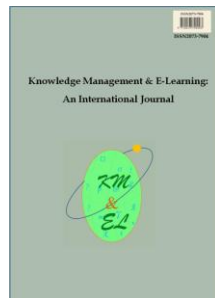


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### **Student motivation and achievement in learning English as a second language using Second Life**

**Tosti H. C. Chiang**  
**Stephen J. H. Yang**  
**Chester S. J. Huang**  
**Hsin-Hun Liou**

National Central University, Taiwan

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## **Student motivation and achievement in learning English as a second language using Second Life**

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Tosti H. C. Chiang

Department of Computer Science and Information Engineering  
National Central University, Taiwan  
E-mail: tosti.chiang@gmail.com

Stephen J. H. Yang\*

Department of Computer Science and Information Engineering  
National Central University, Taiwan  
E-mail: jhyang@csie.ncu.edu.tw

Chester S. J. Huang

Department of Computer Science and Information Engineering  
National Central University, Taiwan  
E-mail: shinjia.huang@gmail.com

Hsin-Hun Liou

Department of Computer Science and Information Engineering  
National Central University, Taiwan  
E-mail: viviliu0501@gmail.com

\*Corresponding author

**Abstract:** This study investigates the impact of a 3D virtual learning environment based on Second Life on student motivation and achievement in learning English as a second language. Twenty-one university students participate in this study, with the support of an English instructor. The Motivated Strategies for Learning Questionnaire (MSLQ) was used to evaluate students' intrinsic and extrinsic goal orientation and self-efficacy in Second Life. The pre-test and post-test were used to assess students' learning achievement. The results showed that students' intrinsic and extrinsic goal orientations in English learning in Second Life had a positive influence on their self-efficacy. In addition, students' self-efficacy of English learning in Second Life was found to positively relate to their learning achievement. Moreover, students' intrinsic and extrinsic goal orientations were found to significantly influence their learning achievement via self-efficacy. In other words, instructors can utilize Second Life to enhance student motivation and achievement in English learning.

**Keywords:** Situated learning; Learning motivation; Learning achievement; 3D virtual worlds; Second Life

**Biographical notes:** Tosti H. C. Chiang is a doctoral candidate of the

Department of Computer Science and Information Engineering, National Central University of Taiwan. His research interests include problem-based learning, inquiry-based learning, virtual world learning and augmented reality learning. He has completed all of the requirements for the doctoral degree with the exception of the dissertation.

Dr. Stephen J. H. Yang is the Distinguished Professor of Computer Science & Information Engineering, National Central University, Taiwan. Dr. Yang received his PhD degree in Electrical Engineering & Computer Science from the University of Illinois at Chicago in 1995. Dr. Yang has published over 80 journal papers, and received the 2010 outstanding research award from National Science Council, Taiwan. His research interests include creative learning, 3D virtual worlds, App software, and cloud services. Dr. Yang is very active in academic services. He is currently the Editors-in-Chief of the International Journal of Knowledge Management & E-Learning, and the Associate Editor of the International Journal of Systems and Service-Oriented Engineering. Dr. Yang also served as the Program Co-Chair of APTEL 2011, ICCE 2010, TELearn 2009, ICCE 2009, IEEE SUTC2008, ICCE 2008, IEEE ISM2008, SDPS 2008, IEEE W2ME2007, IEEE CAUL2006, and IEEE MSE2003.

Chester S. J. Huang received the BA degree in the Department of Management Information Systems from Leader University, Tainan, Taiwan and his MS degree in the Department of Management Information Systems from National Pingtung University of Science and Technology (NPUST), Pingtung, Taiwan. He currently pursues a PhD in the Department of Computer Science and Information Engineering at National Central University (NCU), Taoyuan, Taiwan. His research interests include Peer trust in Peer-to-Peer Networks and Social Relationship for Peer-to-Peer Networks.

Hsin-Hun Liou is currently a PhD student in the Department of Computer Science and Information Engineering at National Central University (NCU), Taoyuan, Taiwan. Her research interests include integration of technology and science instruction, virtual reality and augmented reality in education.

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## 1. Introduction

Most learning activities for learning English as a second language occur in classrooms. However, many students do not have enough opportunities to practice English in Taiwan. After class, students do not have companions with which to practice English. The following presents the reasons why students do not have good learning outcomes in English learning (Thomas, 2010; Wen, Looi, & Chen, 2012). The classroom lacks a situated learning environment in which students can immerse themselves during oral practices (Chang, Lee, Wang, & Chen, 2010; Yang, 2006; Yang & Chen, 2008); students do not have opportunities to practice English with foreigners after class; and learning contents may vary according to distinct tutoring methods.

