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**EDUCATION AND THREE-DIMENSIONAL VIRTUAL WORLDS: A CRITICAL
REVIEW AND ANALYSIS OF APPLYING SECOND LIFE IN HIGHER EDUCATION**

by

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Abstract

Three-dimensional (3D) virtual world Second Life was launched in 2003 and has since become one of the most frequently used 3D virtual worlds in education. Educational practices supported by 3D virtual worlds might continue to be a part of the educational discussion in the near future. In the light of the increasing popularity of the 3D virtual world Second Life in higher education, a review of the existing literature appears to be necessary in order to provide educators with insights into their in-world and real-life educational practices. To that end, this study provides a clear summary of the previous research on the Second Life as a learning tool in higher education. It also explores its affordances, advantages and drawbacks. There is a growing body of research showing that Second Life can support authentic learning and self-directed learning, enhance collaboration, engage learners, create alternative space for educational activities, encourage communities for practice and foster cross-cultural competencies. Despite the issues concerning technology, cost, time, identity and culture, the benefits of application in education outweigh its drawbacks. Practitioners and participants in higher education need to be aware of the potential challenges when incorporating Second Life in education, and actively seek strategies to optimize their educational practices in 3D virtual worlds.

Key words: education, 3D virtual world, Second Life, higher education, addordance

Lay Summary

This graduating paper provides educators with a clear review of the previous researches and offers a critical analysis of the advantage and drawbacks of incorporating the 3D virtual world Second Life in higher education. There is a growing body of research showing that 3D virtual worlds can support authentic and self-directed learning. They can also increase students' participation and foster intercultural competencies. This paper will also help educators, particularly teachers in higher education learn practical strategies in order to effectively use Second Life in their teaching. It can also provide valuable insights for future research and practice in this field.

Preface

This graduating paper is an original and unpublished paper by the author, Wenyi Gong. The study was planned and designed with the help of Dr. Fei Wang from the Department of Educational Studies at the University of British Columbia.

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List of Abbreviations

3D	three-dimensional
CoP	Community of Practice
IVW	immersive virtual world
MUVEs	multi-user virtual environment
SDL	self-directed learning
VE	virtual environment
VLE	virtual learning environment
VWBPE	Virtual Worlds Best Practices in Education

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Chapter One: Introduction

Background

The attempts for integrating technological innovations into education date back to the first decade of the twentieth century (Saettler, 1967). In the past two and a half decades, the popularity of computers and the emergence of diverse digital technologies have prompted the research on the use of virtual worlds for learning (Wang & Burton, 2013). Virtual worlds have since evolved from simple text-based interfaces into persistent, real-world simulated three-dimensional (3D) virtual environments where users can utilize their graphical representations (avatars) to interact with each other as well as the environment at the same time (Collins & Jennings, 2007; Smart, Cascio, & Paffendorf, 2011). 3D virtual worlds such as There, Active Worlds, Whyville, World of Warcraft, Minecraft and Second Life have been steadily growing and utilized as educational environments (De Lucia, Francese, Passero, & Tortora, 2009).

Among these 3D virtual worlds, Second Life used to be the most frequently used platforms for education (Reisoğlu, Topu, Yılmaz, Karakuş Yılmaz, & Göktaş, 2017; Wang & Burton, 2013). Launched by Linden Lab in 2003, Second Life is a 3D online virtual world where users participate in an artificial environment with their avatars (Inman, Wright, & Hartman, 2010). Baker, Wentz and Woods' (2009) study shows that more than one hundred educational institutions across the world have created virtual campuses and conducted educational-instructional activities in Second Life, which makes it “the most active virtual world used in higher education” (p. 59).

Despite the issues concerning technology, cost, time, identity, and culture (Chau et al., 2013; Corder & U-Mackey, 2018; Macario & Ondrejka, 2014; Palomäki, 2009; Warburton, 2009), the benefits of Second Life application in education outweigh its drawbacks. The reason why Second Life is used frequently in higher education is because of its great potential for enhancing

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authentic learning and self-directed learning, engaging learners through collaboration, creating alternative space for educational activities, encouraging communities practice, and fostering cross-cultural competencies (Aydin, 2013; Corder & U-Mackey, 2018; Grant, Huang, & Pasfield-Neofitou, 2018; Richter, Anderson-Inman, & Frisbee, 2007; Twining, 2009; Tsur, 2013; Wang, Song, Stone, & Yan, 2009). This paper focuses on the 3D virtual world Second Life due to its active applications in education and abundant Second Life related research in higher education.

Purpose of the Study

In the light of the increasing popularity of the 3D virtual world Second Life in higher education, a review of the previous studies into its benefits and challenges will provide educators with the pedagogical instructions and technological tools for their Second Life and real-life educational practices. For this purpose, this graduating paper provides a review of the previous studies on the 3D virtual world Second Life as a learning environment in higher education, and analyzes the advantages and potential shortcomings of its utilization. By the end, this paper offers suggestions to educators who are dedicated to incorporating virtual worlds in higher education.

The purpose of this paper is to explore how Second Life has been approached in literature, and to provide an overview of the development and evolution of Second Life related research in higher education. This paper also touches on how Second Life meets the needs of diverse students. Specifically, this paper is guided by the following three questions:

1. How is the 3D virtual world Second Life applied in higher education?
2. What are the affordances, advantages and drawbacks of incorporating Second Life in higher education?
3. What are the recommendations to better integrate Second Life in higher education?

Significance of the Study

During the last decade, as 3D virtual worlds such as Second Life are gaining popularity in education, the research community has devoted particular attention to the use of new technologies in higher education (Curcio, Dipace, & Norlund, 2016). This paper sheds light upon recent studies, theoretical perspectives, critical analysis of the integration of the Second Life in higher education. There is a growing body of research showing that the 3D virtual world Second Life supports authentic learning and self-directed learning, enhances collaboration, engages learners, provides alternative space for instructional activities, and fosters cross-cultural competencies. Therefore, this paper reveals the increasingly significant role that 3D virtual worlds are playing in education today.

This paper can also contribute to the discussion on the instructional use of Second Life by offering a summary of previous studies. Practitioners and participants in Second Life need to be aware of the great potential that Second Life has for educational practices, and also be mindful of the issues related to technology, time, culture, identity, and gender. In order to help educators optimize their teaching effectiveness in virtual worlds, this paper critically examines the integration of Second Life in higher education. This paper also provides educators with recommendations to enhance their educational practice in Second Life.

Definitions of Terms

A variety of terms are used within the literature to refer to virtual worlds, such as virtual environment (VE), virtual learning environment (VLE), multi-user virtual environment (MUVE), immersive virtual world (IVW), serious virtual world, social virtual world, and synthetic virtual world (Girvan, 2018).

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To achieve a clear perception of the literature, the terms used in this graduating paper are explained in this section. They are the virtual world, multi-user virtual environment (MUVE), and Second Life. Additionally, the term “avatar” is also elaborated on in this chapter due to its close relation to Second Life’s affordances, advantages, and drawbacks.

