidelines from YouTube…There is one guy who uploads his own videos while playing [a] video game. I always check out his videos.
RESEARCHER: Any name?
FIQAH: PewDiePie….I will go to his YouTube channel if I don't know how to play [a] new game. I even subscribed [to] his YouTube channel.

RESEARCHER: Why do you like his YouTube channel?
FIQAH: I understand his descriptions well, and he is so funny (laughs).
RESEARCHER: okay…time's up…
RESEARCHER: Do you want to ask me anything?
FIQAH: (long pause) ahh…no

Appendix H

Research Question		**Participant Description**	
Video Game	Q1A		
	Q1B		
	Q1C		
	Q2A		
	Q2B		
	Q2C		
Recall Information	Q1A		
	Q1B		
	Q1C		
	Q2A		

	Q2B		
	Q2C		
	Q2D		
Collaborative Practices	Q3		
	Q2		
	Q3		
	Q4		