Owing to the above factors, this research developed a 3D virtual learning environment based on Second Life to assist in student learning. The presence of 3D virtual worlds is so vivid that students feel as if they are learning in the real world. The technology used to develop 3D virtual worlds has become increasingly more mature (Guttentag, 2010), and computer users enjoy immersing in 3D virtual worlds (Iqbal, Kankaanranta, & Neittaanmäki, 2010). Students can play a role and practice English in

these environments to progress in English learning by studying in 3D virtual worlds (Burgess, Slate, Rojas-LeBouef, & LaPrairie, 2010). In this environment, students can learn without the limitation of time and space and gain more valuable knowledge in this environment than in traditional classrooms.

The uniqueness of this research is that we conducted a 3D virtual world in Second Life that simulates real-life situations as our learning platform. The learning environment combines real time, a sense of presence, sense of the authentic, and a sense of immersion. Language learning provides another avenue to enhance student achievement under the assistance of the instructor and tutor. Second Life includes millions of users worldwide, and most users communicate in English. Thus, Second Life provides students an environment to practice English. This research discusses whether 3D virtual worlds enhance learning motivations of students and provides instructors with suggestions of how to teach in 3D virtual worlds.

This research also discusses whether the intrinsic and extrinsic goal orientations of students influence self-efficacy and learning achievement and whether self-efficacy influences learning achievement in 3D virtual worlds. Previous research has argued that intrinsic or extrinsic goal orientations influence student achievement (Lin, McKeachie, & Kim, 2001), and that high self-efficacy is significant on learning achievement (Law, Lee, & Yu, 2010), which raises the following research questions:

Question 1: Are the intrinsic and extrinsic goal orientations of students positively related to their self-efficacy of English learning in Second Life?

Question 2: Are the intrinsic and extrinsic goal orientations of students positively related to their learning achievement of English learning in Second Life?

Question 3: Is the self-efficacy of students positively related to their learning achievement of English learning in Second Life?

## **2. Literature review**

### *2.1. Situated learning in virtual worlds*

Most learning activities in a traditional classroom involving abstract knowledge are out of context. Lave and Wenger (1991) emphasized situated learning as a process of participation in communities of practice that is first legitimately peripheral, but increases gradually in engagement and complexity. The authenticity of learning activities from observation, demonstrations, explanations, and tips provides learners the opportunity to participate in the learning process. Huang, Liu, Chu, and Cheng (2007) emphasized that thematic teaching can efficiently expand learner knowledge while surfing in cyberspace. This study will practice thematic teaching activities based on situations of English learning in Second Life.

Many researchers have attempted to apply virtual worlds to cooperative learning. Girvan and Savage (2010) and Kock (2006) summarized that a group of learners who collaboratively construct knowledge represent the features of pedagogy. However, most researchers view virtual worlds as a place to display learning materials. During the learning period, students have to read the online texts and share their ideas with each other (Bell, 2009). The context in virtual worlds is more abundant compared to the traditional textbook (Belcher, 1999). The simulation in virtual worlds can enhance the learning motivations of students. Students feel as if they are playing a game while they

are learning in virtual worlds. Chittaro and Ranon (2007) reported good effects by applying Web3D technologies in learning, education, and training. Bellotti, Berta, De Gloria, and Primavera (2010) constructed a European model in virtual worlds, adding to the sense of presence. In Education, Edirisingha, Nie, Pluciennik, and Young (2009) examined pedagogical potential and socialization in distance learning of Second Life. Herold (2010) and Kock (2006) used 3D virtual worlds to build a Media Studies course. Jamaludin, Chee, and Ho (2009) used role-playing to construct argumentative knowledge. Petrakou (2010) interacted through avatars in virtual worlds as a context for online education. The above descriptions illustrate the learning affordances of 3D virtual environments.

## *2.2. 3D virtual worlds*

3D virtual worlds are used in fields as diverse as manufacturing, medicine, and education. Messinger, Stroulia, Lyons, Bone, Niu, Smirnov, and Perelgut (2009) stated that virtual worlds can be traced back to Multi-user virtual environments (MUVES) and Massively multi-player online games (MMOs). Steuer (1992) emphasized that virtual reality gives the user a sense of presence. The use of authentic 3D space such as MUVES and MMOs is the current trend. Burigat and Chittaro (2007), Song and Lee (2007) created virtual worlds where users can update their status and share resources with each other. Popular games such as *Never Winter Nights* and *World of Warcraft* allow users to share their resources. However, these games lack storiness and educational goals. Users cannot create their story or scenarios in the same platform. The unstructured 3D is the main factor that attracts educators to conduct education research in 3D virtual worlds. These education researches provide methods to solve the learning difficulties of students. Warburton (2009) classified virtual worlds into flexible narrative, social, simulation, and workspace; *Second Life* is classified into social world, and possesses the characteristics of MUVES, role-playing, and some degree of cooperative workflow (Xu, Park, & Baek, 2011).