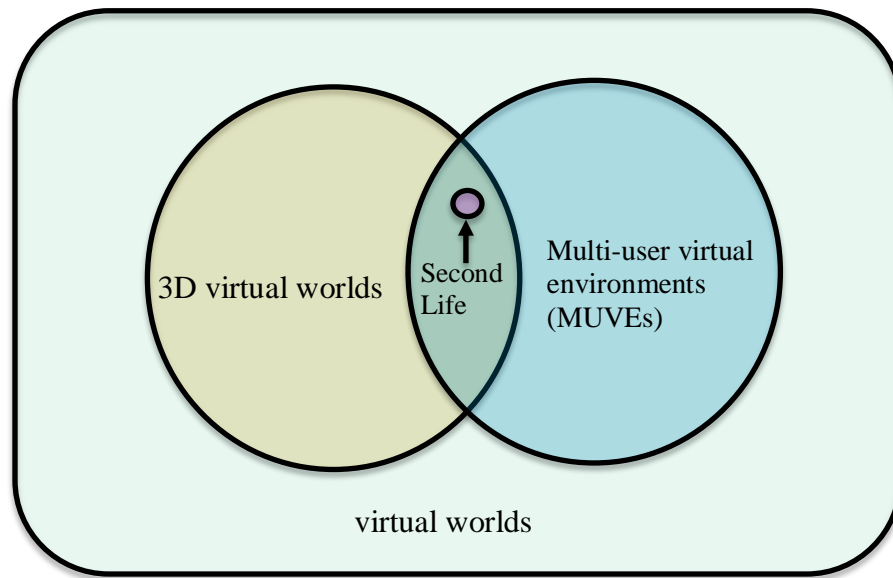


Figure 1. The scope of virtual worlds, 3D virtual worlds, MUVEs and Second Life.

Figure 1 shows the scope of the terms mentioned in this paper. 3D virtual worlds include single-player and multi-user platforms; one of MUVE’s features is multi-user that enables numerous users to navigate and collaborate in real-time (Warburton, 2009). The overlap of the 3D virtual world and MUVE is where the Second Life features lies. These terms are going to be discussed respectively in the following sections.

Virtual world.

There is no generally accepted definition of virtual worlds. They can be as simple as online chat rooms. However, they do require that the world be persistent. In other words, the world must continue to exist even after a user exits the world, and user-made changes to the world should be

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preserved (Girvan, 2013). Even though the literature lacks a commonly used definition of the term “virtual world”, Bell (2008) has combined elements of the earlier definitions and provided a new definition: “A virtual world is a synchronous, persistent network of people, represented as avatars, facilitated by networked computers” (p. 2).

Taking Bell’s (2008) definition as a starting point, Zheng and Newgarden (2011) highlighted avatars as the extensions of real-world users. They described virtual worlds as “metaverses¹ where avatars interact with one another and with software agents in a three-dimensional space that exists as a metaphor for the real world” (p. 31).

A more recent definition of virtual worlds is proposed by Girvan (2018):

A virtual world is a persistent, simulated and immersive environment, facilitated by networked computers, providing multiple users with avatars and communication tools with which to act and interact in-world² and in real-time (p. 6).

Compared to Bell’s (2008) and Zheng and Newgarden’s (2011) definitions of virtual worlds, Girvan’s (2018) definition highlights virtual worlds’ attributions of communication and multi-user. These definitions indicate that virtual words contain these elements:

1. Avatar representation: actions taken by users are actually presented as actions taken by their digital representation avatars;

2. persistence: a virtual world does not perish or cease to function when users log out (Macario & Ondrejka, 2014, p. 2);

¹ *The Oxford English Dictionary* defines “metaverse” as a computer-generated environment within which users can interact with one another and their surroundings, i.e., a virtual world, a cyberspace.

² *The Collins English Dictionary* defines “in-world” as “of or relating to a virtual online environment.”

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3. networked people: users interact with each other through collaborative activities and synchronous communication, and they also interact with the environment;

4. networked computers: the required technical infrastructure.

Multi-user virtual environment.

Multi-user virtual environments (MUVEs) are those online platforms that enable numerous users to navigate and collaborate in real-time (Warburton, 2009). As is shown in Figure 1, a number of MUVEs are three-dimensional. A 3D MUVE comes with a large variety of features within a single software application that collectively provides key features needed for designing educational activities, such as immersive virtual environments, 3D avatars, design visualization tools, and communication tools (Rahman, Yahaya, Halim, & Phon, 2013; Sakalli & Chung, 2015). Unlike traditional learning environments such as classrooms, 3D MUVEs can provide experiential space or a simulation of space where participants learn by doing and can also observe the results of their actions (Chee, 2007). Popular examples of MUVE software in education are Second Life, OpenSim, There, Active Worlds, Whyville, World of Warcraft and Minecraft (De Lucia, Francese, Passero, & Tortora, 2009). Second Life stands out from these software due to its phenomenal growth, and has been considered the most mature 3D multi-user virtual world used in education (Warburton, 2009; Wang & Burton, 2013). The underlying causes why it is favored by so many educators are worth exploring. Therefore, this paper aims to examine and analyze its application in higher education.

Second Life.

Second Life was launched in 2003 by the company called Linden Lab. It is an online, 3D virtual world where multiple users take on the form of avatars and interact with other users in a synthetic environment. In 2013, in honor of Second Life's tenth birthday, Linden Lab, the

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company that created it, released the statistical document *Infographic: 10 Years of Second Life*. It showed that 36 million accounts had been created, and that the users had spent 217,266 cumulative years online, making it the most mature and the most popular 3D MUVE used in education at that time (Linden Research Inc., 2013). In 2018, a new infographic was released, indicating that 35,000 new registrations on average had been created monthly from about 200 countries around the world with 57 million accounts in total. It also showed that 428,000 years of total time that users had spent in Second Life (Voyager, 2018).

In Second Life, users, also known as residents, can explore all kinds of places built in this virtual world. It is not an online virtual game in that there are no game-like levels or tasks (Rymaszewski, 2007). Instead, it is best thought of as a space for social interaction (Baker, Wentz, & Woods, 2009). Users can socialize with other residents, participate in various activities individually or in groups and create objects and properties with others. Second Life users can own land or build houses, and they can let their properties or reside in them (Oxford & Oxford, 2009). That is to say, Second Life offers an online virtual community that is being created by its residents.

Being a 3D virtual world, Second Life can simulate real-world situations and can provide opportunities for students to deal with challenges in a collaborative manner (Thorne & Macgregor, 2018). While sharing common features with other 3D virtual worlds, Second Life is also unique as being an “open world” in which users are provided with tools and guidance to design, create and manipulate the in-world environment (Brown, Hobbs, & Gordon, 2008; Hew & Cheung, 2010; Ralph & Stahr, 2010).

Avatar.

In 3D virtual worlds, users exist by means of their personal avatars, computer-generated three-dimensional graphical representations of real people. Dickey (2005a) stated that three-

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dimensional virtual worlds provided three main components: the illusion of 3D space, avatars that served as the visual representation of users, and an interactive chat environment for users to communicate with one another. Another reason why avatar is important to mention is that it is closely related to the affordances, advantages and drawbacks of the 3D virtual world Second Life, which will be elaborated on in the next few chapters.

Users in Second Life can choose avatars that resemble themselves as they are in real life. Alternatively, avatars may take many forms, such as human, animal, vegetable, mineral, or a combination thereof. In other words, a user's avatar portrays the user in some way, either in a role that is as close as possible to the particular user's true identity, or in another selected role (Rudra, Jæger, & Ludvigsen, 2018). Avatars can move through the virtual world, and can interact with each other and with objects in the virtual environment. They travel via walking, running, vehicular access, flying, or teleportation, and they communicate via local chat, group chat, global instant messaging, either in text or by voice. In other words, users can customize their avatars in their appearance, garment and accessory, and then control their motions through the use of a control interface, such as a keyboard, joystick or gamepad.

