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Study on the Use of Serious Games in Business Education

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STUDY ON THE USE OF SERIOUS GAMES IN BUSINESS EDUCATION

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ABSTRACT

With rapid advance of information technology (IT), computer-based gaming has flourished for decades. Gaming becomes a part of modern culture, especially among emerging digital generations. In addition to the entertaining purpose, attempts are made to use games for serious purpose, such as education and training. With the genuine characteristics that bring enjoyment, engagement, and context, games are considered good tools for business education and training that support or even may substitute the traditional learning methods. However, there is a dearth of research with regards to the comprehensive view of how people can learn business topics through serious games and transfer the value of business games to the work practices. To fill the gap, this dissertation research focuses on the use of serious games in business education and training. In Study I, the two main elements of serious games, namely seriousness and playfulness, and how these elements play roles in game-based learning process, are investigated. From two SEM (Structural Equation Model) analyses of quantitative data from 190 MBA students who have experienced business simulation games, seriousness and playfulness are shown to explain significant parts of the game-based learning process with several antecedents. In addition, Study II investigates the potentially transferrable values of business simulation games to the business practices based on the qualitative data from 43 business professionals who have experienced various business simulation games in their Professional MBA program. The result of analyzing the business professionals' arguments in Toulmin's framework, various values of serious games in business practice are found. Overall, this dissertation research contributes in providing fundamental insights for future studies regarding the use of serious games in business education and training context. Also, the findings from the research provide implications to the practitioners who consider using serious games in business.

CHAPTER 1: INTRODUCTION

INTRODUCTION TO TOPIC

Along with advances in information technologies (IT), digital game playing have flourished over the past decades. While most popular digital games are played for entertainment, many games are designed and played with more *serious* intentions. These types of games are called *serious games*. This study is about the use of serious games in the context of business education.

We live in the digital age (Negroponte, 1996). As Moore's Law (Moore, 1998) suggests, IT has advanced at an accelerated rate, enabling games to provide new types of experiences to the players. Moreover, the emerging digital generations, who are raised up with IT and who prefer interconnectivity and decentralization (Kline et al., 2003), rapidly fill our workforce. The digital generations have characteristics that distinguish them from previous generations. They are exceptionally pragmatic and very visually oriented. They also learn by doing and accept digital communications and interactions as the norm (Hunter, 2013). For them, traditional ways of communication in business, education, and so on, are not as effective. In such an environment, future business education and training should be realigned in accordance with the new generation. Hence, it is suggested that serious games could be a very effective method to approach to them because games are familiar, interactive, and engaging.

Unfortunately, however, the academic literature on serious games, especially games used for business education and training purposes, is sparse. The time is right to address the use of serious games in business education from an academic perspective for better use of games in business. This dissertation seeks to determine the effectiveness of serious games in business education by exploring the game-based learning process in advanced (graduate) business courses, focusing on the participant's seriousness and playfulness as well as the connection of game learning

outcomes and real-world business practice. By doing so, this dissertation sheds light on better understanding of the future use of serious games in business.

Overview of Game

Play has been an important part of human culture and history. It is human nature to pursue activities that are fun. In his seminal book, "Homo Ludens," Huizinga (1955) claimed that play has been interwoven with culture and is one of the main bases of civilization. Play and games are inseparable from each other (Klabbers, 2003). Games are one of the oldest forms of play in human history. It is held by an anecdote in Herodotus' "the Histories" that ancient Lydians endured famines by playing games invented by themselves including dice, knucklebones, and ball (Holland, 1937).

As announced by the Entertainment Software Association (ESA, 2014), global consumers spent over $21.5 billion on video games, hardware, and game accessories in 2013. Video/digital games are no longer for children or teenagers only. A lot of people play games of various types everywhere. ESA (2014) said that the average game player is 31 years old and has been playing games for 14 years. There are enormous gamers everywhere. Angry Bird, a casual mobile game, has 260 million active users as of January 2013 (Wasserman, 2013). Over 340 million units of PlayStations, a household game console series, have been sold worldwide since first introduced in 1994 (Sony Computer Entertainment, Inc. 2013).

There are many different types of games, besides video/digital games. Fantasy sports is a type of game in which players manage a sports team competing against other teams, based on real-world team. As a hybrid of reality and virtuality, fantasy sports have been enjoyed over 50 years of history with huge popularity. According to the Fantasy Sports Trade Association (FSTA, 2011), 32 million people in North America played fantasy sports in 2010. Fantasy sports shares some

similarity to serious games in that players select their moves and observe the consequences based on computational model of interactions between the strategies (Shipman, 2001).

Definition of Game

Many researchers have attempted to define exactly what constitutes a *game*, but there seems not to be a clear consensus. For example, Wittgenstein (1953) took *game* as an example of a word that cannot give a clear boundary. Suits (2005) identified the key characteristics of a game as follows: (1) Pre-lusory goal; (2) Constitutive rules; (3) Lusory attitude; (4) Voluntarily overcoming unnecessary obstacles. Table 1 presents more definitions of game.

Table 1. Definitions of Game

Source	Definition
Hays (2005)	"A game is an *artificially* constructed, *competitive* activity with a specific *goal*, a set of *rules* and constrains that is located in a specific *context* (p.15)"
Salen and Zimmerman (2004)	"A game is a *system* in which players engage in an *artificial* conflict, defined by *rules*, that results in a *quantifiable outcome* (p.80)"
Koster (2013)	"A game is a *system* in which players engage in an abstract *challenge*, defined by *rules*, *interactivity*, and *feedback*, that results in a quantifiable *outcome* often eliciting an *emotional reaction*"
Dorn (1989)	"Any contest or play among adversaries or players operating under constrains or *rules* for an objective *goal* (p. 2)"

As seen in Table 1, there are some common elements shared by various researchers. This suggests that there are some degrees of consensus about what game is, at least in modern society. Some of these elements are discussed below.

Elements of Game

From the previous literature, it can be found that there are several common characteristics of games (Leemkuil et al., 2000; Bright & Harvey, 1984; Suits, 2005; Hays, 2005; Garris et al., 2002; Kapp, 2012). These include game system, players, challenges, rules, feedback, interaction,

reaction, outcome (reward), and context (story). Table 2 provides detailed descriptions of each element.

Table 2. Elements of Game

Element	Description
System	- A space where all other elements of a game (Kapp, 2012) - Often a representation of real world that integrates causal relationships (Crookall & Saunders, 1989)
Player	- Participants in the game - Either single player or multiple players depending on the settings of the game - Especially in simulation-type games, players take a specific role in a game scenario
Challenge	- What players need to overcome - An appropriate level of challenge is essential to keep the players engaged in the game (Hays, 2005; Kapp, 2012)
Rule	- Define how to play the game - Agreement among participants
Feedback	- Keeps connected with players (Kapp, 2012) - Players can determine to take appropriate actions based on feedbacks
Interaction	- Two types of interaction: player vs. game, player vs. player - Important to keep players engaged in the game
Reaction	- Either personal or social - Personal reactions: psychological responses, such as frustrations, happiness, as well as cognitive learning - Social reactions: sense of belonging, consensus of a certain phenomenon could also be game reactions
Outcome (reward)	- Possible in various types - e.g. dichotomous results (win or loss), numeric scores, or a certain types of rewards (e.g., badges) - Distinguish game from "pure play," which usually has no end or outcome (Kapp, 2012).
Context (story)	- Players usually understand the context in the game through which all other elements of game are accepted

TAXONOMY OF GAME

While the main focus of this dissertation is on serious games, it would be useful to review the overall game landscape, especially computer-mediated games, to have a better developed understanding of the topic. Just like the definition of game, it is not entirely clear how to classify

the different games. Indeed, games encompass a vast range of interactive media content (Lindley, 2003).

Nonetheless, there are attempts to classify games based on the characteristics of various games. Researchers (e.g., Caillois, 1991; Shubik, 1983; Klabbers, 2003) suggested various frameworks for classification of games. Among them, Ellington et al. (1982) classified games into seven types: pure games, pure simulations, pure case studies, simulation games, simulated case studies, games used as case studies, and simulation games used as case studies. For purpose of this dissertation, the simplified framework of game classification suggested by Ellington et al. (1982) is assumed.

Hence, two first-order categories are used to distinguish games: *entertaining games* and *serious games*. Entertaining games (also called pure games) are software designed for entertaining people. On the other hand, serious games can be defined as a piece of software that is designed for the purpose of non-entertaining purpose with game structure (Djaouti et al., 2011). The important point to distinguish between them is the objective of design. Though there are some games that are known to be entertaining games, but have found serious use, such as in education. A good example is SimCity (Electronic Arts, http://www.simcity.com/). Even though SimCity was initially developed to entertain people, some teachers use the game to help students understand various city development topics such as the management of environmental resources (Garber, 2007; Fung, 2013). This kind of game usage is called "purpose-shifting" (Djaouti et al., 2011). Those games are designed for pure entertainment, but for containing serious elements, they could be used for serious purpose, such as education. However, it is still classified as entertaining game since its main design purpose is entertaining rather than educating people. In fact, as educational usage of SimCity increased, the developers launched an educational version

of SimCity in 2013 which provides lessons for students and online teachers' network features. Students learn how to manage various public issues concerning city development by playing the SimCity game designed for educational purpose. Since the case of SimCity educational version is designed for mainly educational purpose, it can be classified into the serious games category.

Serious Games

The term, *serious games*, is reserved for games with a specific primary serious purpose, such as education, training, and/or research (Klabbers, 2003; Michael & Chen, 2006; Stone, 2008). In his classical book, Abt (1969) defined serous games as games with an explicit and careful designed educational purpose, not primarily for amusement. Kapp (2012) defined serious game as "an experience designed using game mechanics and game thinking to educate individuals in a specific content domain. (p. 15)"

Serious games began to gain attention due to their unique ability to combine entertainment and education (Brandão et al., 2012). This ultimately leads to more active engagement of students in the learning process (Mayer et al, 2013; Azadegan et al., 2012; Klabbers, 2009; Ben-Zvi, 2010; Charles et al., 2011). Michael and Chen (2006) suggested serious games have been used for military, education (primary, secondary, and higher), and corporate and non-government organizations (NGOs), artists, and really anyone who needs to instruct others. The market for serious games has grown in recent years, and is estimated to range from $2 to $10 billion depending on what areas of serious games (e.g., simulations, and virtual worlds) are included (Reuters, August 23. 2012). Adkins (2013) reports that the projected annual growth rate of revenue from game-based learning and simulation-based learning segments from 2012 to 2017 is 18%. This trend is expected to continue as emerging digital generation prefer multiple streams of information, inductive reasoning, frequent and fast interactions with content, as well as highly-visual literacy skills (Van Eck, 2006). They also have characteristics such as exceptionally

pragmatic, very visually oriented, learning by doing, and accepting digital communications and interactions as the norm (Hunter, 2013). Since these characteristics are consistent with typical serious game environments, it is anticipated that serious games will become more and more important for the digital generations well into the future.

Gamification

The category of serious games can be further divided into sub-categories. First is *gamification*. Despite the increased interest and usage of the term, there are still many debates regarding what exactly gamification is. For the purpose of this research, Deterding et al.'s (2011) definition of gamification is assumed. That is, gamification is "the use of game design elements in non-game contexts (p. 2)." This definition is pretty consistent with other definitions of gamification (e.g. Boulet, 2012; Boinodiris & Fingar, 2014; Kapp, 2012).

A common confusion about gamification is to understand the term as any kind of use of games in a non-entertainment area. For example, some studies (e.g., Herzig et al., 2012) use gamification to simply introduce simulation games in education/training setting. However, this is not, based on the perspective in this research, a gamification since letting students play games in class to teach a topic is not use of game design elements. Rather, if an instructor uses game design elements replacing existing class settings, such as using scoreboard system for grading, or setting specific goals for students to pass each level of study and give them rewards, then it can be called gamification. Simply using a game in a class cannot be called a gamification. The main system of gamification is not game itself. Gamification often refers to a technique to adopt a part of game elements, such as introducing a visible scoreboard system, setting specific goals, rewards, and level/badge system, and/or adding competition into non-game context so people can be more engaged, interested, and motivated. Hence, by using game-based mechanic, aesthetics,

and game thinking, gamification technique can engage and motivate people, and enhance their learning and problem solving skills (Kapp, 2012).

With these added benefits, gamification is used in a wide variety of areas, such as marketing, education, training, human resource management, and social engagement. One interesting and successful example of gamification adoption is designed to provide an incentive for commuters to utilize Singapore's public transportation system (INSIC, Pluntke & Prabhakar, 2013). In this study, a gamification system was developed so commuters in Singapore can earn credits proportional to the distance of their usage of public transportation, with extra credits for off-peak time. With the earned credits, commuters will have a chance to earn cash prizes in a weekly lottery. The government of the city state of Singapore has resolved transportation system congestions by shifting the overall demand from peak-hour to off-peak by about 7.5%. Among the INSINC users, the observed shift was over 10%. This example suggests that gamification could be a good way to enhance social engagement effectively.