*Second Life*, developed by Linden Lab, and launched in June 2003, is a tool for building virtual worlds and is accessible on the Internet. In January 2010, 18 million accounts were registered. This tool supports MUVES and MMOs and is a platform of choice for education (Andreas, Tsiatsos, Terzidou, & Pomportsis, 2010; De Lucia, Francese, Passero, & Tortora, 2009). deWinter and Vie (2008) asserted that *Second Life* is not a game, but a set of 3D virtual world environments without a script. *Second life* provides tools for users to create 3D virtual worlds. Users can edit their appearances and change their hair, shape, skin, etc. *Second Life* provides 13 types of prims to sculpt to become anything users like. Linden Script Language provides methods and the process to control objects in virtual worlds. Users can use events, flow control, and functions to edit a play and even use HTTP protocol to record user behaviors. Residents can use headphones and microphones to conduct peer to peer or peer to group communication. In addition to voice chat, residents can send instant messages to chat with each other or a group. Users can access animations to make their avatar clap hands, blow a kiss, etc. Dalgarno and Lee (2010) conceived that many characteristics are the learning affordances of 3D virtual worlds. Thus, this research creates a virtual world of English learning and teaching in *Second Life*.

## *2.3. Learning motivation as intrinsic and extrinsic goal orientation*

Motivations influence learning effects in many domains, such as learning in decision-making tasks (Chan, 2009) and game-based learning (Papastergiou, 2009). Bernstein,

Penner, Clarke-Stewart, and Roy (2003) proposed that motivation is the intrinsic power of individuals (e.g. interests, attitudes and desires) to affect individual actions and change behaviors. An individual must espouse motivations to engage in long-term meaningful learning. Learning motivations will inspire an individual with learning difficulties to continue learning. Intrinsic goal orientation is the inner force, which energizes individuals to do all kinds of things. This force involves a series of processes: an individual starts an activity and continues that activity toward a goal. Extrinsic goal orientations are the external factors that affect the learning motivations of students. Working toward good grades or class honors are extrinsic goal orientations. Motivations and behaviors are contrastive. Behaviors are external activities, while motivations are the inner process, which empowers individuals to do something. Learning motivation is an inner mechanism that encourages an individual to start a learning activity, continue learning, and finally achieve his learning goal. Lin, McKeachie, and Kim (2001) pointed out that intrinsic or extrinsic goal orientations influence the achievement of students. In Taiwan, students are typically judged by their grades, and the pressure to perform causes them to lose interest in learning and become frustrated. Therefore, it is very important to stimulate the learning motivations of students to assist them to become lifelong learners.

#### *2.4. Self-efficacy and learning achievement*

Bandura (1982) proposed self-efficacy as the belief that one can accomplish tasks on his own in certain conditions. When an individual faces a significant problem, he will acknowledge the problem and solve it. Self-efficacy influences individual decisions. If a person believes he is not able to face a situation, he will avoid it. Self-efficacy is the belief held by a student that he will behave well in class. Chou (2001) believed that high self-efficacy is significant on learning achievement. Law, Lee, and Yu (2010) suggested that a well-facilitated e-learning setting enhances learning motivation and student efficacy. Walker, Greene, and Mansell (2006) described self-efficacy and cognitive engagement as having a significant correlation that will affect student learning achievement.

### **3. Use of iTELL for technology enhanced language learning**

A 3D virtual learning environment based on Second Life, called iTELL, an acronym for island for Technology Enhanced English Learning was used in this study. iTELL provides an authentic and interactive environment to fulfill the needs of students to exchange knowledge.

iTELL enables multiple participants to access virtual contexts, to interact with digital artifacts, to represent themselves through “avatars,” to communicate with other participants and with computer-based agents, and to enact collaborative learning activities of various types. In virtual worlds, everyone can control his avatar to interact, communicate, and cooperate with others. In multiple player virtual worlds, people need an icon or an avatar to feel their existence among others. All things are possible in virtual worlds. One can be a tree, a ball, a bird, or an alien. Learning through avatars can increase learning motivations (Baylor, 2009; Rebolledo-Mendez, Burden, & de Freitas, 2008). iTELL provides a virtual learning environment for instructors and students to interact. The traditional classroom is transplanted to the virtual world in iTELL so that students can learn without the limitations of time and space.