Mazalek (2011) found that despite these standardized character movements in virtual worlds, players developed close connections with their avatars and often treated them as embodiments or extensions of their own. As a result, through playful learning, social interactions, even physical exercise and rehabilitation from traumas, virtual worlds have become a part of users' socialization and personal growth (Mazalek, Chandrasekharan, Nitsche, Welsh, & Clifton, 2011, p. 130).

Furthermore, the interactions among the avatars are in fact interactions among the real users that behind their avatars. They are social units and they associate with different cultures and

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subcultures for the reason that serious virtual worlds are multinational and multicultural environments (Kruk, 2017). They might represent individuals from foreign countries of various age groups. Different from the communication in a face-to-face situation (Figure 2), user-to-user communication via avatars (Figure 3) applies the mediation technology to control the communication (Rudra, Jæger, & Ludvigsen, 2018). Studies show that the use of avatars can decrease the feeling of social disconnection, which makes Second Life a potential medium for distance education (Inman et al., 2010; Wang & Lockee, 2010).

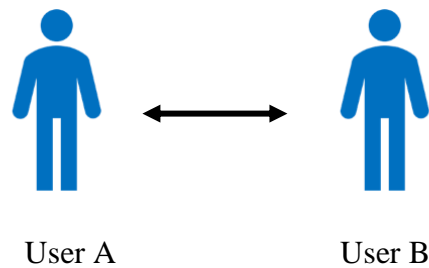


Figure 2. User-to-user communication in a face-to-face situation.

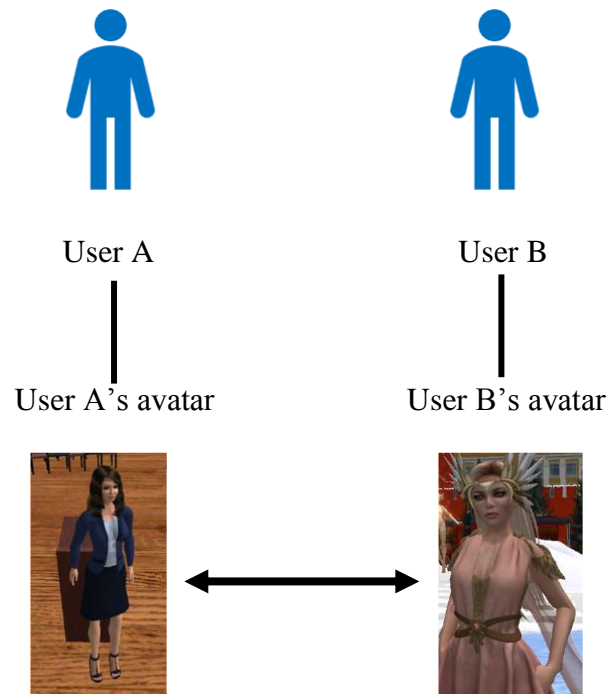


Figure 3. User-to-user communication via avatars in Second Life.

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Overview of the Paper and Its Structure

This graduating paper is delivered in four chapters. The first chapter introduces the background and the rationale of the study, along with the definitions of virtual worlds and multi-user virtual environments. This chapter is concluded by introducing Second Life and the notion of avatars.

The second chapter reviews the literature on the development of 3D virtual worlds for educational purposes as well as their implications in education. This chapter specifically focuses on the studies of the application of Second Life in higher education.

The third chapter analyzes the affordances and advantages of using 3D virtual worlds in education, along with the main theoretical perspectives that are drawn on. It also critically probes into the drawbacks upon the basis of the existing literature.

The analyses of using Second Life in higher education leads to a discussion of the strategies of incorporating 3D virtual worlds in education. The last chapter also offers a conclusion and provides educators with some recommendations for future educational exploration in Second Life.

Chapter Two: Literature Review

To provide a clear review and a critical analysis of the use of virtual worlds in education, this literature review is divided into three sections: 3D virtual worlds and education, Second Life and higher education, and a summary.

3D Virtual Worlds and Education

According to Saettler (1968), the efforts of applying the technological innovations to instructional activities accompanied the development of education since the first decade of the twentieth century. Virtual worlds with multiple users, such as online chat rooms, have been in existence since the late 1970s when they were still text-based (Livingstone, Kemp, & Edgar, 2008). By virtue of the continued advances in computing and information technology, such text-based virtual worlds have evolved into persistent, three-dimensional virtual worlds where multiple users can participate synchronously or asynchronously and interact with each other and with the environment through their graphical representations known as avatars (Collins & Jennings, 2007; Smart et al., 2011).

In the last few years, several authors have identified that organizations use multi-user 3D virtual worlds areas such as marketing, virtual shopping, communication, public relations, research, innovation, collaboration, education and learning, training, and recruitment (e.g., Fardinpour, Reiners, & Wood, 2018; Grant, Huang, & Pasfield-Neofitou, 2018; Macario & Ondrejka, 2014; Tuten, 2009). 3D virtual worlds have been further developed, extensively adopted and studied as educational environments (De Lucia et al., 2009). 3D virtual worlds, such as Active Worlds, Second Life, Traveler, Croquet, Adobe Atmosphere, and There (Hew & Cheung, 2010) were originally developed for the purposes of entertainment and gaming; but now their affordances

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in education, such as collaborative tools, virtual objects and environment, persistence of the world and flexibility, enable them to be widely used for educational purposes (Dickey, 2003).

Initially, 3D virtual worlds replicated real-life interactions in classrooms, lectures and meetings with the main advantage being that learning and collaboration in virtual worlds surpassed geographical distance and offered cross-regional cooperation beyond users' physical locations. Later on, the introduction of unique features within 3D environments such as 3D models and virtual world mind-mapping tools that allowed recording and mapping of the flow of ideas, provided new and exciting elements for in-world collaborative learning (Hanewald, 2013). For instance, Dickey (2005b) applied a 3D virtual world named Active World in two of her courses and found that it could provide learners with collaborative learning opportunities (p. 445). As the constructivists believe that people's knowledge of the world is constructed through interactions with others (Creswell, 2014), Dickey (2005b) noted in her research that learning in virtual worlds made constructivist approaches possible (p. 440).

There are various venues for educational purposes in the 3D virtual world Second Life, such as university campuses, non-profit communities, museums of diverse disciplines, and virtual conferences for worldwide educators and learners. For the purpose of creating alternative spaces for existing activities, users can establish replications of reality in Second Life for individuals to explore or interact with. Alternatively, entirely innovative spaces can also be created in Second Life, such as an invented Japanese city named Hiroba³, and a medieval city named Avilion⁴. They

³ Japan-Hiroba. Second Life url: <http://maps.secondlife.com/secondlife/Davros/92/119/27>

⁴ Avilion. Second Life url: <http://secondlife.com/destination/avilion>

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enable users to conduct activities that are unique to virtual worlds, and encourage participants to generate ideas and even do experiments (Eschenbrenner, Nah, & Siau, 2008).