Simulation Games

Another category under serious games is simulation games. In a very simple definition, simulation games are simulations that include game aspects (Hays, 2005) More specifically, they can be defined as "an exercise that has basic characteristics of both games and simulation…undertaken by players whose actions are constrained by a set of explicit rules particular to that game and by a predetermined end point (p. 3, Dorn, 1989)" As games in general, simulation games also include most game elements that are discussed in the previous section.

What distinguishes it from entertaining games and gamification is its design purpose and the existence of a game system, respectively. As simulation games are designed for players to learn a specific topic area by playing, its design purpose is different from entertaining games. Usually

through playing simulation games, players can learn about something and enhance their skills that can be used in the real world. For this reason, reality is a crucial factor in simulation games (Barton, 1970). Meanwhile, reality in entertaining games is not a main factor because they are not mainly designed to mimic the real world. Rather, fantasy, which refers to fulfillment capability of a game that is not possible in the real world, can be important in entertaining games (Hays, 2005). Reality in entertaining game is necessary only for supporting the other elements to maximize enjoyment of players.

On the other hand, simulation games are different from gamification by the existence of a game system. As mentioned in the previous section, gamification usually does not have its own game system. Instead, it only uses techniques to adopt game elements into a non-game context. Thus, the system of gamification is not a game itself, but the original system of the non-game context, such as a class or training courses. Instead, a simulation game have its own system separated from the real world. The system of a simulation game incorporate all the elements of a game, so participants can have the feeling of entering another (small) world that is somewhat similar to but distinguished from the real world. By simulating the way that a model of (i.e., a part of or reduced view of) the world works, participants can learn lessons that are relevant to the real-world.

In addition to simulation elements, simulation games contain game-oriented elements, such as enjoyment, which enable them to engage people more than other instructional methods. For its instructional advantage, simulation games are used for various purposes. Hays and Singer (1989) suggests potential areas that instructional games can be used as follows: (1) to assess performance; (2) to provide instructional information; (3) to change attitude or behavior; (4) to organize learning prior to other forms of insturction; (5) to provide alternate forms of instruction;

(6) to provide opportunities to drill or practice; and (7) to illustrate the principles of a task. Dorn (1989) also claimed that simulation games can be designed to be used in following areas: (1) Affective learning; (2) Cognitive and conceptual learning; (3) Enhancing cooperation, interaction, and communication; (4) Skills of decision-making, problem solving, and critical thinking.

GAMES IN EDUCATION

Among the various areas that serious games may be used, the educational and instructional area is the most popular. Especially with emerging digital generation, so called the "NET generation," who are comfortable working in the digital environment, educators are finding new ways to teach students effectively using serious game (Van Eck, 2006). The most significant elements of serious games in education are as follows:

1. Situated Cognition

   Games can provide a meaningful and relevant context that allows learners to understand the subject matter more effectively and in a more convenient manner (Van Eck, 2006). Games help learners understand the relationships between content, process and context of the subject matter (Klabbers, 2003). Many subjects in modern education strive to achieve learning outcomes in relevant contexts so students can more easily bridge theory and practice, and have a more practical perspective. Therefore serious games can provide more meaningful and relevant contexts where learners better understand the subject matter more effectively and easily. This is called *situated cognition* (Van Eck, 2006).

2. Assimilation/Accommodation

   Games provide learners opportunities of assimilation and accommodation (Van Eck, 2006). Piaget (1952) explained the process of learning by assimilation and accommodation. According to his theory of cognitive development, assimilation is a

learner's process of trying to incorporate new information into an existing framework of his knowledge without breaking it. Accommodation is a process that a learner takes new information in his environment and modify an existing framework in order to fit new information. Piaget (1952) claimed an individual's intelligence is matured by the continuous cycle of assimilation and accommodation process. Games can provide learners with the opportunity to experience the assimilation and accommodation process. Playing educational game usually require a player to experience a constant cycle of hypothesis formulation, testing, and revision (Van Eck, 2006; Garris et al., 2002; Hays, 2005).

3. Engagement

Games engage and motivate learners (Garris et al., 2002; Parker & Lepper, 1992; Malone, 1981; Lepper & Malone, 1987; Rieber, 1996). Educational games usually sustain more challenging learning tasks and require less instructional involvement (Gee, 2003; 2007; Rupp et al., 2010). Moreover, previous studies revealed that computer-based games elicit more students engagement than traditional classroom activities (Malone, 1981; Lepper & Malone, 1987; Rieber, 1996). One possible explanation of the games' engaging characteristics is "flow" theory (Csikszentmihalyi, 1991; 1992). Flow is the psychological status in which a person is fully immersed in an activity balancing both ability and challenge (Csikszentmihalyi, 1991). Jones (1999) found that flow theory can explain the intrinsic motivation of gamers to a large extent. Games are good at facilitating flow experiences through their characteristics such as interaction and challenges (Egenfeldt-Nielsen, 2006). Providing flow experience, educational games can enable learners to keep engaged in and focused on the subject matter.

CHAPTER 2: BUSINESS SIMULATION GAMES

USE OF GAMES IN BUSINESS

Organizations have long pursued various approaches to training and education in an effort to ensure their employees perform at their full potential. For the effective learning of management skills it is important to involve trainees in the learning content development, to actively evaluate consequences and to carefully think over decisions (Michael & Chen, 2006). Business simulation games provide a good opportunity for them to develop risk-free decision making experiences and to improve their decision making skills by trial-and-error role playing. Games are used widely in this fashion to facilitate effective business education and training context.

There are many different types of skills corporations expect their employees to have, which include job-specific skills, people skills, organizational skills, communication skills, and strategy-making skills (Michael & Chen, 2006). Training games that are designed to address specific topics are very effective as learning through trial-and-error "discovery" eventually leads to higher retention rate as well as more engagement. Prensky (2001) suggested the following difficult situations where game-based learning would be beneficial as follows: (1) Dry, technical, boring material; (2) Complex or difficult subject matter to understand or transmit; (3) Hard to reach to the audience; (4) Difficult for assessment and certification; (5) Sophisticate "What if?" analysis; (6) Developing or communicating corporate strategies.

PROFESSIONAL BUSINESS EDUCATION

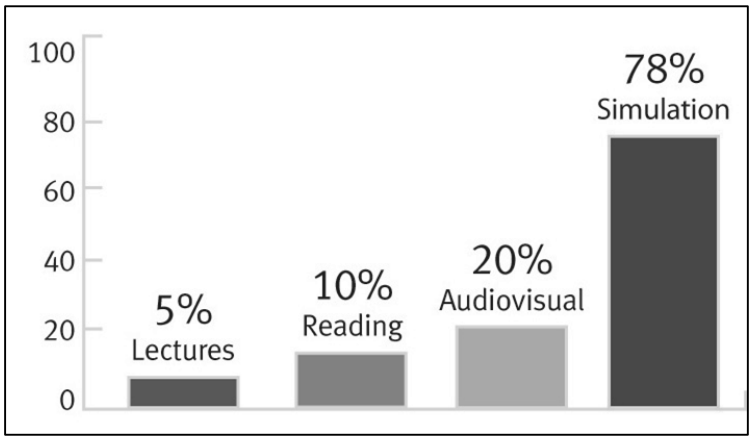
Learning by doing, or experiencing, is one of the most effective ways of learning (Gentry, 1990). AACSB (Association to Advance Collegiate Schools of Business) emphasizes the importance of incorporating effective and practical learning approaches into the MBA experience, including real-world experience, critical thinking, communication skills, global awareness, and integration skills. In addition, recruiters have identified important skill sets for new graduates to including

dealing with ambiguity and uncertainty, which can be enhanced by working in complex (simulated) environments with challenging problems to solve.

Another thing that should be noted is that the focus of business education is most often adult learners. Basically adult learners are those who already have already developed a certain amount of knowledge and experience in their own discipline. They are likely to learn new things based on their individual needs. They learn faster by trial-and-error based on their existing knowledge (Hunter, 2013). Knowles (1970) characterized the traits of adult learners as follows: (1) Desire to rapidly apply and test their learning; (2) Need to pull from real-life experience as a learning resource; (3) Requirement to self-manage, plan, and individually execute their learning activities; (4) Desire for a real-life-centric approach to learning new information and solving problems. Moreover, today's business environment is very complex and dynamic so the traditional linear type learning methods (e.g., reading materials, listening to lectures, and taking notes) are not enough to prepare students for the business world (Riedel & Hauge, 2011). It is important for students who study business to understand how to gather the necessary information from a complex situation and drive possible solutions, and then apply in a certain context in order to determine whether or not it works. This kind of problem-finding and solving skill in a complex world is not easy to be attained by traditional learning methods. Instead, providing student with a real world-like situation/context and letting them find a working solution by trial-and-error would work better for the purpose.

All in all, to meet the various business education requirements mentioned above, it would be necessary to introduce game-based learning to business education. Gentry (1990) claimed that computer-assisted instruction (which includes business simulation games) are effective instruction method to provide experiential learning to business students for the ability to focus on

content, high level control, feedback, more intense activity, and self-pacing. Game-based learning is also good for students to remember what they learned for a long time. A study by NTL (National Training Laboratories) Institute, simulation is the best method for students' retention among the various learning methods (see Figure 2).



(Source: http://www.simulationpoweredlearning.com/retention-graph.html)

Figure 1. Study on Learning Retention Rates

Games can provide business students opportunities to experience with complex situations that require them to understand multiple business concepts simultaneously. For example, business strategy games require the game participants to consider many different business parts, such as marketing, finance, and supply chain at the same time so the participants can be trained for making a better "integrated" decision based on the various perspectives. Keys and Wells (1989) pointed out that there are three factors necessary for effective management learning; dissemination of content, opportunities for experience, and feedback. Business simulation games fulfill the three requirements because, content is self-discovered, experience is rich, and feedback from simulated reality is more helpful than reality (Lane, 1995). Faria and Wellington (2004) identified various advantages of business simulation games to students and teachers. Those perceived advantages includes: (1) Experiential learning; (2) Integration of different functional areas; (3) Application of theory; (4) Demonstration of the consequences of decisions; (5)

Teamwork and involvement; (6) Interactive/dynamic exercises; (7) Realism; (8) Exposure to business competition; and (9) Fun, interest and motivation.

SIMULATION GAMES RESEARCH IN BUSINESS EDUCATION

Brief History of Business Simulation Games

Modern business gaming is a combination of war games, operations research, computer technology, and education theory (Wolfe, 1993). The origin of war games can be traced back to Wei-hai in China in about 3000 BC, and the Hindu game of Chaturanga (Wilson, 1968). In the early 15th century, European chess was developed for more serious and sophisticated war game exercises by Weikhamann at Ulm and Helwig at the German Court of Brunswick (Lane, 1995). Throughout World Wars I and II, more complex war games were developed and used for military purpose. After the war, many military personnel and resources influenced game development in the business world as they saw many opportunities to apply war simulation to business education and trainings. The combination of experience-based learning and technological advancements led to the rapid development of many business games. By and large, the history of serious games in business can be divided by four stages.

The early ages of serious games (prehistory – mid 20C) mostly involved board games for military strategy training purposes. Most games were played manually, and had relatively simple rules. Chinese chess, Western Chess, and early war games are examples of serious games in the period.

In the second stage, which is referred to as the modern genesis (mid 1950s – mid 1960s), games became more complex and practical. In 1955, RAND Corporation developed a simulation exercise focused on the U.S. Air Force logistics system (Faria & Wellington, 2009). The American Management Association developed Top Management Decision Simulation for use in management seminars (Hodgetts, 1970). In 1957, a business simulation game, TOP Management

Decision Game, was first used in a university course at University of Washington (Watson, 1981). Business games in this period were still relatively simple and executed manually.

The third stage of the serious business games is referred to as the mainframe age (mid 1960s – mid 1980s). During this period, main frame based business games were developed. When using a mainframe, games could include complex calculations and functions, which led rapidly to the proliferation of business games. Moreover, commercially published games in diverse business topic areas were available. In 1961, more than 100 business games were expected to exist in the U.S. and used by more than 30,000 executives and numerous students (Kibbee et al., 1961). In 1980, two hundred twenty eight business games were identified (Horn & Cleaves, 1980). During this period, although calculations were done by machine, the inputs of the games still relied on punch-hole cards and the outputs were simple numbers.

The fourth stage of the business games is referred to as the PC age (mid 1980 – late 1990). Due to the wide spread use of personal computers (PC), many mainframe-based games were converted to the PC platform. As well, games developed exclusively for PC platform were introduced. PC-based games were easy to install, they can use the whole computing resources of each PC toward running games, and participants could have more responsibility for the game input/output operations (Fritzsche, 1987). Higher processing power of PCs enabled business games to incorporate more complex games strategies and tactics. Games during this period were equipped with GUI (Graphical User Interface), which provide much usability to the users. With higher quality and usability of PC-based business games, many business schools began to adopt business games in their courses. In 1986, it was estimated that over 190 AACSB schools were using business games (Faria, 1987).