The situated learning scenarios simulate the English learning environment in the real world (see Fig. 1). iTELL provides instructors a virtual platform in which to teach and switch his slides. A traditional classroom is equipped with one projector and one projector screen. However, these virtual learning environments possess ten projector screens. Students can view the projector screens from various directions. Instructors can store texts in a certain area for students to preview or review after class. Learners can build unstructured classrooms in the air or at sea in Second Life. Instructors and students can record their learning reflections on the message board. Their partners may also give them feedback here. Students can store electronic books in their inventory, which they can read anytime. Students can view the teaching materials in varied directions, and objects will move as you walk or fly. Presence is more vivid in Second Life than in other 3D environments. Every learner can control the status and size of objects and change the appearance and content of objects. Students can communicate with others through a microphone or by typing. The 3D texts increase student comprehension and intrigue their learning motivations. Students can watch learning films from YouTube in the theater, and instructors and students can draw their ideas on the electronic whiteboard to share with others.



**Fig. 1.** Simulated English learning environment in Second Life

Second Life can create every teaching material in virtual worlds. This research created several scenarios to explore the various feelings of students engaged in 3D environments. We presented merchandise in a shopping mall in 3D virtual worlds for students to identify easily. The merchandise is spelled and pronounced in the shopping mall so students can learn English while shopping, and listen to English conversations at the counter where they unconsciously learn English for daily life.

#### 4. Methodology

iTELL provides a situated learning environment for English learning in Second Life. Situated learning also identifies and arranges the learning community through actual participation and uses experts as guides to provide a real learning environment for students.

Twenty-one students, one English instructor, and one tutor participated in this research for eight weeks. This research discusses whether Second Life enhances learning achievement by applying thematic teaching to the virtual courses. The theme of these English courses is “Going shopping in the shopping mall”. Learning objectives enable students to understand the meanings of vocabulary and phrases. They can use the exact sentence pattern in the lesson, realize what causes shoppers to buy more products in a supermarket, and understand sales promotion terms. The English courses in this study were arranged into five stages (see Table 1): preparation, learning in the virtual classroom, interaction in the virtual classroom, interaction in the situational environment, and evaluation. The course stages are listed below:

**Table 1**  
Learning activities

Phase	Activity
Preparation (Week 1)	Introducing and practicing the operation of 3D virtual worlds in Second Life. The instructor explains the experimental objectives and evaluation methods and proposes a pre-test questionnaire.
Learning in the virtual classroom (Week 2-Week 3)	Thematic instruction in the virtual classroom. The instructor administers a pre-learning assessment to students.
Interaction in the virtual classroom (Week 4-Week 5)	Class discussion about shopping; where to buy, how to buy, what to buy, why to buy, and who to buy for.
Interaction with the situational environment (Week 6-Week 7)	The tutor leads students in a discussion about buying something from the shopping mall. The instructor administers a post-learning assessment to students.
Evaluation (Week 8)	The instructor proposes a post-test questionnaire.

#### 4.1. Preparation

Introducing and practicing the operation of 3D virtual worlds in Second Life. The instructor explains the experimental objectives and evaluation methods. During the first week, students register for an account in Second Life and chose an avatar they like. Afterwards, the instructor proposes a pre-test questionnaire.

#### 4.2. Learning in the virtual classroom

The instructor administers a pre-learning assessment to students before the class begins. In a virtual classroom, the instructor designs learning materials according to the theme. The learning materials, which include vocabulary, pronunciation, grammar, sentences, and dialogues, are taught by projecting slides or playing videos. Supplementary materials are available on the websites. Students look at the title, “*Who Decides What You Buy?*” and tell their classmates, which factor will influence their purchase decision. The instructor introduces the article, “*Who Decides What You Buy?*” and the factors that marketing specialists use to persuade shoppers to buy more products. The instructor explains the meanings and usage of vocabulary, idioms, and phrases, introduces grammar patterns, summarizes the article, and asks comprehension questions.



### 4.3. Interaction in the virtual classroom

In the following two weeks, students engage in discussions in the virtual classroom. They share their experiences of shopping in a supermarket with their classmates. They look at the title, “*Who Decides What You Buy?*” and share with their classmates which factor would influence their purchase decision. The instructor’s avatar teaches English in the virtual classroom (see Fig. 2) and the real instructor interacts with students through the headset and microphone. Students share their experiences of shopping in a supermarket. The following is a fragment of conversation practice.