Additionally, a number of studies have documented that some educational activities in 3D virtual worlds can help learners with a variety of real-world disabilities and special needs (e.g., Biever, 2007; Cooper et al., 2018; Gilbert, Murphy, Krueger, Ludwig, & Efron, 2013; Grynszpan, Martin, & Nadel, 2008; Jeffs, 2010; Nussli, 2014; Parsons et al., 2000; Zielke, Roome, & Krueger, 2009). Over the past few years, special education teachers have made attempts to incorporate 3D virtual worlds in their classrooms to engage students with physical disabilities, sensory impairments, moderate cognitive disabilities, autism, learning disabilities, attention deficit, behavioral disorders, and traumatic brain injury (Jeffs, 2010). For instance, a researcher at the University of San Francisco interviewed eighteen special education teachers who used Second Life for teaching, and investigated their perceptions on the usability of Second Life for students with social skill challenges (Nussli, 2014); the University of Southern California developed an educational and treatment program for post-traumatic stress disorder in OpenSim, another prominent 3D virtual world (USC, 2018).

Second Life and Higher Education

A typical example of 3D virtual worlds that is gaining popularity in education is Second Life. The journey of attempting to apply Second Life in education has been fifteen years since the Linden Lab created Second Life in 2003. The environment is created by the users as Linden Lab offers the foundational tools for residents to build their own unique worlds and objects. Such a way of creating the virtual environment becomes the unique feature of Second Life (Eschenbrenner et al., 2008).

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A large number of studies on Second Life have been done since its advent in 2003. Meanwhile, some researchers have done meta-research on the studies related to Second Life teaching and learning. They have studied the scope of disciplines and teaching activities in Second Life, students academic and social competencies, the trend of using it in K-12 and higher education, and so on (Duncan, 2012; Kim, 2012; Sivunen & Hakonen, 2011; Tokel & Karatas, 2014). A taxonomy was created by Duncan (2012) to categorize users, activities, learning approaches, technologies and research areas that are conducted in 3D virtual worlds. Tokel and Karatas (2014) explored fifty-five 3D MUVE studies conducted between 2008 and 2013. They found that among the topics dealt with in Second Life were teacher education, language education, programming, medical education, librarianship, tourism, trade, and life-long learning. The area of socialization was studied by Sivunen and Hakonen (2011) who evaluated forty-seven studies carried in several 3D virtual worlds, including Second Life. They came up with a suggestion that future research should focus on the specific social affordances these environments provide for groups (p. 418). Kim (2012) evaluated sixty-five studies conducted in Second Life for K-12 and higher education and found that research was conducted the most widely aiming at higher education, accounting for 45% of the total studies (p. 13).

In higher education, Second Life can be used in distance learning where teaching and learning mostly take place (Kaplan & Haenlein, 2016); it can also be used in blended learning where learning takes place partially in traditional classrooms and partially in Second Life (Thorne & Macgregor, 2018). Additionally, it can sometimes be used to assist in teaching some challenging contents in the subjects of chemistry, mathematics, architecture, astronomy, and space geometry (Wang & Burton, 2013).

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A brief review of the previous studies show that Second Life earns such a welcoming status due to the following main reasons: easy access to education resources, flexible learning activities and a combination of imagination and the reality.

Easy access to educational resources.

First of all, in Second Life, participants can have easy access to a wide range of educational resources in different disciplines and various formats. There are some islands in Second Life that are only open to their residents, while most of the educational places are open to all users and provide them with free access to their educational resources (Linden Research Inc., 2014). Therefore, student users do not need to worry about paying money in exchange for learning. A click of the books, whiteboards, or objects leads to different forms of information, such as notecards, e-book, PowerPoint slides and external links. For instance, the Stanford University Libraries Island⁵, running by the library systems at Stanford University, contains various resources, exhibits, showcases and galleries. What makes this place special is that it provides users with the access to a practice not offered in real life: Its Virtual Archives Exhibit (Figure 4) enables learners to virtually “browse” Stanford’s closed manuscripts stacks (Stanford Libraries, 2017) via digital copy and external links of the ancient manuscripts. Compared with real-life learning approaches, such instant, flexible and user-friendly ways of presenting information in Second Life increase the efficiency of acquiring knowledge.

⁵ Stanford University Libraries Island.

Second life url: <http://maps.secondlife.com/secondlife/Stanford%20University%20Libraries/162/227/33>



Figure 4. Virtual Archives Exhibit on Stanford University Libraries Island in Second Life.

Flexible and innovative learning activities.

Furthermore, Second Life is a platform that allows flexible and innovative learning activities. Professionals can not only deliver courses, but also conduct research and conferences in either traditional classroom settings or create learning venues in Second Life.

Taking foreign language education in Second Life as an example, Second Life is used as a tool for teaching and learning a multitude of languages, such as English, Chinese, Spanish, Turkish, and German. Stevens (2006), Cooke-Plagwitz (2008) and Hislope (2008) conducted studies in Second Life respectively, and all of them found that students could gain oral practice and cultural proficiency through experiencing authentic learning conditions and interacting with native speakers in Second Life. In 2012, the Linyi University in China, in cooperation with the Florida Gulf Coast University in the U.S., integrated Second Life into an English language learning program. The program indicated that Second Life had merits in solving the shortage of authentic learning opportunities for English learners in Chinese universities (Ishizuka & Akama, 2012). In

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2014, educators from Monash University in Australia and Taiwan Kainan University co-established the Monash University Chinese Island⁶ in Second Life. In this study, researchers found that conducting task-based language teaching in Second Life could motivate students to set clearer goals, ensure student-centered approaches, and provide multiple opportunities for input, production and feedback (Grant, Huang, & Pasfield-Neofitou, 2018).

Imagination meets the reality.

Thirdly, 3D virtual worlds, such as Second Life, are places where imagination meets the reality (Bartle, 2004). In Second Life, learning not only takes place in classroom-like spaces, but also in novel spaces. In other words, educators can make learning possible by creating places that cannot be realized in real life. For instance, participants can take a natural science class under the sea, learn astronautics in a space station, acquire WWI history through a field trip, practice driving without any risks in a virtual driving school, learn dancing in a medieval ballroom, or “e-meet” a professor in a foreign university. Figure 5 shows the scene when a history teacher is guiding his students to a WWI trench warfare built by himself in Second Life.

Participants can also exhibit and share their learning outcomes in Second Life. For example, Stanford University Libraries Island builds the Student Galleria for Stanford students to showcase their works of art; Second Life artists can exhibit their virtual creations in the Art Warehouse Studio 33 on Rockcliffe University Consortium Second Life campus⁷.

⁶ Monash University Chinese Island blog: <http://www.virtualhanyu.com>

Second Life url: <http://maps.secondlife.com/secondlife/Monash%20University%202/85/64/35>

⁷ Rockcliffe University Consortium Second Life campus.

Second Life url: <http://maps.secondlife.com/secondlife/Rockcliffe%20I/9/125/25>

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Notably, many venues offer 3D virtual sandboxes where learners can experiment with building objects and environments and collaborate on a project or co-create virtual three-dimensional object. This feature provides an opportunity to play, create, and experiment (Rockcliffe University Consortium, 2018).



Figure 5. A field trip to a WWI trench warfare in Second Life.

Summary

With the continued advances in computing and information technology, virtual worlds have evolved from text-based environments into persistent, real-world simulated, and three-dimensional virtual platforms. Multiple users can participate synchronously or asynchronously and interact with each other and with the environment through their avatars.

Second Life, as one of the most popular 3D virtual worlds used in education, shows great potential for higher education (Stanley & Mawer, 2008). Participants can have easy access to a wide range of educational resources. Second Life also serves as the versatile learning space for in-world learning activities, such as lectures, presentations, conferences, interactive simulations and

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educational games in classroom-like or wholly creative spaces. The incorporation of Second Life in higher education reveals the tendency that 3D virtual worlds will continue to infuse into the mainstream of the educational process with concentrated efforts in research, development and creative applications.