The most recent period of business games is the Internet revolution age (late 1990 – present). During this period, due to the rapid growth of business games run on central servers through the Internet, interactive play with distant connections was enabled. Also various multimedia were incorporated in the games, which increased player's engagement. Now, some games are available on mobile devices so students can play almost anywhere. With the cutting-edge technology available, business games can more focus on providing complex, real world experiences to the players. These factors accelerated the spread of business games. Faria (1998) found that about 97.5 percent of AACSB member schools were using business games in one or more of their courses. In 2004 a survey of business school in North America showed that over 30 percent of the professors were current business simulation users and another 17 percent were former users (Faria & Wellington, 2004).

PROBLEMS DETECTED IN USING BUSINESS SIMULATION GAMES

Despite many advantages of simulation games, they are not panacea. Dorn (1989) pointed out that simulation games do not provide problem-free instruction. He listed possible issues of using simulation games in instruction as follows: facilitation; assessment; teacher/student emotional investment; sociological, economic, and political costs; privacy, and oversimplification of reality. Among these issues, two specific problems are explored further: (1) trivialization of learning and (2) connection of learning outcomes of game-based learning with real-world business practices.

Trivialization of Learning

Studies of game effectiveness for education purpose show mixed results (Dorn, 1989; Lee, 1999; Egenfeldt-Nielsen, 2003). A possible reason why using games in education fails is that people trivialize learning through games. This is why many game experts emphasize the importance of exercising caution when using games for education (Boulet, 2012; Van Eck, 2006). By

definition, games are supposed to be different from real life (Boulet, 2012). Historically, people have been playing games for a chance to disconnect themselves from the real world. By playing games, people stay away from stressful things and refresh and recharge themselves. Hence, playing games is usually considered a non-serious activity. A negative consequence of using games in education might be trivialization of learning. In such a case, participants don't place much importance on the learning outcomes of the games for the simple reason that it is a "game". In another case, participants might place more focus on the playful part of the game and less emphasis on the learning outcomes intended by the instructor or game designer.

Like with any other method of instruction, student attitude toward simulation games are very important (Miles et al., 1986). Faria (2001) mentioned that attitude has been one of the main foci of game-based learning research. Prior studies showed that positive attitude are closely related to education game performance (Brenenstuhl, 1975; Schneier & Beatty, 1977). However, not much effort has been focused on determining specific types of attitude that can make a difference in game-based learning, such as participants' perceived seriousness and playfulness toward simulation games.

One crucial element in the learning process could be the learner's seriousness toward the learning methods and content. It is claimed that a serious attitude could make a difference in learner's motivation and performance (Biggs, 1996; Park, 2004). As in the terminology of "serious" games, the concept of seriousness is essential for simulation game participants to learn something from game playing. With a serious mindset on learning, a student would pay attention to activities related to learning, through which she will be aware of the benefits from learning the content as well as the disadvantages from not learning the content. By taking more serious attitude toward game playing and learning, the student would ultimately learn better.

On the other hand, playfulness is another major element of game-based learning. It is generally accepted that playfulness makes people more interested in learning content and more engaged in the learning activities (Webster & Martocchio, 1992; Deterding et al., 2011). However, playfulness may not always have a positive effect. Too much playfulness in a task might lead people to focus on tiny details that do not make much difference in performance (Webster & Martocchio, 1992; Nash, 1990). This could prevent effective learning through games.

All in all, to identify the role of seriousness and playfulness in game-based learning process is essential for better understanding and more effective use of games in business education. By probing the mechanism of how the cognitive concepts works along with personal motivations and behaviors may give much insight to theory as well as practice communities interested in game-based learning. For this reason, Study I research uses quantitative research methods to investigate the role of seriousness and playfulness in a game-based learning process incorporating the participant's cognitive and behavioral dimensions.

Connection of Learning Outcomes of Game-based Learning with Real-World Business Practices

Another issue with game-based learning in the business education context is the discrepancy between the learning and the application. This is not just limited to a certain area of business education, but applies to the overall business education system. Many researchers have raised the issue of the disconnection between business school curriculum (what students learn) and real-world business practice (what students need to learn) (Pfeffer & Fong, 2002). For example, Porter and McKibbin (1988) pointed out the lack of emphasis on relevant problem finding skills considering the importance of these skills in practice. Leavitt (1989) also criticized business school curricula that fail to balance between analyzing skills and application skills. To overcome

these problems, AACSB stresses the importance of experiential learning, which can facilitate students to understand and improve unique situations that different business environments have. Game-based learning, which includes business simulation games, would be a good way to provide experiential learning to business curricula. However, not much research has been conducted in this area, especially concerning how students really transfer the learning outcomes obtained from business simulation games to real-world business practice. In this sense, it would be worthwhile to identify how people who experienced game-based learning in their MBA course connect the learning outcomes to the real-world business practice. Hence, in Study II, a qualitative research methodology is used to investigate the argumentation patterns of working business professionals when connecting their learning outcomes from game-based learning to the business practices.

RESEARCH STRATEGY

Even though there have been several attempts to address these issues, there is a dearth of academic research that focuses on simulation games, especially those with a business education and training perspective. The importance of research on the use of games in business education and training from an academic point of view cannot be overstated. This dissertation addresses the effective use of simulation games particularly focusing on simulation games for business education. By doing so, this dissertation would shed light on the more effective way of using serious games in a business context.

The intention of this dissertation is to pursue a comprehensive understanding of learning process using games in business education. To achieve the goal, two separate studies are conducted to explore the complete game-based learning process in business education. Specifically, Study I will quantitatively explore the use of business simulation games to achieve certain learning outcomes. On the other hand, Study II will qualitatively investigate how learning outcomes are

connected to real-world business practice (see Figure 3). A brief summary of the two studies is presented in Table 3.

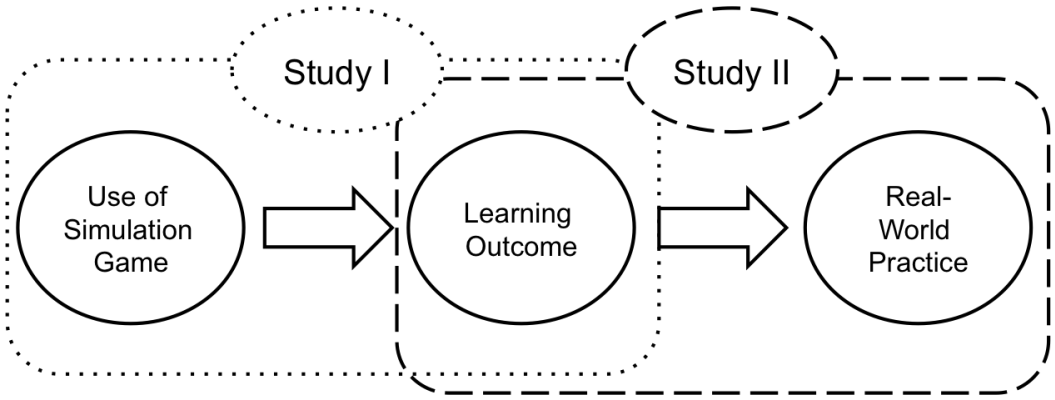


Figure 2. Conceptual Diagram

Table 3. Research Strategy

	STUDY I	STUDY II
Subtitle	"Role of Seriousness and Playfulness in Game-based Learning Process"	"Exploration of Practical Potentials of Business Simulation Games"
Research Question	How do seriousness and playfulness work in the learning process using simulation games?	How can the learning outcomes from simulation games be connected to the real-world business practices?
Research Approach	Quantitative investigation into the process of learning through a simulation game in professional business education focusing on the effects of seriousness and playfulness.	Interpretive approach to discourses of the working professional students about how the learning outcomes from a simulation game could be connected to the real-world business practices
Data Collection & Analysis	Subject: MBA students who experienced business simulation games Cross-sectional survey CB-SEM & PLS-SEM analysis	Subject: Working professional MBA students who experienced business simulation games In-depth written report Sensemaking argument analysis

CHAPTER 3: STUDY I - "ROLE OF SERIOUSNESS AND PLAYFULNESS IN GAME-BASED LEARNING PROCESS"

INTRODUCTION TO BUSINESS SIMULATION GAME

Simulation Game has been considered an effective method to teach/learn topics in business education. Many business schools are using simulation game as a way to enhance the learning experience in the curriculum (Faria, 1998). Simulation games are also used for training employees in corporates. By using simulation games, trainees would feel interesting, competing, usefulness, and so on, which consequently enhance the effectiveness of learning.

Although simulation games are considered as an effective way to learn business topics, there exist pitfalls as well. One of the most significant challenges of using games in business education is that learning by game playing could be regarded as trivial. This would be due to the profound characteristics of the game itself. By its definition, games pursue fun through fantasy, which is distinct and separate from real life. People who play games have been using games as a way to disconnect from real life. Therefore, as Boulet (2012) pointed out, one must be cautious to using games when training real-life skills if learning intentions are serious. People may take games used in education/training just for fun but not give much importance to serious learning, which would reduce the effectiveness of serious games. Van Eck (2006) also is cautious about the effectiveness of using games in education due to such reasons.

To address this problem, it is necessary to look into what really makes the difference in using games in business education. The issue may provide us with a more profound understanding and definition of serious games. As the name implies, there are seemingly two elements that exist in serious games, seriousness and playfulness. With serious games, people use playful element of games (e.g. fun/enjoyment) in serious purpose (e.g. education). At the first glance, they might be

conflicting each other. However, the key of successful use of games in serious context is to harmonize the two elements together.

Learners' perception would play a significant role in using games in education. As Miles et al. (1986) suggested, students' perception toward education using games are important to look into. However, there is a dearth of academic research on this topic. Thus, it is worthwhile to investigate how the perceptions of subjects who play serious games as a learning method can affect their learning process. In this study, the main focus is on the students' perceived seriousness and playfulness toward serious games that are used as a part of professional business education (i.e. MBA Core Operations Management course). By doing so, it is expected to reveal how these two elements, namely, seriousness and playfulness, influence the learning process.

Seriousness and playfulness are the two major elements that students perceive throughout the learning process in serious games. A serious attitude may make difference in learner's motivation and performance (Biggs, 1996; Park, 2004). For example, if a student takes a course serious, that is, s/he thinks the course is important to them and has relevant and important learning outcomes, then pay more much attention to the course, which consequently would increase their motivation to perform well in the coursework. On the other hand, if a student is not serious about a course, s/he would have low motivation that would eventually lead to poor performance.

Playfulness in serious games is likely connected to the idea of feeling amusement from game playing. The amusement or fun that a player would feel could lead to an internal inclination to repeatedly play the game (Sheldon & Biddle, 1998; Dormann & Biddle, 2009). This is similar to the concept of 'flow' suggested by Csikszentmihalyi (1991). By playing the game repeatedly, students will eventually achieve better learning outcomes.

Research Objective

The objective of this study is to investigate the process of learning through the use of serious games in professional business education especially focusing on the role of perceived seriousness and playfulness of the learners towards their motivations and learning outcomes. By doing so, this study is expected to reveal how the seriousness and playfulness affect the learning process, which eventually should shed light on the effective adoption and use of serious games in business education. Therefore, the specific research questions that this study tries to answer is as following:

1. How does seriousness and playfulness affect motivation and learning outcomes in game-based learning process?
2. What are the antecedents of seriousness and playfulness in game-based learning process?

THEORETICAL BACKGROUND

There are several theoretical research streams that are related to the purpose of this study, which includes the game process model, self-determination theory, and theories related to seriousness and playfulness in serious games. The details of each topic are presented below.

Game Process Models

Garris et al. (2002) suggested an input-process-outcome game model. They pointed out that learner's motivation is the most significant factor in modeling a game process. By stimulating the learner's motivation, instructional games would develop the learner's ability to self-direct and self-motivate, which ultimately leads to achieving the desired outcomes. Their model is summarized with three important points. First, the objective of instructional game studies is to design a game incorporating certain characteristics or features. Second, the game features initiate a game cycle, in which a user judges or reacts to the game features, and then takes actions in the

game system based on user's perception, which is followed by a feedback on the system. After interacting with the game through several game cycles, user would earn the expected learning outcomes. An illustration of this model is presented in Figure 3.