**Fig. 2.** Instructor’s avatar and students’ avatars in the virtual classroom

Instructor: Where do you go shopping and what do you buy?

Student A: I like shopping at the department stores and buying clothes, hair ornaments, or decorations with my classmates.

Student B: I like shopping the streets filled with many strange things.

Student C: I like shopping at the shopping mall, because it is cheaper than other places.

Instructor: The shopping mall is a good shopping environment. What factors do you consider when shopping?

Student D: I consider the price, it is best to use a little money to buy many things.

Student E: I think about the quality of goods and the warranty date, which affect my willingness to purchase.

Instructor: What can be done to make shoppers buy more in the supermarkets?

Student A: Soft music and a suitable temperature encourage people to stay longer in a store.

Student B: Popular items are placed at eye level so that shoppers cannot avoid seeing them.

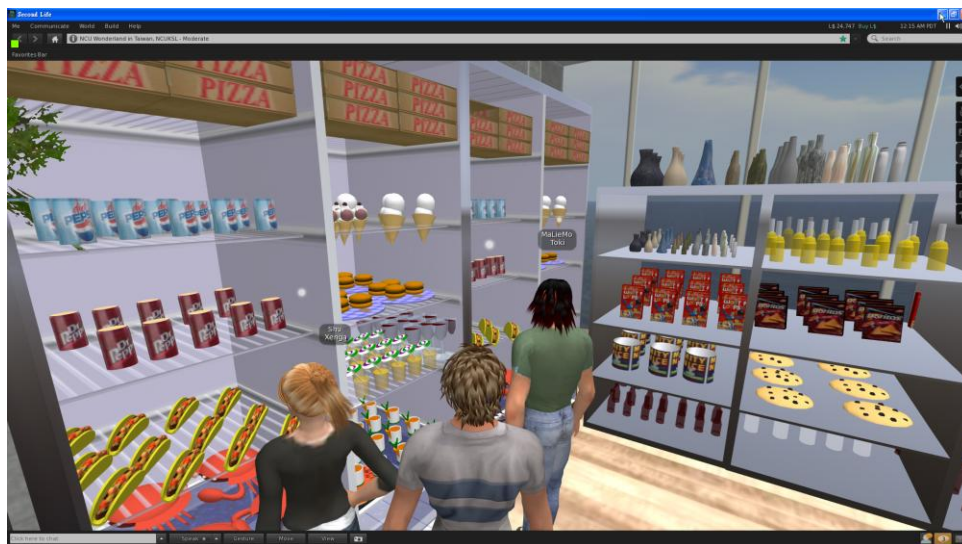
Student C: Items for children are placed at their eye level so that parents will have to buy something extra to keep their children quiet.

Student D: Small items are placed at the checkouts to attract shoppers.

Fig. 3 shows that the real instructor interacts with students' avatars in the real world. Desktop computers are equipped with a 3D accelerator card, a network, and a headset microphone in the real environment serve as the communication interface with virtual worlds.



**Fig. 3.** A real instructor in the real world



**Fig. 4.** Tutor avatar that helps students' avatars accomplish tasks in the virtual world

#### 4.4. Interaction with the situational environment

In the situational environment, students can view 3D virtual merchandise and listen to the voice of their companions via headphones, and chat with each other through keyboards or microphones. The teaching goal of these two weeks is to enable students to purchase virtual merchandise in the virtual shopping mall. They can feel the authentic environment and discuss shopping issues in the mall. The merchandise in the shopping mall includes prices and English pronunciation. An avatar tutor also helps students practice English in the shopping mall. The instructor assigns tasks to students to accomplish in situated environments (Fig. 4). The following is a fragment of conversation practice.

Instructor: Could you buy a hundred bottles of Pepsi Cola with the least money in a shopping mall?

The task starts.

Student A: What is the cost of a bottle of Pepsi cola?

Tutor: I am offering them to you at two Euros a piece. Is that all right?

Student A: Is tax already included in the price?

Tutor: Yes. Our price cannot be matched.