Chapter Three: Affordances, Advantages and Drawbacks

This chapter reviews the affordances of 3D virtual worlds, analyzes the benefits of utilizing the 3D virtual world Second Life in higher education, and critically probes into the drawbacks on the basis of the existing literature.

Affordances of 3D Virtual Worlds in Higher Education

The concept of affordance is introduced by the American psychologist James J. Gibson in 1979 who defined it as a property of an object, animal, or environment that affords, or makes available, certain actions (Scarantino, 2002). Gibson found that every object could be recognized as having an affordance, meaning every object offered the possibility for action (Hutchby, 2001).

In this paper, this notion means that 3D virtual worlds offer a variety of capabilities that may become affordances when users are able to make use of their potential. Second Life is an environment that can afford a variety of actions. For instance, if an object with a “rotation script” can do the animation of “rotation,” then users can utilize this capability.

3D virtual worlds have become immersive platforms that can engage students in authentic, experiential and culturally diverse learning activities (Gregory & Wood, 2017). Educators begin to appreciate the affordances that the technology offers to engage their students. They engage in emerging research and experiment with innovative applications of virtual worlds to support learning and teaching.

3D virtual worlds possess a number of unique features, such as collaborative tools, virtual objects, supportive environments, persistence of the world, and flexibility of activities (Dickey, 2003; Girvan & Savage, 2010; Minocha & Roberts, 2008). Dalgarno and Lee (2010) have identified the following five major affordances of 3D virtual worlds in higher education: (1) enhancing spatial knowledge representation of the explored domain, (2) enabling experiential

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learning activities that would be impractical or impossible to undertake in the real life, (3) facilitating intrinsically motivating learning tasks, (4) providing learning opportunities through contextualization of learning which supports the transfer of knowledge and skills to real-life situations, and (5) facilitating effective collaborative learning tasks.

Researchers keep exploring the potential appropriate pedagogies that can leverage the affordances. It is not surprising that early adopters of innovative educational technologies in higher education are already adapting virtual worlds for educational purposes (Kluge & Riley, 2008). For one thing, the affordances of 3D virtual worlds enable users to design interactive spaces with the intended content, and allow them to view a given problem from different perspectives (Omale, Hung, Luetkehans, & Cooke-Plagwitz, 2009). 3D virtual worlds can include virtual activities that are risky or difficult to exercise in real life, such as practicing surgery for medical students and learn marine ecosystem under the sea. By interacting with other individuals, the learning environments, and the objects within, users are able to access virtual contents simultaneously, share information, receive multifaceted feedback, and conduct activities (Cheng & Wang, 2011).

The affordances of 3D virtual worlds are also important for university curricula that strive to fulfill the needs of individuals from different geographical venues. 3D virtual worlds are such places that gather these learners together and offer them a quality education by means of the rapidly progressing information and communications technology (Lee, 2005). As a result, educators worldwide have recognized virtual worlds' considerable potential for education. Applications in education can be found in areas of astronomy, medicine, music, literature, biology, history, mathematics, forensic science, ecology, tourism and so on (Nussli, 2014). Furthermore, some leading universities around the globe have developed and implemented their own 3D virtual campuses in instructional processes (Cheryan, Meltzoff, & Kim, 2011).

Advantages of Integrating Second Life in Higher Education

The 3D virtual world Second Life provides a new range of educational opportunities. The environment is generalized rather than contextual, which allows Second Life to be applicable to almost all disciplines (Kluge & Riley, 2008). Despite the generally restricted functionality with a focus on building scenarios and providing collaborative communication tools, Second Life finds broad applications in education, such as teacher education, engineering, health sciences, logistics and manufacturing, and simulation of hazardous situations for training purposes (Fardinpour, Reiners, & Wood, 2018).

A review of the previous research shows that Second Life can be a very effective learning space. This paper identifies seven prominent advantages: (1) supporting authentic learning, (2) facilitating self-directed learning, (3) enhancing collaboration, (4) engaging learners, (5) creating alternative space for educational activities, (6) encouraging online educational communities for practice, and (7) fostering intercultural competence. These advantages make the Second Life an ideal medium to transfer knowledge to real-life situations and develop several learning skills, such as creative problem-solving skills and cultural understanding competence (Gregory & Wood, 2017).

Authentic learning.

Authentic learning has been used in different disciplines over time to increase the quality of training in education systems. It is about engaging students in learning and solving real-life problems by means of simulation and educational technology (Herrington & Herrington, 2006).

Authenticity is the representation of real-world tasks. When they are recreated in 3D virtual worlds, realism (exactness in visualization) and fidelity (exactness in functionality) become essential as authentic activities mirror the “kind of activities people do in the real world”

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(Herrington & Kervin, 2007). Simulations of the problem-solving process and physical environment provide spaces for authentic learning experiences to occur where real-life costs and consequences are avoided (Gregory, 2011).

Barab (2000) noted that authenticity occurred not in the learner, the task, or the environment, but in the dynamic interactions among these various components. With interactive experiences as close as an authentic setting, Second Life is being harnessed to provide a key source of learning motivation for students with a particular purpose (e.g., foreign language learning) (Grant, Huang, & Pasfield-Neofitou, 2018). In this way, Second Life demonstrates “the potential to provide learners with some degree of experiencing the world beyond the campus” (p. 96). A large number of such venues exist in Second Life, such as Japan-Hiroba, Moscow Island⁸ and Monash University Chinese Island.

On Monash University Chinese Island, students can participate in a number of everyday activities, such as shopping, eating out, and socializing with people. They have plenty of opportunities to communicate with non-player characters, other users and even native speakers. Students get in-country experience in such authentic settings (Grant, Huang, & Pasfield-Neofitou, 2018, p. 111). Given the authenticity of activities, it is possible to map the acquired knowledge later to their correlated real situations counterparts (Bastiaens, Wood, & Reiners, 2014). Figure 6 shows a student learns to use Chinese to check in at Binhai International Airport on Monash University Chinese Island.

⁸ Moscow Island. Second Life url: <http://maps.secondlife.com/secondlife/Moscow%20Island/245/170/21>



Figure 6. Binhai International Airport on Monash University Chinese Island.

Self-directed learning.

One of the features of online learning settings is an increasing degree of control by learners over the pace of learning (Brookfield, 2009), and learning online in Second Life grants learners a degree of control over geographical restriction and timing of learning. As such, online education may create new possibilities for self-directed learning (SDL) that its proponents have not anticipated (Brookfield, 2003). Knowles (1975) described SDL as a process where learners took the initiative to recognize knowledge deficits, determine learning goals, identify credible learning resources, implement plans, and evaluate those plans for success. With self-direction in learning as the central element in his concept of andragogy, he believed that teachers should take the role as facilitators and that self-directedness should be the primary goal of adult education (Brookfield, 2009).

Self-directed learning is evidenced by young adult learners being proactive learners, entering into learning situations purposefully and with greater motivation than a child trudging into classrooms. Knowles (1995) saw self-direction in learning as a step-wise process: diagnosing

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learners' needs, identifying learning resources, choosing and implementing appropriate learning strategies, and assessing learning outcomes.