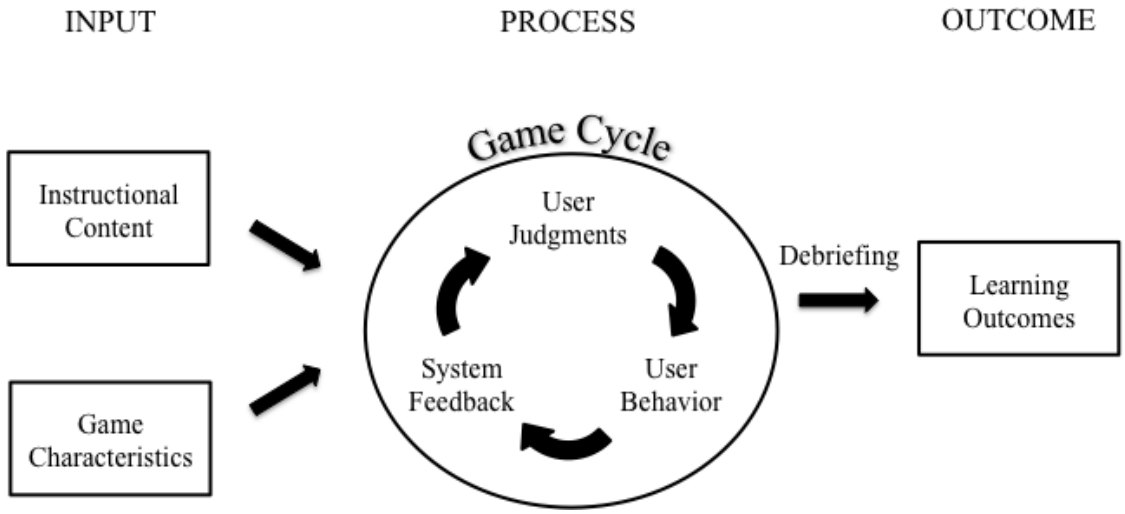


Figure 3. Input-Process-Outcome Game Model (Garris et al., 2002)

Different from the traditional single-trial learning model, Garris et al.'s (2002) perspectives provide a model incorporating multiple trials triggered by a certain game characteristics that are more common when a user uses a game as a learning method. In their view, game play involves repeated judgment-behavior-feedback loops, through which game play itself could increase the user's perceptions of the game. The incorporation of the game cycle is the hallmark of the model, reflecting the defining characteristic of computer game play. This is consistent with learning theories of Dewey (1938) and Kolb et al. (2001), which emphasizes the experiential learning approaches (Garris et al., 2002).

The closed-loop process in game-using education is also identified and suggested by other researchers. Simons (1993) stressed that the educational value of simulation comes from repeated trials. He claimed that the simulation users try different strategies over time, through which they gradually build their understanding of the system. The essence of learning through

games is that players formulate and try various hypotheses, then observe the result until they find the hidden relationships among the elements. Through this process, they can experientially learn the subject topics.

Another model that should be noted is a course performance model suggested by Landers and Callan (2011). Landers and Callan emphasize the properties of instructional games when they are considered for their learning potential. In this sense, they proposed a model incorporating indirect determinants that are mediated by direct determinants to affect course performance. The basis of this model was first proposed by Campbell (1990), who tried to explain the determinants of job performance. For example, in his model, conscientiousness (indirect determinant) is mediated by motivation (direct determinant) to influence job performance (outcome). In addition, Kraiger (2003) emphasized two definitive direct determinants of course performance, including learner trainability and motivation. Landers and Callan (2011) proposed a model incorporating indirect determinants mediated by direct determinants to produce learning outcomes in the context of learning by games as illustrated in Figure 4.

One thing that needs to be pointed out in the model is not all indirect determinants are connected to the direct determinants. For example, Fun and enjoyment affects only motivation in their model. This implies that the entertaining element of the instructional game only stimulates a learner's willingness to play the game repeatedly, but does not affect the effectiveness of their learning subject. For example, a fun game would encourage a learner to engage with the game more, thus enhancing their motivation to play more and subsequently learn more. Enhanced motivation would lead to better understanding of the learning outcomes, as intended.

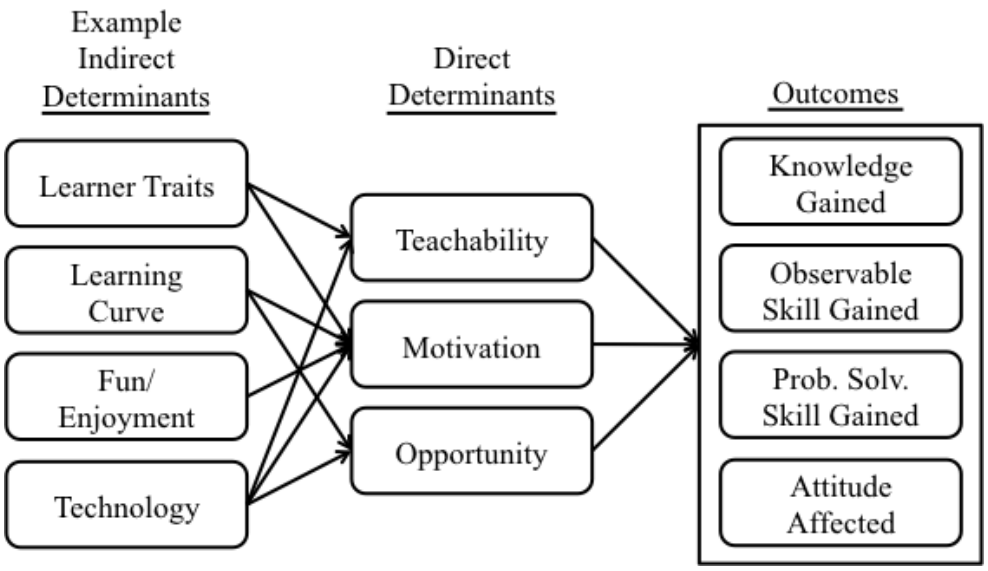


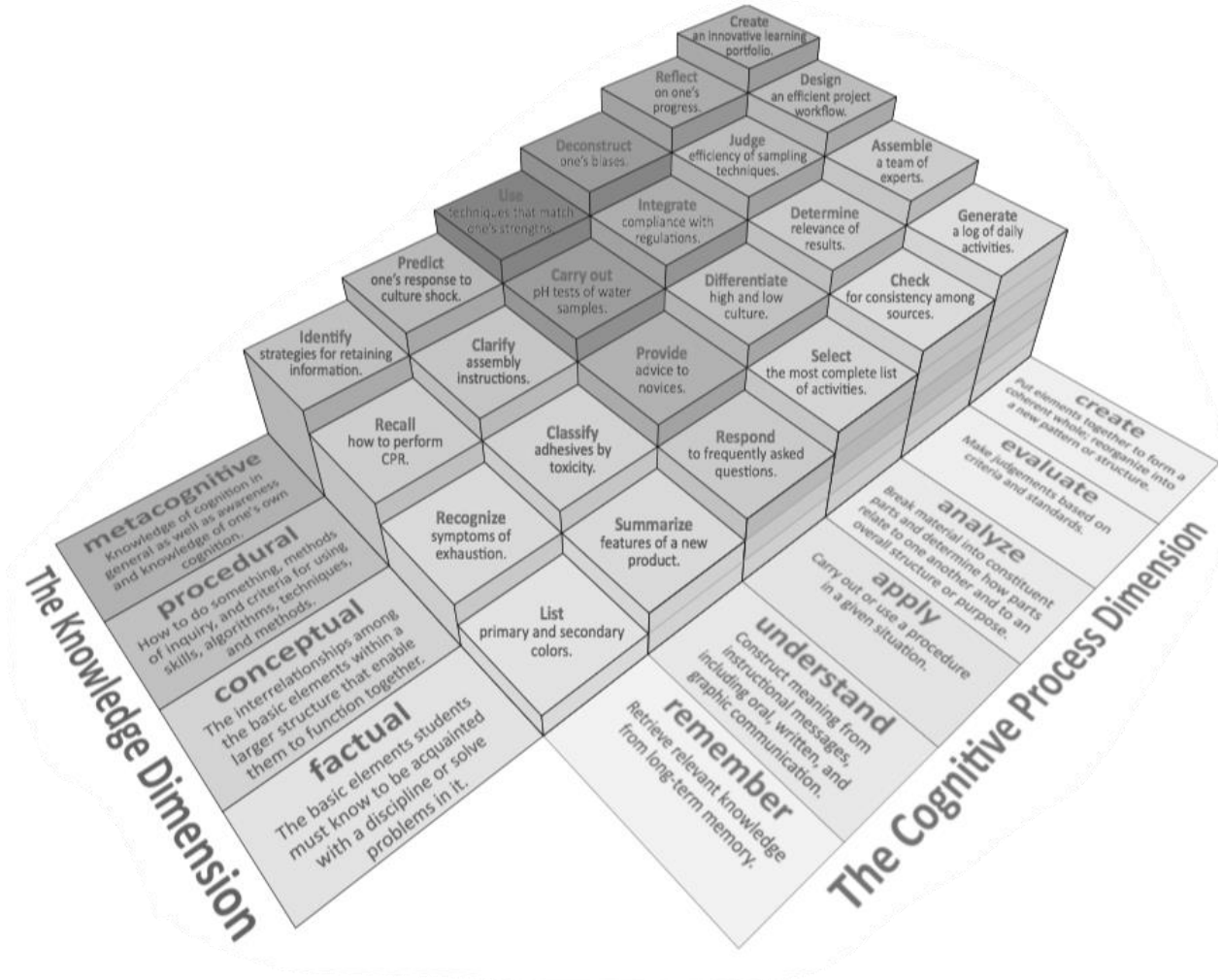
Figure 4. Course Performance Model (Landers & Callan, 2011)

Self-Determination Theory

As it was mentioned in the previous section, motivation is a significant element in the learning process and is considered an important part of educational theory. Studies have shown that motivations (both intrinsic and extrinsic, which will be discussed more in the next section) are positively correlated to academic achievement (Lepper et al., 2005; Harter & Connell, 1984; Henderlong & Lepper, 1997; Barron & Harackiewicz, 2001; Harackiewicz et al., 2002; Schunk et al., 2008). One of the biggest challenges that instructors encounter is teaching learners who feel that learning is a boring and unpleasant activity (Malone & Lepper, 1987). Motivating students so they feel excited about learning and engaging in the learning process is critically important to achieving successful learning outcomes.

Anderson and Krathwohl (2001) proposed one model of learning objectives. Revised from the original model of Bloom (1956), the model distinguishes different levels of intellectual behavior in learning. As it is illustrated in Figure 5, the ability to achieve higher levels of learning objectives is related to a learner's autonomous learning efforts. This is where a learner's

motivation comes in to play. Self-determination theory (SDT; Deci & Ryan, 1985; 1991; Ryan, 1995; Ryan & Deci, 2000) indicated that people have tendency to behave in accordance with their needs and fulfillment of the needs. According to SDT in educational perspective, learning could be influenced by the learner's motivations to achieve psychological growth of self, which are adjusted by educational environments. In this sense, Deci and Ryan (1985) claimed that there are basically two types of motivation that drive people to do an activity: intrinsic motivation and extrinsic motivation. Hence, many research concerned about the factors that promote people's motivation, especially in educational perspective.



(Source: http://www.celt.iastate.edu/teaching-resources/effective-practice/revised-blooms-taxonomy/)

Figure 5. Revised Bloom's Learning Objectives

Types of Motivation

The traditional view of motivation suggests that motivation is a unitary phenomenon. However, people may have different levels of motivation as well as different types of motivation (Ryan & Deci, 2000). SDT researchers have found that there are largely two types of motivation, namely, intrinsic motivation and extrinsic motivation (Deci & Ryan, 1985). Intrinsic motivation refers to doing something because of inherent interest or enjoyment, whereas extrinsic motivation refers to doing something by expecting a separable outcome (Ryan & Deci, 2000). More details about the two types of motivation follow.

Intrinsic Motivation: Ryan and Deci (2000) defined intrinsic motivation as "the doing of an activity for its inherent satisfactions rather than for some separable consequences. (p. 56)" Intrinsically motivated person does an activity pursuing the fun or enjoyment innate in the activity. First discovered by White (1959), the intrinsic motivation phenomenon has been studied to explain human behaviors. Unlike Skinner's (1953) operant theory, which claims all behaviors are motivated by rewards, perspectives from Hull's (1943) learning theory, which asserts all behaviors are motivated by physiological drives, support researchers effort to find the human's psychological needs satisfied by intrinsically motivated behaviors (Ryan & Deci, 2000).

With the assumption that intrinsic motivation exists, past research as largely focused on exploring conditions that elicit, sustain, and enhance intrinsic motivation as well as those that subdue or diminish it (Ryan & Deci, 2000). Cognitive Evaluation Theory (CET), which is a subtheory of SDT, presented by Deci and Ryan (1985) identifies the factors in social contexts producing variability in intrinsic motivation. In CET, social contexts (e.g. interpersonal events and structures) that yield feelings of competence can increase intrinsic motivation (Ryan & Deci, 2000). Thus, conditions such as properly challenging and effective feedback can facilitate intrinsic motivation. Furthermore, CET specifies that a sense of autonomy (also termed as

internal perceived locus of causality) accompanied with feeling of competence is important to enhance intrinsic motivation (Ryan & Deci, 2000). Simply put, people are intrinsically motivated when they feel satisfaction with competence and autonomy.