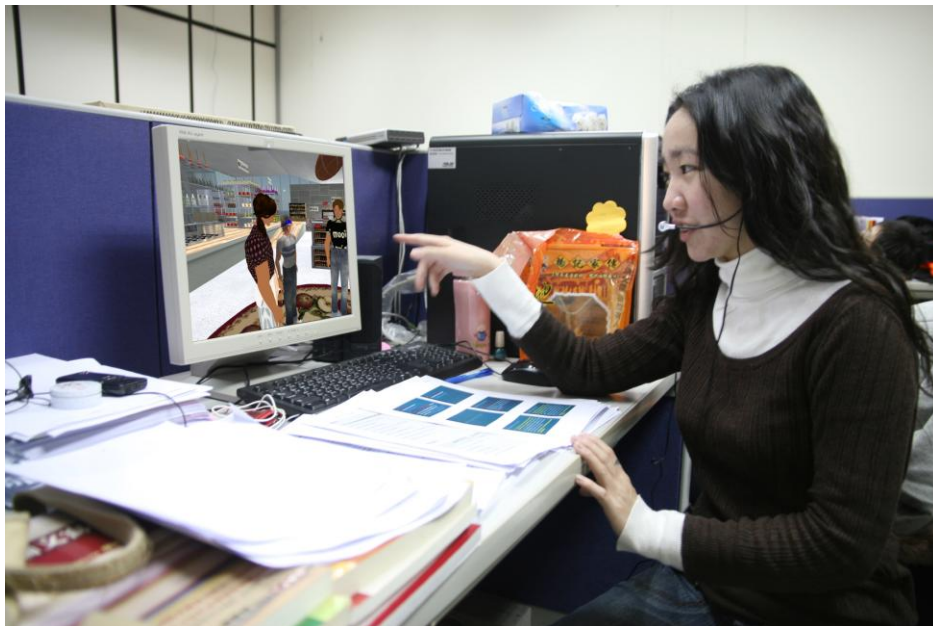
Student A: Would you consider a volume discount?

Tutor: If you buy ten or more, you will get a 10% discount.

Student A: That is too much money for me. Could you give me a greater discount?

Tutor: If you buy 100 or more, you will get a 15% discount.

Student A: I accept your offer.



**Fig. 5.** A real tutor in the real world

The instructor presents certain issues to students and asks them to go to the shopping mall on the iTELL. Students discuss with their group mates the best location in the shopping mall to place those products the instructor proposed. Fig. 5 shows the real tutor helping students accomplish the task and practice situational English conversation.

#### *4.5. Evaluation*

After using Second Life, the instructor administers a post-test questionnaire to students, edited based on intrinsic goal orientation of English learning in Second Life, extrinsic goal orientation of English learning in Second Life, and self-efficacy of English learning in the Second Life subscale.

### **5. Data collection**

The participants of this experiment were fresh university students in Northern Taiwan. A total of 21 students were included in this study, ranging between 19 and 20 years of age. An instructor and a course tutor participated in this research. They took the questionnaire and assessment before using iTELL as an e-learning platform to study English. After eight weeks of learning, subjects responded to the questionnaire again to see if they had higher learning motivation and achievement of English learning in Second Life. The questionnaire was adopted from Artino Jr (2005).

The internal consistency of reliability was assessed by computing Cronbach's  $\alpha$ . The alpha reliability was highly accepted ( $\alpha=0.72$  to  $\alpha=0.90$ ) (see Table 2). Students rated intrinsic goal orientation, extrinsic goal orientation, and self-efficacy of English learning in Second Life on a 7-point Likert scale, from 1 which means "strongly disagree" to 7 which means "strongly agree."

To assess the students' learning achievements of the meanings for vocabulary and phrases, a pre-test was conducted to ensure that the students had equivalent prior knowledge before the learning activity. It consisted of thirty multiple-choice items with a perfect score of 100. Moreover, a post-test was conducted for assessing the students' learning achievements after the learning activity. It consisted of thirty multiple-choice items for assessing the students' knowledge with a perfect score of 100. Both the pre-test and the post-test were developed by two experienced teachers who had more than 5 years experience in teaching English course. The instructor rated the learning achievement of students from 0 to 100. Finally, the data collected were transformed to z-scores.

### **6. Result**

In this study, The data collected was analyzed by descriptive statistics, one-way ANOVA, and regression. The results showed that the intrinsic and extrinsic goal orientations of students in English learning in Second Life had positive influence on their self-efficacy of English learning in 3D virtual worlds. In addition, the self-efficacy of English learning of students in Second Life positively related to their effectiveness of English learning in Second Life.