The Virtual Ability Island⁹ in Second Life is one of those examples that follow the SDL process. The goal of establishing this island is to provide an orientation and training center for people with disabilities and chronic illnesses (Virtual Ability, Inc., 2018). The design strategy of this island is embedded with key andragogical theories, such as SDL, and the entire learning experience on the Island is self-directed (Zielke, Roome, & Krueger, 2009). According to Zielke (2009), the design team of the Virtual Ability Island observed and participated in newcomer training and touring other facilities, and spent several months to determine participants' learning needs (p. 12). For example, on its orientation path (Figure 7), the order of the tasks, the instructional strategies, and the opportunities to practice independently are designed for adult learners. Observers and helpers along the orientation trail can quickly evaluate a newcomer's progress.



Figure 7. The orientation path on the Virtual Ability Island.

⁹ The Virtual Ability Island. Second Life url: <http://maps.secondlife.com/secondlife/Virtual%20Ability/127/128/23>

Collaborative learning.

Knowles's (1975) basic precepts of self-directed learning for post-secondary and adult education can be regarded as the essence of collaborative virtual education (Zielke, Roome, & Krueger, 2009). To begin with, 3D virtual worlds can facilitate collaboration by providing means of verbal and non-verbal communication. It is more like the face-to-face communication than other popular technologies, such as email, blogs, and wikis (Kluge & Riley, 2008). Users communicate via local chat, group chat, global instant messaging, either in text or by voice; many of the 3D virtual worlds, such as Second Life, also have functions to show users' non-verbal communication cues and emotions on one's avatar (Palomäki, 2009).

Secondly, education benefits from Second Life as they create a sense of presence that lacks in other media (Henderson, Henderson, Grant, & Huang, 2018; Kluge & Riley, 2008). The control of users' avatars, and the visual and physical realism that Second Life adds to the virtual space, combine to produce a profoundly immersive experience (Warburton, 2009). Also, Palomäki (2009) found that instructors were able to interact with students via avatars in a more fluid and natural way, allowing students to select their own paths of learning as well as encourage cross-class collaboration.

Furthermore, Foster (2007) noticed that, in distance education, avatar customization could provide a culturally diverse communication, thereby enhancing collaboration among them. In some language projects, for example, researchers found that Second Life provided advancement in international research collaboration, collaborative interactions and peer-scaffolding in language education (Aydin, 2013; Wang, Song, Stone, & Yan, 2009).

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Engagement and participation.

A major benefit attached to learning in 3D virtual worlds is the increased engagement and participation. The immersive nature of the 3D virtual world Second Life, along with its physical, social and cultural dimensions, can provide a compelling educational experience, and therefore lead to a high degree of engagement and participation.

Richter, Anderson-Inman, and Frisbee (2007) noted that the perceptions of immersion into another world and in learning in the first perspective via avatars were more interactive and experiential than classroom learning. As learners are allowed to interact with information in the first person, it facilitates constructivist-based learning activities (Palomäki, 2009). Similarly, Dickey (2005b) found that the interaction with virtual objects could be helpful in developing a stronger conceptual understanding of the content.

Utilizing Second Life in education can also increase the motivation and enthusiasm for participation in that they enable learners to engage in some experiences that they may have never realized in classroom-based learning (Palomäki, 2009).

As an example, Aydin (2013) underlined in his foreign language teaching research that Second Life provided an authentic and collaborative learning environment that supported learners to involve in linguistic behaviors and made them innovative and imaginative. In a teacher training program, Teoh (2012) compared using simulations in Second Life and real life for teachers' training, and found that Second Life could be a more effective educational tool for learning engagement.

Alternative space for educational activities.

The benefits of learning in Second Life include allowing users to do things which are difficult or impossible to do in the physical world, both literally and pragmatically (Twining,

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2009). For instance, in a Space Geometry class in Second Life, instructors create and manipulate objects to help students understand concepts. The students can participate in this process and immerse themselves in such virtual classrooms via using their avatars. Therefore, some educational professionals see Second Life as an alternative space for instructional tasks (Palomäki, 2009).

Second Life is a useful tool to build visualization for challenging content. Such simulations are optimized when it comes to architecture, astronomy, and space geometry. Instructors conduct courses or related activities in 3D virtual places other than the classroom. For example, they can guide students to visit the simulated architecture of Pompeii that no longer exists in real life. Moreover, the time spent on organizing in-class activities can be freed by conducting teaching in a virtual place in Second Life which also follows traditional classroom instructional methods.

Second Life also offers a social laboratory where role-playing, simulations, exploration, and experimentation can be tried out in a relatively risk-free environment (Graves, 2008). That is to say, learners are able to execute many activities and explore new domains of interest in 3D virtual worlds with fewer risks and more comfort. For instance, students can learn about and experiment with an atom smasher in a laboratory located in a space station (Figure 8) in Second Life.

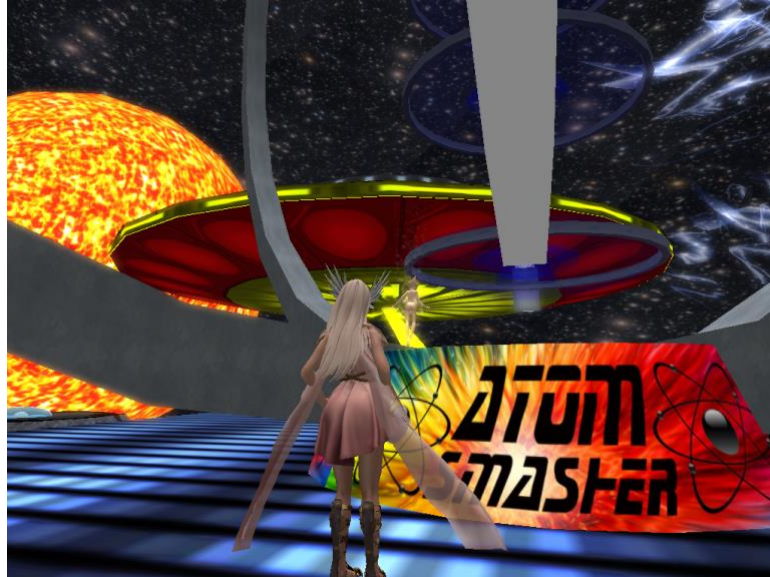


Figure 8. An atom smasher in a laboratory in Second Life.

Educational communities of practice.

Apart from the educational institutions, some educational communities are active practitioners in conducting and sharing educational research in Second Life. Online Communities of Practice (CoPs) are for those people who communicate, participate and actively engage in shared practices on online platforms (Houghton, Ruutz, Green, & Hibbins, 2010; Eckert, 2006). Although CoPs were originally conceptualized as a type of situated learning in a co-located setting (Lave & Wenger, 1991), many organizations including universities have begun to explore the possibilities of virtual communities of practice.

According to Houghton (2010), there is growing interest in the role that online CoPs play in continuing professional development of academics (p. 527). They are mediated through technology and created through a sense of membership (Houghton, Ruutz, Green, & Hibbins,

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2010). The Virtual Worlds Best Practices in Education (VWBPE)¹⁰ is one of such virtual CoPs in Second Life. The annual VWBPE Conference is a completely virtual conference that aims to showcase the learning and research that take place in immersive virtual environments (VWBPE, 2018). Attendees experience the conference through a virtual reality type setting, including conference rooms, theatres, expositions and other types of venues similar to a conference in the real world. Figure 9 shows one of the virtual conferences hosted by VWBPE in Second Life.