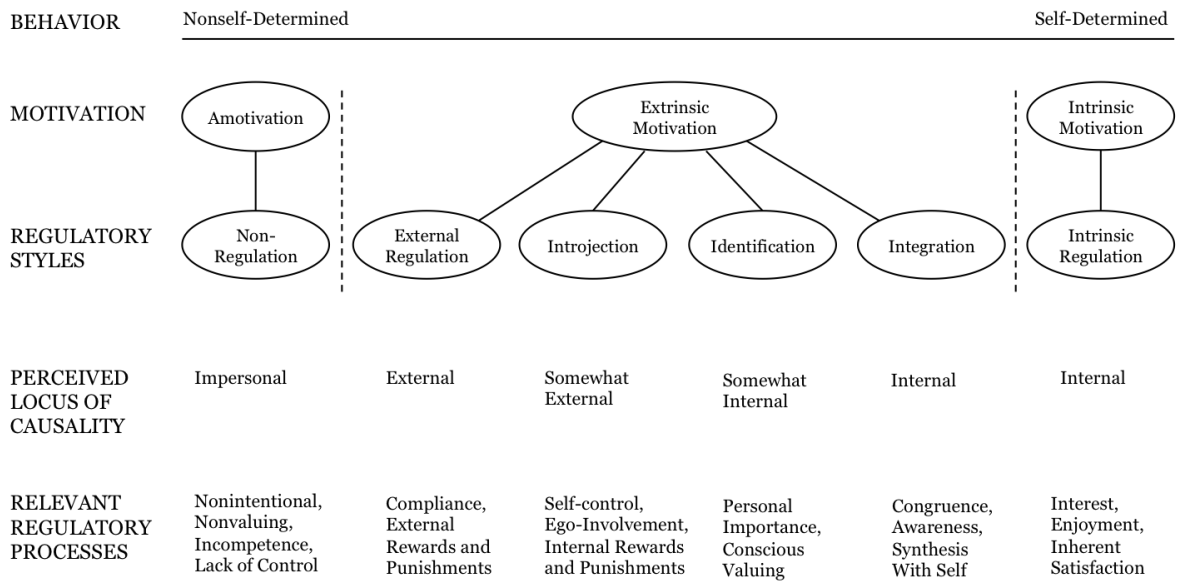


Figure 6. Taxonomy of human motivation (Ryan & Deci, 2000)

Extrinsic Motivation: Extrinsic motivation is defined as "a construct that pertains whenever an activity is done in order to attain some separable outcome." (Ryan & Deci, 2000, p. 60) It focuses on the external value expected by doing an activity, which is contrasted to intrinsic motivation that focuses on the enjoyment from doing the activity itself. SDT suggests that, unlike intrinsic motivation, extrinsic motivation varies based on the degrees of autonomy (Ryan & Deci, 2000). A student may study a subject expecting different rewards. It might be a teacher's praise, or good grade, or even a good job in the future. These are associated with a different degree of autonomy. In SDT research, it is termed as the internalization and integration of values and behavioral regulations (Deci & Ryan, 1985). Internalization refers to the process of taking in a value or regulation, whereas integration refers to the process of transforming the regulation into their own sense. Based on the degree of internalization and integration, external motivation can

be divided into several different forms (Deci & Ryan, 1985). As illustrated in Figure 6, the types of motivation are on a continuum of the extent to which the motivation for one's behavior emanates from one's self (Ryan & Deci, 2000).

Motivation in Education

One of the biggest issues in research related to motivation is whether motivation would affect students' performance, and if so, how could we foster motivation in educational settings. SDT has been widely adopted to explain the role of motivation in the classroom. Basically SDT suggests that the high-level of educational achievements result from being intrinsically motivated and internalizing values and regulatory processes (Deci et al., 1991). Assuming that the ultimate goal of education in any discipline is to make learners understand a subject matter conceptually and use the acquired knowledge flexibly, the best way to achieve this goal is to let a learner feel good about oneself and act volitionally to satisfy their own needs while learning. In this sense, the high quality learning would occur when optimal conditions exist to promote one's motivation for personal growth and adjustment (Deci et al., 1991).

Past research shows that there is strong relationship between intrinsic motivation and academic achievement (Pintrich & De Groot, 1990; Gottfried, 1985; 1990; Harter & Cornell, 1984; Henderiong & Lepper, 1997; Lloyd & Barennlatt, 1984; Lepper et al., 2005). Specifically, studies emphasize the importance of autonomous motivation in education (Reeve, 2002). In other words, it has been shown that the level of a learner's motivation, especially intrinsic motivation, influences their academic achievement. In addition, it is also argued that a learner's motivation can be influenced by external conditions, such as student-teacher relationship (Eccles & Midgley, 1989). Therefore, in order to enhance learning outcomes, it would be productive to positively influence the students' intrinsic motivation, leveraging their external conditions to help influence where possible. By and large, there are four types of intrinsic motivation relevant

to educational settings, namely, challenge, curiosity, independent mastery, and focused immersion. Each is briefly discussed below.

First, *challenge* is a type of intrinsic motivation refers to the learner's desire to engage in challenging tasks rather than easy works (Harter, 1981; Lepper et al., 2005). If an activity is too easy or too difficult, the intrinsic motivation of a learner is compromised. Thus, an activity with the "right" level of challenge would lead to the highest level of intrinsic motivation. In addition, in order to be challenging, an activity must provide some level of uncertainty that the activity can be successfully completed (Eifferman, 1974; Kagan, 1972; Malone & Lepper 1987). Second, *curiosity* refers to a learner's bias towards personal interest (i.e., intrinsic motivation) rather than on pleasing the teacher and/or getting a good grade, that is, extrinsic motivation (Harter, 1981; Lepper et al., 2005). Curiosity is enhanced when an optimal level of information complexity is achieved (Berlyne, 1960; 1965), or when an optimal level of discrepancy between current knowledge and expectation is achieved (Hunt, 1961; 1965; Kagan, 1972; Piaget, 1951; 1952). Curiosity is known that most direct intrinsic motivation for learning (Malone & Lepper, 1987). Curiosity is similar to challenge, except that challenge assumes some level of self-esteem (Malone & Lepper, 1987). Third, *independent mastery* refers to the learner's desire to master a task independently rather than depending on the teacher for guidance and direction (Harter, 1981; Lepper et al., 2005). Self-confidence, largely influenced by independent achievement (Bandura et al, 1975) is closely related to intrinsic motivation. *Focused immersion* is an outcome of intrinsic motivation that refers to a total engagement in an activity so other attentional demands are ignored (Agarwal & Karahannal, 2000), which is closely related to the concept of flow (Cscikszentmihalyi, 1990). Flow is defined as "the state in which people are so involved in an activity that nothing else seems to matter" (p.4, Cscikszentmihalyi, 1990). Focused

immersion, like cognitive absorption, is a result of intrinsic motivation that leads people to state of deep involvement (Vallerand, 1997; Agarwal & Karahannal, 2000).

On the other hand, research show that extrinsic motivation has relatively weak but positively related to academic outcomes (Barron & Harackiewicz, 2001; Elliot & McGregor, 2001; Harackiewicz et al., 2002; Lepper et al., 2005). Self-Determination Theory leaves open the possibility that a learner can internalize their extrinsic motivating factors in a way that influences their determination to engage in a learning activity (Rigby et al., 1992, Ryan et al., 1992). By and large, there are three types of extrinsic motivation relevant to an educational environment: external regulation, introjected regulation, and identified regulation (Reeve, 2002). First, *external regulation* is a motivation caused by an environmental event (e.g. rewards, pressures, and constraints). For example, if a student does an assignment because s/he wants to get a good grade in the course, it would be an example of external regulation. Second, *introjected regulation* is a motivation that occurs when a person reflects on another's beliefs, but does not truly accept them as their own. For example, a student may complete an assignment because her teacher indicates that "good students will complete this assignment," even if the student does not find value in doing the assignment. Lastly, *identified regulation* is a motivation that occurs when a person accepts the value of the external belief because s/he finds value in it. For example, a student will complete an assignment if s/he thinks that doing the assignment will help her/his achieve an important goal that s/he sets such as getting a good job. It is the most internalized form of extrinsic motivation. However, the stimuli of the behaviors are still from outside of oneself, such as external rewards, teacher's advice, or future goals, etc.

Seriousness and Playfulness in Business Simulation Game

By definition, serious games have features that are designed to incorporate a certain level of seriousness. At the same time, serious games should also incorporate elements of playfulness to

make participants feel enjoyment or fun. At first glance, it might seem contradicting that the two elements coexist in the game. For instance, Huizinga (1955) argued that play is essentially not a serious activity. Nonetheless, his argument needs to be reinterpreted (Rodriguez, 2006). In fact, Huizinga claimed that most serous pursuits have playful characteristics. In a similar context, Riezler (1941) stated that playfulness is not the mere reversal of seriousness. Ruch et al. (1997) suggest that state-seriousness is understood as a unipolar concept rather than the opposite of playfulness or other similar concepts. Seriousness and playfulness features may exist at the same time in a game, yet they each serve different purposes. To build a serious game, both elements are essential. By balancing the seriousness and playfulness, instructors who use serious games in their course could achieve better learning outcomes.

Seriousness

The concept of seriousness has been considered necessary but often neglected in education (Wilson, 1998). If a student doesn't feel serious about school, s/he would lose interest in school and, consequently, not pay attention to school activities. If a student feels serious about school, s/he will realize the importance of school activities and will put more effort into them. With serious attitude, a student concentrates, pays attention, and becomes a "good learner,", hence will learn (Wilson, 1998). For example, a student's serious attitude towards a mathematics test will affect their test performance (Park, 2003; Biggs, 1996).

Under conditions of seriousness, one would be "earnest, committed, wholehearted, and sincere, not superficial or pretending." (p.145, Wilson, 1998) Seriousness is closely related to setting individual disciplines and monitoring everyday behaviors (Wilson, 1998). Therefore, heightened levels of a learner's seriousness will lead to heightened awareness and effort to seek the most effective outcom. Ruch (1990; 1993) first tried to conceptualize the seriousness in his work through the emotion of exhilaration. He found that seriousness should be included as a factor of

human psychological status. Six facets of the concept of seriousness are identified (Ruch et al., 1996) as summarized in Table 4.

Table 4. Elements of seriousness

Element of seriousness	Description
Prevalence	"Prevalence of serious states"
Earnest	"A perception of even everyday happenings as important and considering them thoroughly and intensively (rather than treating them superficially)"
Readiness	"The tendency to plan ahead and set long-range goals (and attaining the closest possible harmony with these goals in every action and decision)"
Rationale	"The tendency to prefer activities for which concrete, rational reasons can be produced (thereby considering activities which don't have a specific goal as a waste of time and nonsense)
Sober	"The preference for a sober, object-oriented communication style (for example, saying exactly what one means without exaggeration or ironic/sarcastic undertones)"
Humorless	"Humorless attitude about cheerfulness-related behavior, roles, persons, stimuli, situations, and actions"

Basically there are two views of seriousness. The first view is to consider seriousness as a trait (Ruch et al., 1997). In this view, those who have a high-level of trait-seriousness perceive everything as important and will be thorough and intense in their consideration. The trait-seriousness is related to one's set of mind to accept her surroundings to the extent of significance. Thus, trait seriousness is represented by one's habitual feelings/actions towards events repeated happen.

On the other hand, there are perspectives to understand seriousness as a state (Ruch et al., 1997). In this view, seriousness is described as a person's readiness to behave seriously. Someone who has a high-level state-seriousness is characterized as "attentive, immersed in deep thought, involved in something perceived as really important, applies a sober or objective perspective or style, is earnest in purpose, and mentally set for levity or amusement. (Ruch et al., 1997, p. 478)" This state-seriousness is more closely related to the perceived seriousness towards an event or

object. In this sense, in this study, seriousness is defined as a user's perception to the extent that she thinks about the game in serious aspects.

Playfulness

As it was already mentioned in the earlier chapter, play is assumed to be an element that exists in all games, by definition. Indeed, play and game almost always come together, as we refer to game participation as play (Makedon, 1984). However, not all games are playful. Actually people say some games offer players with high level of playfulness, whereas others with low playfulness. It is also possible that some people feel higher playfulness from a game, while others feel lower playfulness from the same game. Riezler (1941) described a playful attitude is manifested when a player plays within the game itself, never minding pursuing goals inside nor outside the game. Volutariness, spontaneity, and intrinsic worthiness are three important elements of playful game (Makedon, 1984).