### 6.1. Findings from the tests and survey

In the table 2, the mean value of intrinsic goal orientation of English learning in Second Life are greater than 4.81, the standard deviation is less than 1.21, which represents most of the students agree that the intrinsic goal orientation will effect their English learning in Second Life; the mean value of extrinsic goal orientation of English learning in Second Life are greater than 5.19, the standard deviation is less than 1.17, which represents most of the students agree that the extrinsic goal orientation will effect their English learning in Second Life; the mean value of self-efficacy of English learning in Second Life are greater than 4.86, the standard deviation is less than 1.32, which represents most of the students agree that the Self-efficacy will effect their English learning in Second Life.

**Table 2**

The mean, standard deviation, and Cronbach's value

Item	M	SD	$\alpha$
<i>Intrinsic goal orientation of English learning in Second Life</i>	5.31	.76	.72
• In a class like this, I prefer course material that challenges me to learn new things.	5.33	1.02	
• In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.	5.57	1.21	
• The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.	5.52	.81	
• When I have the opportunity in this class, I choose course assignments that I can learn from, even if they do not guarantee a good grade.	4.81	1.03	
<i>Extrinsic goal orientation of English learning in Second Life</i>	5.49	.87	.84
• Getting a good grade in this class is the most satisfying thing for me right now.	5.19	1.03	
• The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.	5.57	.93	
• If I can, I want to get better grades in this class than most of the other students.	5.81	1.17	
• I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.	5.38	1.07	
<i>Self-efficacy subscale of English learning in Second Life</i>	5.31	.80	.90
• I believe I will receive an excellent grade in this class.	5.52	1.12	
• I am certain I can understand the most difficult material presented in the readings for this course.	4.86	1.42	
• I am confident I can learn the basic concepts taught in this course.	5.33	.73	
• I am confident I can understand the most complex material presented by the instructor in this course.	5.38	.86	
• I am confident I can do an excellent job on the assignments and tests in this course.	5.00	.95	
• I expect to do well in this class.	5.52	.81	
• I am certain I can master the skills taught in this class.	5.38	1.32	
• Considering the difficulty of this course, the instructor, and my skills, I think I will do well in this class.	5.48	.87	
<i>Achievement assessment value between pre-test and post-test from the instructor of English learning in Second Life (from 0 to 100)</i>	21.67	2.29	

Table 3 shows that intrinsic and extrinsic goal orientations have positive correlation with self-efficacy and learning achievement. If a learner has higher intrinsic or extrinsic goal orientations, he or she will also have higher self-efficacy ( $r=.53^*$  ;  $r=.76^{**}$ ) and learning achievement ( $r=.59^*$  ;  $r=.89^{**}$ ).

**Table 3**  
Correlation analyses

	Zscore (Intrinsic)	Zscore (Extrinsic)	Zscore (Self-efficacy)	Zscore (Achievement)
Zscore(Intrinsic)				
Zscore(Extrinsic)	.44*			
Zscore(Self-efficacy)	.53*	.76**		
Zscore(Achievement)	.59**	.89**	.89**	

\* $p<.05$ , \*\* $p<.01$

To examine our hypothesis, Table 4 is a regression analysis performed to check the effect of intrinsic goal orientation, extrinsic goal orientation, self-efficacy, and learning achievement of English learning in Second Life.

**Table 4**  
Regression results of predicted path relationships

	Dv	Iv	$\beta$	$R^2$
Q1	Self-efficacy	Intrinsic	.53*	.28*
Q2		Extrinsic	.76*	.57***
Q3	Achievement	Intrinsic	.25*	.05*
Q4		Extrinsic	.76**	.80***
Q5	Achievement	Self-efficacy	.89**	.79***

\* $p<.05$ , \*\* $p<.01$ , \*\*\* $p<.001$

First, Table 2 shows that the most intrinsic and extrinsic average scores are greater than 5. In the questionnaire, most of learners agree that they will want to use Second Life as a learning tool in 3D virtual worlds. Extrinsic goals for obtaining good grades in this course are agreed by the majority of learners. Table 4 indicates that intrinsic goal orientation of English learning in Second Life was a predictor of student self-efficacy of English learning in Second Life ( $\beta=.53$  ,  $p<.05$ ) and extrinsic goal orientation of English learning in Second Life had a positive effect on student self-efficacy of English learning in Second Life ( $\beta=.76$  ,  $p<.001$ ). If learners have higher intrinsic/ extrinsic goal orientation of English learning in Second Life, they also have higher self-efficacy of English learning in Second Life. The result supports question 1. Second Life is a fully 3D scene, virtual objects, and interesting context. In the virtual environment, learners' intrinsic goal orientation affecting their self-efficacy will make learners have more confidence in English learning.