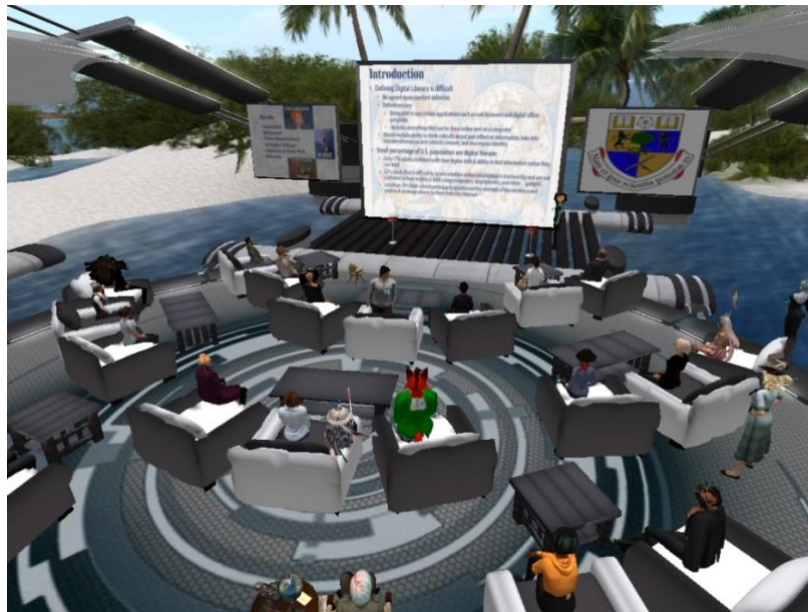


Figure 9. A virtual conference in Second Life.

Compared to face-to-face conferences in physical worlds, virtual conferences have several advantages:

- (1) They are easy and cost effective for organizers and participants.

¹⁰ Virtual Worlds Best Practices in Education. <https://vwbpe.org>

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(2) They go beyond temporal and spatial constraints because people can host and attend virtual events from anywhere in the world. If they cannot personally attend them, they can still benefit from a video-on-demand content if they miss the live events.

(3) Virtual conferences make networking easier via just a few mouse clicks of the attendees' avatars.

(4) Virtual conferences also offer backend data and analytics that cannot be typically gathered accurately in a physical event.

(5) Additionally, because there are no traveling or printed materials, they are environmentally friendly (Tsur, 2013).

Over the last 12 years, VWBPE has been the vanguard leading the charge on understanding how culture, technology and pedagogy merge to provide a more enriching experience for both teachers and students (Leon & Feenan, 2018).

Intercultural competence.

An added value of learning in Second Life is that intercultural communication is valued and supported. Intercultural competence refers to people's ability to understand others' worldviews and communicate appropriately and effectively in intercultural situations based on one's intercultural knowledge, skills, and attitudes (Deardorff, 2006). In Second Life, understanding different cultural backgrounds of the participants requires users to gain intercultural competence; such ability is also needed in understanding the culture of a particular 3D virtual platform.

The interaction among different avatars in different environments in the metaverse can be a powerful catalyst to foster intercultural competence. University students in the twenty-first century need to be able to demonstrate intercultural abilities: studying and working collaboratively

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across cultures, being mindful and responsive to different worldviews, having a comprehensive knowledge of culture, being able to tolerate ambiguity and uncertainty and so on (Gregory & Wood, 2017).

Owing to the characteristics of intercultural competence and the authentic pedagogical approach, Second Life offers a rich experiential and explorative environment for developing intercultural competence. There is a wide range of cultural environments for social interaction, language practice, cultural exploration and diverse cultural perspectives (Corder & U-Mackey, 2018; Corder & U-Mackey, 2015). For instance, users can live Scandinavian lifestyles in Second Norway¹¹ island, and visit a traditional Japanese garden in a village named Sweet Serenity¹² in Second Life.

Drawbacks

While 3D virtual worlds enjoy many advantages for teaching and learning, they inevitably have weaknesses, and subsequently, bring about some adverse impacts. For educators, the 3D virtual world is like a Pandora's Box. Research shows that technical problems, cost, investment of time, virtual identity and cultural shock are some of the drawbacks that make it challenging to utilize virtual worlds such as Second Life as learning environments.

Technology.

Problems such as technical issues and difficulties in navigation and using 3D interfaces may significantly impede the user experience in Second Life. There are also matters such as network speed, quality of graphics card, and screen resolution (Chau et al., 2013). Students who

¹¹ Second Norway. Second Life url: <http://maps.secondlife.com/secondlife/Norge/144/108/27>

¹² Sweet Serenity. Second Life url: <http://maps.secondlife.com/secondlife/Sweet%20Serenity%20Estate/240/99/23>

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have low computer self-efficacy and capability may find it difficult to manage in the 3D virtual worlds; the slow connection may lead to communication delay in the learning process, and low-quality hardware may result in poor 3D animations. As a consequence, students' learning experience may be reduced due to these problems.

Cost.

The economic models of 3D virtual worlds may differ across platforms depending on the issues, such as whether they are hosted locally or outsourced, whether the code base is open or proprietary, and whether they use a subscription, owned or similar business model (Warburton, 2009). For users of all ages, Second Life is totally free to register and play. It will not cost them any money unless they decide to own virtual properties or go shopping in Second Life. For eligible educational organizations who want to buy lands, Second Life offers them a fifty percent discount on the price (Linden Research Inc., 2014).

Investment of time.

Planning, building, testing, supplementing, running and maintaining educational resorts and activities in Second Life require time. McKeon and Wyche's (2008) research found that active content creators often spent twenty-five to forty hours per week in Second Life. The design, implementation and practice overheads in Second Life often require educators to spend time developing multiple skills to deal with them (Warburton, 2009). Especially, if instructors want some teaching facilities that are not sold in Second Life stores, they may have to build the objectives on their own. The transformation of the raw material (i.e., primitives) into artifacts requires a considerable investment in the temporal, technical and creative sense (Macario & Ondrejka, 2014). For instance, in building a natural science teaching project in Second Life, the

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time that is spent on creating pandas and bamboos from scratch may vary from three hours to three days.

Virtual identity.

The avatar is the locus of identity in Second Life (McKeon & Wyche, 2008). As mentioned in the first chapter, the customization of avatars is one of the learning features of Second Life. Users can modify their avatars through changing clothing, bodily appearance (e.g., skin, hair, eyes), accessories and their behaviors in interactions with others and their response to the Second Life environment itself (Corder & U-Mackey, 2018). In addition to the avatars, creating an avatar profile is also one of the ways to build a personal identity in virtual worlds (McKeon & Wyche, 2008). Each Second Life resident has a profile that contains photos, status, ratings given by other users, biographical information, group affiliations, interests, skills, and information about the resident's life in the physical world.

On the one hand, the construction and reconstruction of identity in Second Life show that 3D virtual worlds enable users to express themselves without the social confines of the physical world (Liao, 2011; Maile, 2015); on the other hand, one has to question the ethics of online identity (Maile, 2015) as the freedom to play with identity and the accountability for actions may become an issue of concern (Palomäki, 2009; Warburton, 2009). There are cases that a middle-aged Caucasian male lives his life in Second Life via the avatar of an eleven-year-old Asian girl (Spingarn-Koff, 2011), or a university professor uses a cat as his/her avatar.

Cultural shock.

Cultural shock usually refers to the psychological disorientation experience by people who suddenly find them living and working in radically different cultural environments (Kathirvel & Febiula, 2016). The understanding of cultural shock in Second Life is based on people's relevant

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knowledge in the real world; the symptoms of cultural shock in Second Life are created due to the dynamic nature of the users - their diverse cultural and social backgrounds (Corder & U-Mackey, 2018).