Many previous studies have attempted to define playfulness. Similar to the defining game, it is quite controversial to define playfulness. Scholosberg (1947) stated, "the category of playful activity is so loose that it is almost useless for modern psychology." (p.215) However, there have been attempts to identify and characterize the attributes of playfulness for decades. Dewey (1913) defined playfulness as "the capacity to draw satisfaction from the immediate intellectual development of a topic, irrespective of any ulterior motive." (p. 727) Though Lieberman (1977) first claimed that playfulness could be viewed as a unitary concept, she also suggested that there could be multiple dimensions in the concept of playfulness. It is generally accepted that playfulness is a multifaceted construction encompassing factors such as cognitive spontaneity, social spontaneity, physical spontaneity, manifest joy, and sense of humor (Webster & Martocchio, 1992; Barnett, 1991; Lieberman, 1977). For this study, the multifacet perspective of

playfulness is taken as a relevant theoretical framework. In Table 5, elements of playfulness are described.

Table 5. Elements of playfulness

Playfulness dimensions (Lieberman, 1977)		Elements of playfulness dimensions (Barnett, 1990)
Sense of Humor		Joking, teasing, funny, laughs, clowning
Manifest Joy		Expressing enjoyment, demonstrating exuberance, showing enthusiasm, freely expressing emotion, singing/talking
Spontaneity	Physical spontaneity	Coordination b/w movements and activities, physical activeness, active-preferred, frequent runs
	Social spontaneity	Easy response to other's approach, initiating activities, cooperation, leadership role
	Cognitive spontaneity	Inventing own games, using unconventional objects, different character roles, changing activities

Like seriousness concept, playfulness can also be viewed as trait as well as state. In the view of trait-playfulness, playfulness is conceived as that relatively stable characteristic of an individual (Lieberman, 1977; Moon & Kim, 2001). Lieberman (1977) earlier mentioned that playfulness might be accepted not only as part of behavior but also as a personality trait of the individual. Thus, this view emphasizes more on the individual characteristics of personality pursuing enjoyment (Glynn & Webster, 1992).

Another viewpoint is to understand playfulness as a state of mind. Generally a state indicates, "affective or cognitive episodes that are experienced in the short run and fluctuate over time." (p. 203; Webster & Martocchio, 1992) In this view, playfulness is a subjective characteristic of an experience (Ellis, 1973), which may vary depending on the context.

With regards to playfulness in IT usage, Webster and Martocchio's (1992) work is one of the first attempts to investigate the playfulness in the context of microcomputer interaction. They depicted that microcomputer playfulness is a situation-specific individual characteristic, which is

defined as “an individual’s tendency to interact spontaneously, inventively, and imaginatively with microcomputers.” (p. 202) Their approach to playfulness is trait-based view. Yager et al. (1997) examined the several aspect of microcomputer playfulness and found that playfulness is a stable trait. On the other hand, Webster et al. (1993) examined flow in human-computer interaction in which they borrowed many aspects of flow (Csikszentmihalyi, 1991), which is a state-based approach. Moon and Kim (2001) investigated playful use of World Wide Web and defined three dimensions of perceived playfulness, which include concentration, curiosity, and enjoyment.

In summary, the role of intrinsic and extrinsic motivation, and seriousness and playfulness during serious game playing is examined. These factors are believed to strongly influence learning during serious game playing activities. In the next section, a specific research model of this study will be presented based on the theoretical background discussed above.

RESEARCH METHODS

Research Model

Based upon the theoretical framework in the previous section, here I will suggest a theoretical model that focuses on the relationship among the elements that are relevant to the game-based learning process.

Seriousness/Playfulness –Motivation/Game Efforts

Seriousness is defined as the extents of readiness to which a person perceives, acts, or communicates seriously regarding an activity (Ruch et al., 1997). In a high state of seriousness, a person is very attentive, earnest in purpose, perceives things important, and applies an objective perspective. As mentioned in the earlier section, a serious mindset in a student is believed be connected to better learning. With a serious attitude, learners would concentrates, pay attention, and be willing to accept their teacher’s instruction, which consequently helps them learn

(Wilson, 1998). Indeed, there are several previous studies revealing the positive relationship between seriousness and individual performance in the context of learning (Park, 2003; Biggs, 1996; Day & Silverman, 1989).

Game effort in this study is defined as a participant's degree of effort towards playing the serious games in a game-based learning process. It could be the amount of time that a learner spends playing the game, or could be the number of repeated plays. On the other hand, game expertise is defined as the degree of a participant's proficiency in the game as the outcome of playing the serious game. Most serious games are designed so that through the process of game playing, players can gain knowledge on a certain topic and achieve a certain target in the game. Thus, the learner's level of expertise, or proficiency in the game will be measured by their game performance (e.g., score).

The relationship between seriousness and performance in a certain task is mediated by extrinsic motivation. As suggested in Landers and Callan's (2001) model, motivation mediates the indirect determinant's effect on learning outcomes. Seriousness, one of the potential elements to influence the learning outcome, may increase individual's motivation, especially extrinsic motivation, because having a serious mindset towards a certain task will lead one to focus on the benefits that can be obtained by doing the task. Also, increased extrinsic motivation will ultimately enhance the learning outcome. For example, if a student is serious about certain activities in a course, s/he would seek what s/he can gain from doing those activities, which consequently evokes her extrinsic motivation to keep doing the required tasks. In a game-based learning process, if a learner feels serious about the game, s/he would think about the benefits from playing the game as well as actually spend more time playing the game than those who are not serious about the game.

This reasoning leads to the following hypotheses:

H1a: Perceived seriousness has a positive effect on a learner's extrinsic motivation during the game-based learning process.

H1b: Perceived seriousness has a positive effect on a learner's efforts expended during the game-based learning process.

Playfulness in some past research (e.g., Moon & Kim, 2001) embraces the concepts of concentration, enjoyment and curiosity. However, after careful consideration, it is believed that the concept of concentration is more similar to immersion or flow (Csikszentmihalyi, 1991; Fu et al., 2009), which is somewhat different from definition of playfulness from the steam of studies that focus on the dimension of intrinsic interest, voluntariness, spontaneity in playfulness of serious games (Riezler, 1941; Makedon, 1984). Hence, for the purpose of this study, playfulness is assumed to include only a learner's perceived enjoyment and curiosity towards an activity. Playfulness is one of direct drives for intrinsic motivation. Given that intrinsic motivation requires an individual's satisfaction of psychological innate needs (Ryan & Deci, 2000), high playfulness could be a trigger for one's intrinsic motivation. It is shown that playfulness is one of the precedencies for intrinsically motivated without extrinsic rewards (Harter, 1978). Without fun element, a game would hardly attract people to play. Reversely, a playful game would easily motivate players to play repeatedly. Hence, playfulness of game will be closely related to intrinsic motivation as well as game efforts in the game-based learning process.

This reasoning leads to the following hypotheses:

H2a: Perceived playfulness has a positive effect on a learner's intrinsic motivation during the game-based learning process.

H2b: Perceived playfulness has a positive effect on a learner's efforts expended during the game-based learning process.

As mentioned in the previous section, game-based learning is a cyclical process, in which players' past game playing behaviors could affect their cognition toward their next game playing behavior (Garris et al., 2002). Once players begins playing game, they would gain their own perceptions toward the game, which could be shifted as they repeatedly play the game. Especially given that motivations, whether intrinsic or extrinsic, are personal determination of actions based on the fulfillment of human psychological needs (Deci et al., 1991), it could be possible that the experience with the game affect the player's motivation. Indeed, some motivation theories (e.g., Harter, 1981) claim the recurring motivation process between mastery attempts and motivation. That is, the repeated attempts to improve performance during game playing would affect player's motivation to play the game itself.

This reasoning leads to the following hypotheses:

H3a: Game effort has a positive effect on a learner's extrinsic motivation during the game-based learning process.

H3b: Game effort has a positive effect on a learner's intrinsic motivation during the game-based learning process.

Motivation/Efforts – Game Expertise

It is considered that high motivation generally yields better performance (Ryan, 1995; Vallerand et al., 1997). Previous literature suggests that there is a significant connection between intrinsic motivation and performance (Tauer & Harackiewicz, 2004). When people are intrinsically motivated, they focus on the task, by which they earn better skills to produce a favorable performance level. Therefore, intrinsic motivation is generally considered as an important locus

for performance, especially in the long term (Tauer & Harackiewicz, 2004). Thus, in the game-based learning process, intrinsic motivation would be related to the player's game expertise.

It is know that the degree of influence of extrinsic motivation on performance is relatively less than intrinsic motivation (Harlow et al., 1950; Amabile, 1979; Deci, 1975; Harackiewicz et al, 1984; Lepper et al., 1973), especially in the learning process (Deci et al., 1999; Deci & Ryan, 1991). However, studies claim that extrinsic motivation also plays a role in learning to some degrees (Van Etten et al., 1998; Lin et al., 2001).

This reasoning leads to the following hypotheses:

H4a: A learner's extrinsic motivation has a positive effect on their level of game expertise during the game-based learning process.

H4b: A learner's intrinsic motivation has a positive effect on their level of game expertise during the game-based learning process.

In addition, as a player repeatedly plays a serious game, she would get familiar with the game, including game scenarios, background, control, and so on. Thus, repeated game playing would enhance player's skills level, which will consequently increase the player's game expertise (Bandura, 1994).

This reasoning leads to the following hypothesis:

H4c: A learner's effort expended in the game has a positive effect on their game expertise during the game-based learning process.

Game Performance – Learning Outcome

The ultimate goal of using serious games in any educational settings is not only to maximize the learners' performance in the game but also to maximize the learning outcomes on the topic that the game deals with. Gagné and his colleagues suggested three different domains of learning outcomes: cognitive, affective, and psychomotor (Gagné, 1965; Gagné et al., 2005; Gagné &

Driscoll, 1988; Gagné & Medsker, 1996). He also suggested five major categories of learning outcomes, including verbal information, intellectual skills, cognitive strategies, attitudes, and motor skills, all of which are highly recognized as essential requirements in the recent business education. At the same time, they all can be acquired through serious games. O'Neil et al. (2005) classified the learning outcomes that could be attained by video games based on Kirkpatrick's (1994) and Baker and Mayer's (1999) model of learning. As a result, they concluded that, in addition to cognitive aspects, it is necessary to include affective/motivational aspects in the learning outcomes for games. As it has been pointed out in previous research (Garris et al., 2002; O'Neail et al., 2005), games themselves are neither sufficient for learning nor could be the final destination of using games in education. Instead, learning outcomes related to the subject topics should be the ultimate goal of using serious games in education. Hence, it is important to incorporate the learning outcomes into the game-based learning process.

At the same time, learners' performance in the games used in the educational context would be an indicator of how well they understands the topic. For example, when a serious game is used in an operations management course, the ultimate goal for using a game is to help students improve their understanding of operations management, and their ability to perform analysis, solve problems and make decisions. By playing the game, their operations management competencies would be strengthened, which would be reflected by their performance in the game. Following reasoning, it would be asserted that game performance is closely related to the learning outcomes in the game-based learning process.

This reasoning leads to the following hypothesis:

> H5: A learner's game performance has a positive effect on their learning outcome during the game-based learning process.

Antecedents of Seriousness

There are several factors that could affect the perceived seriousness in the context of game-based learning process. Those factors include usefulness, reality, clear rule, and competition. First, from previous studies of technology adoption, perceived usefulness is considered a strong antecedent of a person's attitude toward using a technology (Davis et al., 1989; 1992; Venkatesh, 2000). Given that seriousness is more related to one's logical thinking than emotional feeling, degree of seriousness toward a game would be more influenced by the degree of user's perception of usefulness on the game. Along with Davis et al.'s (1992) notion that usefulness is an extrinsic source of motivation, the relationship between usefulness and extrinsic motivation would be mediated by user's perceived seriousness.

This reasoning leads to the following hypothesis:

> H6a: A learner's perceived usefulness has a positive effect on their perceived seriousness during the game-based learning process.

Second, user's perception that a simulation game is similar to real world could be another factor that affects the perceived seriousness towards the game. Reality is a characteristic of serious games that is compared to fantasy in game. Fantasy in games provides a fulfillment of wishes of users in a vicarious way. Games, especially entertaining games, can make players satisfied by enabling them to do something that is hardly done in the real world, such as flying in the sky, controlling a spaceship, killing monsters, etc. (Malone, 1981) However, when it comes to serious game, fantasy should be tempered by realism, which means that it should be as relevant to real world practice as possible. Several previous studies show that students experience higher motivation and better performance with increased reality of computerized learning system (Huang et al., 2010; McMahan et al., 2012). Accordingly, users would feel serious and be more

concerned about games that they perceive more realistic when they want to learn something from the games.

This reasoning leads to the following hypothesis:

H6b: A learner's perceived reality has a positive effect on their perceived seriousness during the game-based learning process.