Second, intrinsic goal orientation of English learning in Second Life was a predictor of the learning achievement of students of English learning in Second Life ( $\beta=.59$  ,  $p<.01$ ) and extrinsic goal orientation of English learning in Second Life was a predictor of the learning achievement of English learning in Second Life ( $\beta=.89$  ,  $p<.001$ ). If learners have higher intrinsic/extrinsic goal orientation of English learning in Second Life, learners also have a higher learning.

Third, the self-efficacy of students of English learning in Second Life positively affected their learning achievement of English learning in Second Life ( $\beta=.89$ ,  $p<.001$ ). If learners feel confident learning a subject, they perform well in that subject. The result supports question 3.

**Table 5**  
Regression results of intervening variables

	B1		
	M1	M2	M3
<b>Extrinsic</b>	.89***	.76***	.50***
<b>Intrinsic</b>		.25	.14
<b>Self-efficacy</b>			.43**
$\Delta R^2$	.80***	.05*	.07***
$R^2$	.79***	.84***	.92***
<b>Adjusted <math>R^2</math></b>	.79***	.83***	.90***
<b>F</b>	74.04***	48.77***	61.94***
<b>df1</b>	1	2	3
<b>df2</b>	19	18	17

\* $p<.05$ , \*\* $p<.01$ , \*\*\* $p<.001$

The M2 in Table 5 revealed that the extrinsic goal orientation of English learning in Second Life, intrinsic goal orientation of English learning in Second Life, and self-efficacy of English learning in Second Life were predictors of the learning achievement of students of English learning in Second Life. If the learning achievement of students of English learning in Second Life was further controlled (as showed in M3), the  $\beta$  value of the intrinsic goal orientation of English learning in Second Life and learning achievement of English learning in Second Life changed from .25( $p<.05$ ) to .14( $p>.05$ ). The  $\beta$  value of the extrinsic goal orientation of English learning in Second Life and learning achievement of English learning in Second Life changed from .79( $p<.001$ ) to .50( $p<.001$ ). The results indicated that the intrinsic goal orientation of English learning in Second Life would influence learning achievement of English learning in Second Life via self-efficacy of English learning in Second Life, while extrinsic goal orientation of English learning in Second Life partially affected learning achievement of English learning in Second Life via self-efficacy of English learning in Second Life.

## 6.2. Findings from interviews

After the experiment, 10 students randomly participated the interview session. A microgenetic qualitative analysis of student interviews and open-ended feedback indicated that most students feel that their motivation and achievement of English learning in Second Life is positive between pre-use and post-use in virtual worlds. We also interviewed students and summarize students' comments opinions. The instructor and students were able to express their views more effectively in Second Life through interviews. When using the Second Life platform to teach English, Authors recommend extending additional materials, which appear in the chat frame in the virtual class. Instructors may find it difficult to spend time looking for local slides of additional materials. Second life provides various materials located in cyberspace. Placing curriculum materials on Second life can avoid wasting time looking for local materials. English learning in 3D virtual worlds differs from Web learning. Beginning learners might have trouble trying to control their avatars and viewer operations in Second Life. Especially in hardware, the computer needs to install a 3D accelerator card and higher



network bandwidth to keep the frames smooth. The experiment requires considerable time in preparation and training. However, there was consensus among the students that the English learning activities in Second Life impacted their motivation and self-efficacy.

## 7. Conclusion

This research shows that 3D virtual worlds provide situated learning environments and thematic learning scenarios, as well as socialization and interactive communication environments for students. Students can even perform language-learning activities in these environments. If learners have a higher intrinsic goal orientation or higher extrinsic goal orientation of English learning in Second Life, they also have higher self-efficacy of English learning in Second Life. Thus, intrinsic goal orientation or extrinsic goal orientation of English learning in Second Life affects self-efficacy for English learning in Second Life. If learners possess intrinsic goal orientation, higher extrinsic goal orientation, or higher self-efficacy of English learning in Second Life, they also have higher achievement of English learning in Second Life. The motivation of learners will affect their achievement of English learning in Second Life. If learners feel confident about learning a subject, they perform well in that subject. This research shows that 3D virtual worlds offer educational potential; therefore, instructors can apply 3D virtual worlds to their teaching. By playing videos, cartoons, and music, teachers can enhance the learning motivations of students. In this way, students will be more involved in their learning and demonstrate enhanced learning achievement in Second Life.

Finally, the research reported here was a small-scale study; only twenty-one students, one instructor, and one tutor participated in this research, which may raise issues that require further studies.

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