Fifteen years since the advent of Second Life, its residents have developed their own codes, norms, language and social etiquette; while “the fluidity of identities and relatively no boundaries on behavior” (Palomäki, 2009, p. 27) also exist in Second Life. These factors “simulate the dynamic nature of cross-cultural encounters and can create symptoms of culture shock” (p. 28). Ward (2010) found that students who were new to Second Life could experience both positive and negative feelings. In those Second Life places that are similar to their real-life surroundings, they are more likely to gain a sense of integration and assimilation, while in those foreign places, they are likely to experience segregation and marginalization (Ward, 2010, p. 4). Childs and Peachey’s (2013) pointed out that intercultural competence did not develop automatically when learners encountered cultural differences. Learning to manage interactions, emotions, and psychological stress associated with culture shock is an invaluable intercultural competence in both virtual worlds and the real world. Therefore, knowing how students can be supported to engage with Second Life for learning to take place is a critical factor for educators.

Summary

The major affordances of 3D virtual worlds enable users to design interactive spaces and risk-free activities; they are also important for schools and teachers to meet the needs of individuals in different geographical places. The affordances of the 3D virtual world Second Life bring education a wide range of advantages. The simulated problem-solving process and physical environment in the virtual world offer spaces for authentic learning experiences to occur; they allow educators to conduct collaborative learning activities; they provide a culturally diverse

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experience and a livelier communication; the immersive nature of 3D virtual worlds, along with their physical, social and cultural dimensions, can provide a compelling educational experience, and therefore lead to a high degree of engagement and participation. Second Life also offers a risk-free space for educational activities, a rich authentic experiential environment for developing intercultural competences, and a virtual venue for active educational communities. However, Second Life is not without flaws. Issues concerning technology, cost, time, virtual identity and culture may become obstacles when educators and learners utilize Second Life for educational purposes.

Chapter Four: Discussion and Conclusion

This chapter provides the discussion and some recommendations for educators to conduct educational practices in Second Life. At last, a conclusion is made based on all the four chapters in this graduating paper.

Discussion

The integration of 3D virtual worlds in education offers innovative and unique educational opportunities (Dickey, 2005a). The findings of this paper indicate that most research focuses on students' or instructors' acceptance of Second Life, while there are not enough studies about Second Life's influence on students' real life, such as students' intercultural experiences, in-world time, virtual world addiction, and gender identity.

Prior intercultural experience.

Students should be prepared and supported not only for the technological challenges, but also for the emotional and behavioral challenges caused by the cross-cultural interactions with different participants. However, intercultural competence is contextual, and any individuals can be affected unexpectedly by culture shock, whatever their level of intercultural competence is (Corder & U-Mackey, 2018).

For some types of educational activities take place in exotic places in Second Life, getting prior intercultural experience can help reduce students' stress when they have to manage cultural differences. According to Corder and U-Mackey (2018), those students who appeared to have effective intercultural management skills in the classroom could be challenged by those in Second Life (Corder & U-Mackey, 2018, p. 40). Therefore, students should be encouraged to get theoretical intercultural knowledge and tools, including an understanding of culture shock, regular

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critical reflection on experiences (Hemming Lou, 2012) and the interventions of an instructor to guide them throughout their learning journey in 3D virtual worlds.

In-world time and virtual world addiction.

Within the fifteen years since Second Life was created, users have cumulatively spent 428,000 years of total time in Second Life, showing by the data from *Infographic: 15 Years Of Second Life* (Voyager, 2018). Although there was no official data showing the amount of time that students spend in Second Life, McKeon and Wyche's (2008) research found that most of their student participants spent more than twenty hours a week in Second Life. In their study, one student described failing exams because of his/her time spent on Second Life, while other students explained how they had to wean themselves from the Second Life so it would not interfere with their real life (McKeon & Wyche, 2008). If teachers' instructional activities lead to students' longer time in Second Life or even addiction to it, learning in Second Life will inevitably impinge on students' real-life studying time.

Issues about gender.

Gender is a multi-layered and complex issue to explore. In Second Life, some players prefer to use their avatars to express gender atypical traits that are difficult to express in real life (McKeon & Wyche, 2008). Some questions are worth thinking related to this. Why do some users alternate between different gendered avatars? How does their virtual identity influence their gender identity outside Second Life? Does the ability to play an opposite gender in Second Life impact the user's offline life? As topics related to LGBTQ may still be a taboo in some regions, it is even more worthwhile to explore how users' attitude towards gender in Second Life impact their real lives psychologically, personally and socially.

Recommendations for Future Exploration

Second Life opens up many educational opportunities for educators and students, and provide them with the ability to connect, communicate, and collaborate with participants from around the world. While participants are learning or teaching in Second Life, it is important to remember that there is a real person behind every avatar. Students should understand that some avatars they meet will be helpful and friendly and others will not, just like the people they meet in real life. Teachers need to make sure that students know how to avoid places or leave unwanted interactions and know how to interact appropriately in the virtual world (Baker, Wentz, & Woods, 2009). The following recommendations can be useful for educators to incorporate 3D virtual worlds in education.

Since the 21st century witnesses the growth of utilizing 3D virtual worlds in education, it is becoming necessary to include media literacy in the curriculum. Media literacy is generally defined as the ability to get access to the media, to understand and to critically evaluate different aspects of the media content and to create communications in a variety of contexts (EU Council, 2018). Educators shoulder the responsibility of helping university students develop digital skills. As both teachers' and students' knowledge and basic virtual world skills improve, it is easier to carry out teaching activities and motivate the students to use 3D virtual worlds such as Second Life in their learning journey.

Lester (2006) from Linden Lab suggests seven strategies for Second Life educators to utilize the 3D virtual world Second Life more successfully. They are also applicable for teaching on other virtual learning platforms.

- (1) Explore and learn about Second Life as much as possible.

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- (2) Converse with other educators who are currently using Second Life for real life education purposes.
- (3) Develop clear and measurable goals for your academic use of Second Life.
- (4) Write a paper about your Second Life experiences and utilize other venues to share your knowledge.
- (5) Be open to the potential of Second Life and the variations in activities possible.
- (6) Think creatively about new uses for instruction and avoid applying old models of thinking.
- (7) Capitalize on feedback from students' experiences (pp. vi-vii).

In light of Lester's (2006) suggestion, teachers should embrace technology creation potential and make the best use of it. In planning and carrying out instructional activities in Second Life, teachers should make full use of their collaborative time with colleagues, and make adjustments to the teaching plan according to Second Life's affordances and participants' physical, social and cultural backgrounds. Documenting the process is also important for improvement and further study. Above all, teachers should see the 3D virtual world Second Life as a tool that facilitates teaching and learning in higher education.

Conclusion

The 3D virtual world Second Life provides a new range of opportunities in higher education. Despite the drawbacks relating to technology, cost, time, identity and culture, the benefits of applying Second Life in education outweigh its drawbacks. Teaching in Second Life is conducive to achieving authentic and self-directed learning, enhancing collaborative learning, increasing participation, providing alternative space for educational activities, offering an in-world venue for active educational communities and developing intercultural competence. However,

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issues concerning students' intercultural experiences, in-world time, virtual world addiction and gender identity need further exploration. Therefore, educators should actively seek strategies and effective practices to provide a safe and inclusive learning environment in Second Life for the students in the 21st century.

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