Third, clear rule in serious games would be related to the seriousness. Every game has its own rules or guidelines consisting of a small world within the game (Lindley, 2003; Narayanasamy et al., 2006). Users who are willing to play a game need to learn the game rules and make them understood. However, not every rule is explicitly stated in the game. Moreover, not every rule is explained before the game start. Many times players learn game rules implicitly while they are playing, which is a phenomenon we call the game-play gestalt (Lindley, 2003; Narayanasamy et al., 2006). Players would feel better when the rules in a game are clear and acceptable. By understanding the rules, a player would think the game is reasonable and significant.

This reasoning leads to the following hypothesis:

H6c: A learner's perceived clearness of rules has a positive effect on their perceived seriousness during the game-based learning.

Lastly, competition in game playing would influence the seriousness. Many games provide at least some degrees of competition. With competition, players try to outperform the other players (e.g., classmates) who play the same game. Liu et al. (2013) revealed that the level of competition in a game could affect a player's behavior and emotional response. Following this reasoning, one would expect that higher competition would make players feel more serious about the game.

This reasoning leads to the following hypothesis:

H6d: A learner's perceived competition has a positive effect on their perceived seriousness during the game-based learning process.

Antecedents of Playfulness

It should be also noted there are factors affecting perceived playfulness in the game-based learning process, which include ease of use, challenge, feedback, and previous experience. First, perceived ease of use is well known to influence user's intrinsic interest in technology (Davis et al., 1989; Venkatesh, 2000). Perceived ease of use has been related to the enjoyment of interacting with information technology (Moon & Kim 2001). Although Venkatesh (2000) modeled that computer playfulness (or intrinsic motivation) influences perceived ease of use in the context of TAM (Technology Acceptance Model), he actually noted that it is plausible that perceived ease of use is a determinant of computer playfulness.

This reasoning leads to the following hypothesis:

H7a: A learner's perceived ease of use has a positive effect on their perceived playfulness during the game-based learning process.

Second, an appropriate amount of challenge would influence playfulness in the game-based learning. It is known that human beings will pursue an activity through which they can develop competence and feeling of efficacy (White,1959; Piaget, 1951). People will have most fun when they play an activity with intermediate level of difficulty and challenge (Malone & Lepper, 1987). People would feel trivial when they do activities that are too easy, whereas they feel frustration when they do activities that are too much difficult. In game-based learning process, players can feel playfulness that is accompanied with a feeling of accomplishment by overcoming embedded challenges. One of the requirements for an activity to be challenging is that it should provide goals that have a certain amount of uncertainty associated with it

(Eifferman, 1974; Kagan, 1972). If one is engaged with a task with a certain outcome, s/he will hardly feel enjoyment from doing the activity.

This reasoning leads to the following hypothesis:

> H7b: A learner's perceived challenge has a positive effect on their perceived playfulness during the game-based learning.

Third, feedback on performance could be important for playfulness in serious games. It should provide a performance feedback to keep one's self-esteem regarding an activity (Malone & Lepper, 1987). Feedback is essential for a person to learn from an activity and keep doing it. Without a proper feedback regarding performance, a learner may easily lose their interest in the activity. In the context of learning, it is necessary for a learner to receive feedback on their learning not only from the game itself, but also from trainers, observers, and peers (Kraiger, 2003). Many games are designed to provide some amount of feedbacks to players. However, the appropriateness of feedback that a player perceives could be different based on the timing, frequency, amount, and quality of feedback.

This reasoning leads to the following hypothesis:

> H7c: A learner's perceived appropriateness of feedbacks has a positive effect on their perceived playfulness in the game-based learning process.

Lastly, a user's past experience with a similar games would influence the perceived playfulness. In Technology Acceptance theory, it is shown that the experience with technology would affect ease of use (Venkatesh & Davis, 1996; Venkatesh, 2000). As the experience with a technology increases, user's knowledge about the technology also increases, which escalates the user's ease of use toward the technology. Increasing experience contributes perceived ease of use to reflect the unique attributes of enjoyment (Venkatesh, 2000). Meanwhile, there is a direct relationship

between experience and playfulness in a computer system (Webster & Martocchio, 1992; Hackarth et al., 2003). Usually people feel intimidated when they first interact with a technology. As they get familiarized with the technology, past experience with the technology could reduce the anxiety of players for the game so they feel comfortable and playful with the game.

This reasoning leads to the following hypothesis:

> H7d: A learner's past experience with similar serious games has a positive effect on their perceived playfulness in the game-based learning process.

In sum, an overall research model of this research could be summarized as following Figure 7.

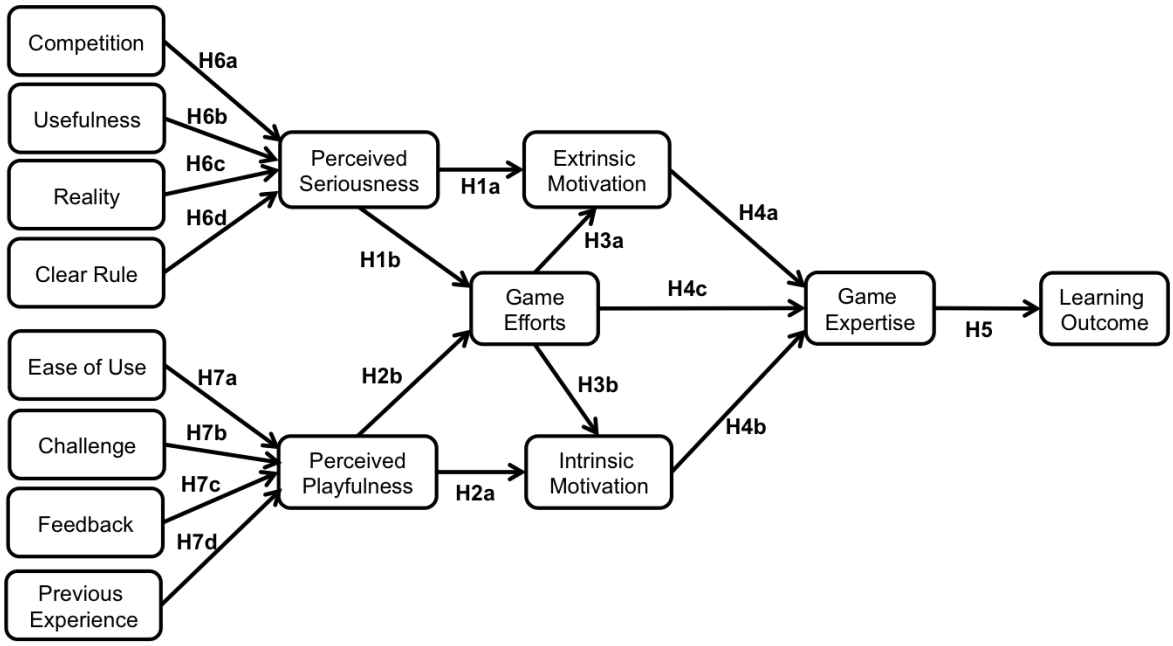


Figure 7. Research Model

Data collection

For a statistical analysis of the proposed model, data for the constructs in the model were obtained from 190 MBA students at a nationally ranked public university. Samples are drawn from students enrolled in the MBA Core operations management courses across for program formats (i.e., Full-time, Professional, Executive, and Online MBA programs) from Spring 2014

to Spring 2015. The course provides nearly identical course materials to all course formats, requiring students to play multiple business simulation games related to the course topics. Typically, five to six, different games are used in the course to help students understand related topics. Among them, three games that are utilized across all four formats and share similar game characteristics are targeted for the survey. All three games are played individually and repeatedly to varying degrees. Due to the course design, game number one was introduced to the students first, followed by game number two. Game number three was always assigned towards the end of the course. After playing each game, students were asked to take surveys measuring the constructs related to the research on a voluntary base. For students who participated in the survey, a small amount of bonus credits was awarded toward their course work (e.g. quizzes, exercises, etc., usually worth 0.1 – 0.5% of total course grade). This motivated most students to complete the surveys in a thoughtful and thorough manner. More details about the sample and serious games used in the course are described in Table 6, Figure 8, and Table 7.

Table 6. Classes and Survey Participants

Semester	Program	Format	Number of survey participants
Spring 2014	Full-time MBA	Traditional face-to-face day classes	48
Summer 2014	Online MBA	100% online, no face-to-face meetings	16
Summer 2014	Executive MBA	Evening classes	17
Fall 2014	Professional MBA	Classes on alternate weekends	40
Spring 2015	Online MBA	100% online, no face-to-face meeting	16
Spring 2015	Full-time MBA	Traditional face-to-face day classes	53
Total			190

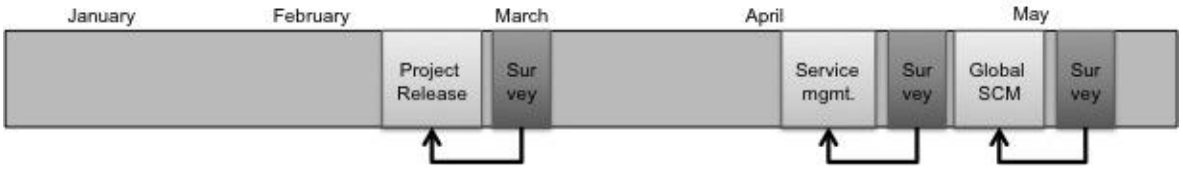


Figure 8. Game & Survey Schedule Example

Table 7. Serious Games Description

Game	Game 1	Game 2	Game 3
Topic Area	Project Management	Process Analysis, Capacity, and Service mgmt.	Supply Chain Design, Demand Forecasting, Resource Allocation, and Production Planning
Learning Objectives	Understand how - the project management levers (scope, resources, and schedule) improve project outcomes and interact each other - project characteristics affect team morale and work quality	- Analyze capacity, demand rates, cycle time, and throughput - Understand how batching strategies improve throughput - Optimize capacity - Minimize demand variabilities	- Create a cost-effective & flexible supply chain - Build flexibility into the supply chain - Evaluate forecasting methods and interpret the dynamics of a forecasting team - Build a production plan base on a demand forecast
Decisions	Individual	Individual	Individual
Competition	Competitive	Competitive	Competitive
Repeatability	Repeatable	Repeatable	Limitedly Repeatable

Based on the research model development, all the constructs and variables are defined and items were prepared for survey. Most of the measurement instruments were adopted from existing literature. After reviewing the instruments, some items were modified to be more suitable to the purpose of the study. The details of the construct definitions and measurement items are summarized in Appendix A.

To maximize the generalizability of the model, almost the same survey format but specifying the context of each game was used across the three surveys. Then all the results across the three surveys were combined and analyzed in the model. Besides the latent constructs related to the

model, individual behaviors, such as game effort, game performance, and learning outcomes were also measured by individual student's game runs, game scores, and the exam scores, respectively.

Analyzing Data

The analysis procedure is consisted of following steps. First, measurement model for the proposed research model will be analyzed to assure the constructs are operationalized by the measurement variables. To do so, the confirmatory factor analysis for the construct is performed to see how the measurement items represent the latent construct. Then a measurement model is examined by using CB-SEM analysis tool. Second, structural model based on the proposed research model is analyzed by using PLS-SEM analysis tool.

Measurement Model

First of all, in order to ensure the constructs used in the research model are tapped correctly by the items, the confirmatory factor analysis (CFA) was conducted for each construct by using SPSS software. The details of CFA results are presented in Appendix B. As a result of the CFA, it is identified that some constructs are multi-dimensional.

With CFA result, a measurement model consisted of all the latent constructs in the study is analyzed through AMOS (ver. 21) software. As a result of several iterations of modifying the measurement model, *Challenge* constructs are dropped due to their instability in the measurement model. All other constructs stay in the model with some items dropped. The detailed information of items dropping is presented in Appendix A. The final result shows that the overall measurement model is acceptable. No items are added or dropped after this final measurement model afterwards. Some information of the measurement model is summarized in Table 8.

Table 8. Measurement Model Summary

Item	Value	Item	Value
Sample size	190	GFI	0.727
Chi-square	1915.061	RMSEA	0.058
CMIN/DF	1.630	RMR	0.046
CFI	0.915	PCFI	0.811

In addition, the construct validity of the model is examined. Table 9 presents the composite reliability (CR), the average variance extracted (AVE), the maximum shared variance (MSV), the average shared variance (ASV), and correlation matrix among the measured constructs. MacKenzie et al. (2011) suggest a number of techniques to assess the validity of measuring constructs in IS and behavioral research. Based on their suggestion, it is generally acceptable when all constructs have CRs above 0.7 to ensure reliability of measurements. To check convergent validity, it is recommended to have AVEs above 0.5 (MacKenzie et al., 2011; Malhotra & Dash, 2010). Also, to have discriminant validity, all MSV and ASV should be less than AVE of the constructs as well as square root of AVEs greater than inter-construct correlations, which are in bold on the diagonal (MacKenzie et al., 2011; Fornell & Larcker, 1981; Hair et al., 2010). While examining all the values of the measurement model in the table, no issues are detected for all criteria, thus ensuring construct validity.

In addition, all survey participants' game effort, game performance, and learning outcomes are measured for the behavioral items in the model. For measuring game effort, the number of repeated game runs of the participants are counted for all three games and standardized within each class and averaged. By standardizing the measurement within the class, it can control for the difference among the class environments.

Table 9. Construct validity for measurement model

	CR	AVE	MSV	ASV	Playfulness	Seriousness	Extrinsic Motivation	Intrinsic Motivation	Reality	Feedback	Rule	Previous Experience	Competition	Usefulness	Ease of use	Game effort	Game Expertise	Learning outcome
Playfulness	0.913	0.777	0.676	0.423	**0.881**													
Seriousness	0.910	0.629	0.585	0.252	0.584	**0.793**												
Extrinsic Motivation	0.809	0.590	0.572	0.257	0.636	0.423	**0.768**											
Intrinsic Motivation	0.939	0.836	0.676	0.457	0.822	0.765	0.589	**0.914**										
Reality	0.837	0.632	0.613	0.381	0.582	0.402	0.466	0.702	**0.795**									
Feedback	0.888	0.666	0.650	0.406	0.685	0.499	0.416	0.687	0.776	**0.816**								
Rule	0.915	0.782	0.540	0.313	0.546	0.457	0.327	0.678	0.660	0.735	**0.884**							
Previous Experience	0.855	0.671	0.025	0.009	0.082	0.124	0.158	0.110	0.087	0.090	0.060	**0.819**						
Competition	0.859	0.604	0.540	0.363	0.656	0.607	0.530	0.735	0.673	0.646	0.572	0.051	**0.777**					
Usefulness	0.950	0.863	0.676	0.434	0.822	0.518	0.756	0.728	0.696	0.693	0.522	0.103	0.683	**0.929**				
Ease of use	0.906	0.763	0.650	0.411	0.768	0.379	0.516	0.672	0.783	0.806	0.688	0.014	0.586	0.761	**0.874**			
Game effort	1.000	1.000	1.000	1.000	0.091	0.086	-0.012	0.209	0.098	0.080	0.200	-0.030	0.157	0.013	0.108	**1.000**		
Game Expertise	1.000	1.000	1.000	1.000	0.048	0.179	0.105	0.157	0.147	0.033	0.167	-0.018	0.136	0.094	0.083	0.391	**1.000**	
Learning outcome	1.000	1.000	1.000	1.000	-0.008	0.071	-0.138	0.066	0.109	0.078	0.108	-0.134	0.017	-0.020	-0.028	0.209	0.255	**1.000**

For example, generally students in online MBA program would have less time to spend in course works than other programs because the course is designed as 7-week. In fact, the difference in average runs for game 1 between professional MBA and online MBA is about 22 runs as shown in Table 10. If a raw score of those behavioral measures is used, it might bring a significant bias to data analysis. Instead, by using standardized score within the class, the difference among the class environments is controlled for.

It is also applied to game performance, which is measured by the average of the three game scores standardized within each class. Learning outcomes is measured by the individual participants' overall course grades. The course grade is basically determined by several course grading items, such as quizzes, course participation, exercises, tests, and so on. All the grading was determined by cooperation among the primary instructor and the secondary instructor. In addition, individual students were able to keep track and ask questions about the grading. Hence, the rater bias in grading is minimized. Based on individual student's performance on each grade item, a total course grade is calculated and converted to a standardized score within each class. As a result, the course grade would be used as a well-suitable proxy measure of learning outcomes in a course.

Table 10. Behavioral variables results

Class Format	N	Game 1		Game 2		Game 3		Average Course Grade
		Average Runs	Average Score	Average Runs	Average Score	Average Runs	Average Score	
Full-time	101	76.5	814.5	76.4	688.5	3.4	95.5	89.9
Professional	40	91.2	776.4	90	665.4	1	95.2	92.1
Executive	17	83	755.8	33.3	672	1	94	94.2
On-line	32	69	738	104.2	682.2	2.4	91.4	86.2
Total	190	78.9	788.2	80.4	681.2	2.1	94.6	90.1

Structural Model

To analyze the data obtained from the survey, two approached are considered. First, covariance-based SEM (CB-SEM) is adopted, which is traditionally used for structural analysis of models containing latent constructs (Klein, 2011). According to Hair et al. (2014), CB-SEM is useful to confirm (or reject) existing theories by examining how well a proposed model estimates the covariance matrix from a sample data set. CB-SEM has been widely used in various areas, especially testing, confirming, and/or comparing theories. However, since this technique requires a high standard in theory and data of the model, there are some alternative techniques such as PLS-SEM, which are more suitable than CB-SEM in a certain situation.

Table 11. Comparison between CB-SEM and PLS-SEM

Criteria	CB-SEM	PLS-SEM
Research Goals	- Theory testing, theory confirmation, or comparison of alternative theories	- Predicting key target constructs or identifying key "driver" constructs - Exploratory or an extension of an existing structural theory
Measurement Model Specification	- Formative measures requires accounting for relatively complex and limiting specification rules - Error terms require additional specification, such as covariation	- Formative constructs are part of the structural model
Structural Model	- Works fine with nonrecursive model	- Works fine with complex structural model (many constructs and many indicators)
Data Characteristics	- Data should meet the CB-SEM assumptions exactly such as minimum sample size and the distributional assumptions	- Less restrictive in sample distribution
Model Evaluation	- Provides global goodness-of-fit and test for measurement model invariance	- Provides latent variable scores which can be used in subsequent analyses

Adapted from Hair et al. (2011)

Second, PLS-SEM (Partial Least Squares - Structural Equation Modeling) is also employed to analyze data to test the proposed model. PLS-SEM analyzes direct, indirect, and interaction relationship of structural models consisted of constructs measured by multiple items (Venkatesh, 2000; Hair et al., 2014). It is being used widely in Information Systems research. According to Goodhue et al. (2012), 49% of the path analysis studies published in ISR, JMIS, and MISQ from 2006 to 2010 used PLS analysis. The technique has advantages in developing theories especially in exploratory research due to its robustness against measurement and/or sample size (Hair et al. 2010; Gefen et al. 2011; Hair et al. 2014). A brief comparison between CB-SEM and PLS-SEM is presented in Table 11.

Given that this study is a mixture of confirmation of existing theories (e.g. relationship between intrinsic/extrinsic motivation and effort/performance) and exploration of new theory build-up (e.g. role of seriousness and playfulness in learning process), it would be worthwhile to analyze the proposed model through both CB-SEM and PLS-SEM. By doing so, it is intended to investigate the learning process using serious games in business education context comprehensively. The IBM SPSS Amos 21 and SmartPLS v. 3.2 (Ringle, et al., 2015) software were used for CB-SEM and PLS-SEM statistical analysis purpose, respectively.

Analysis Results

The models below depict the result of analyzing the proposed research model which is intended to investigate the learning process in game-based learning process by CB-SEM and PLS-SEM. Model fit information of CB-SEM analysis is presented in Table 12 below. While some fit indices are shown acceptable, other fit indices are hard to be called good. For example, the goodness-of-fit statistic (GFI) value of the model is 0.685, which is much lower than usual acceptable level of .90 (Hooper et al., 2008). However, because GFI is sensitive to the sample size and the number of parameters in the model, it is recommended to use this statistics with

caution (Diamantopoulos & Siguaw, 2000; Hooper et al., 2008). With a relatively small sample size (n=190) and a large complexity in the model, the proposed model is inevitable to have a low GFI value. As for comparative fit index (CFI) and standardized root mean square residual (SRMR), the model also provides values of 0.883 and 0.089, respectively. They are very close values to the generally accepted thresholds, which are 0.90 for CFI and 0.080 for SRMR, respectively. Hu and Bentler (1999) mentioned that, with a small sample size (i.e., $n \leq 250$), we should consider there is a tendency to overreject true-population models under nonrobustness condition. Therefore, even though this model is very good model fit, it would be hard to call it unacceptable. Moreover, a PLS-SEM analysis will be also looked and compared with CB-SEM result, which would add more interpretation to the model analysis.

Table 12. Structural Model Summary

Item	Value	Item	Value
Sample size	190	CFI	0.883
Chi-square	2407.411	RMSEA	0.065
CMIN/DF	7.425	SRMR	0.089
GFI	0.685	PCFI	0.821

Looking at the path coefficients among the constructs, while some paths are statistically significant and in the same direction as in the proposed model, some are not. Specifically, among the antecedents of seriousness and playfulness, the paths from reality to seriousness and the paths from feedback and previous experience to playfulness are shown insignificant in the analysis result. In addition, paths from both seriousness and playfulness to game efforts, path from game efforts to extrinsic motivation, paths from both extrinsic and intrinsic motivation to game expertise are also shown insignificant. A graphical presentation of the CB-SEM analysis results is shown in Figure 9.

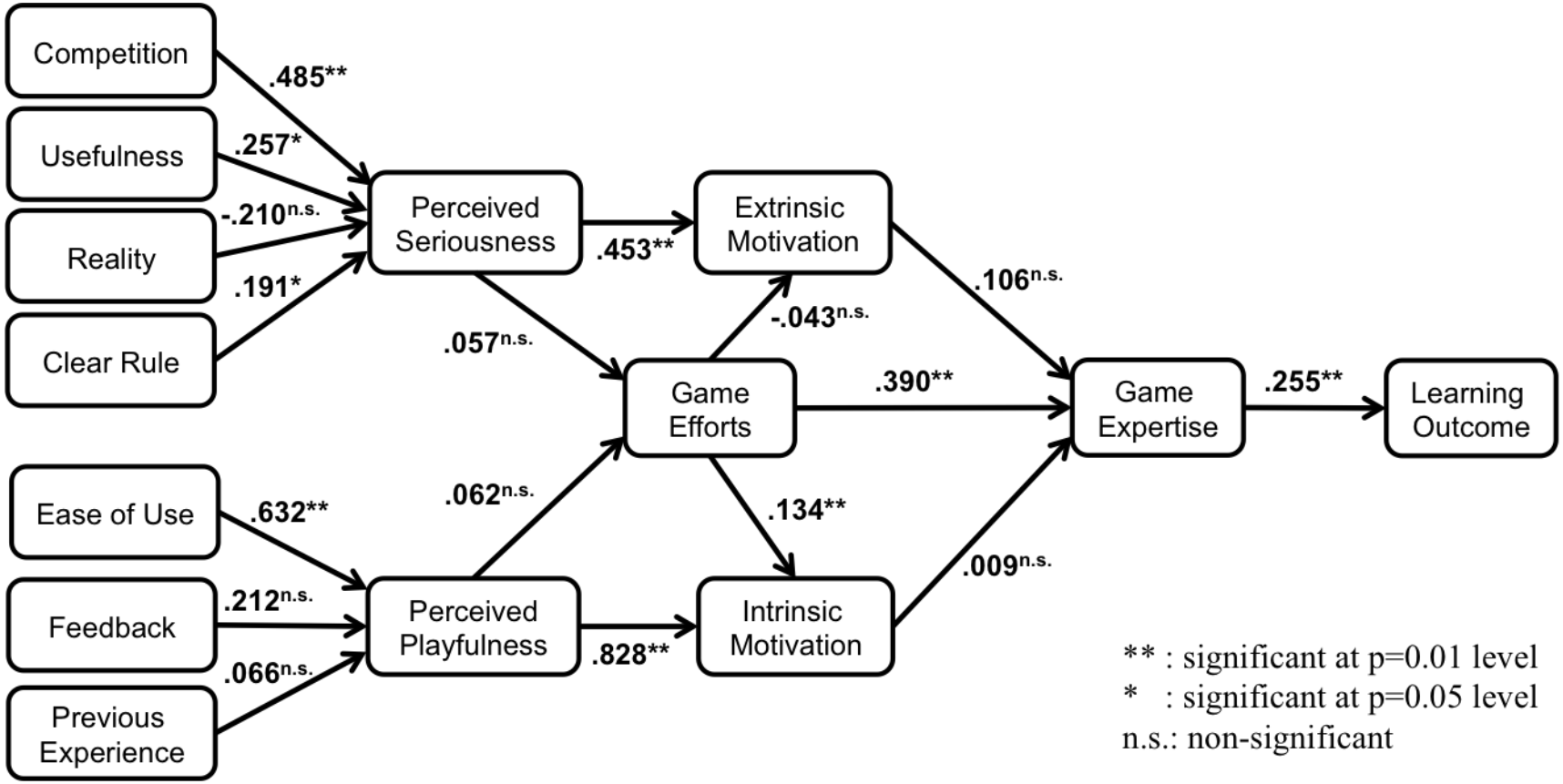


Figure 9. CB-SEM structural analysis result

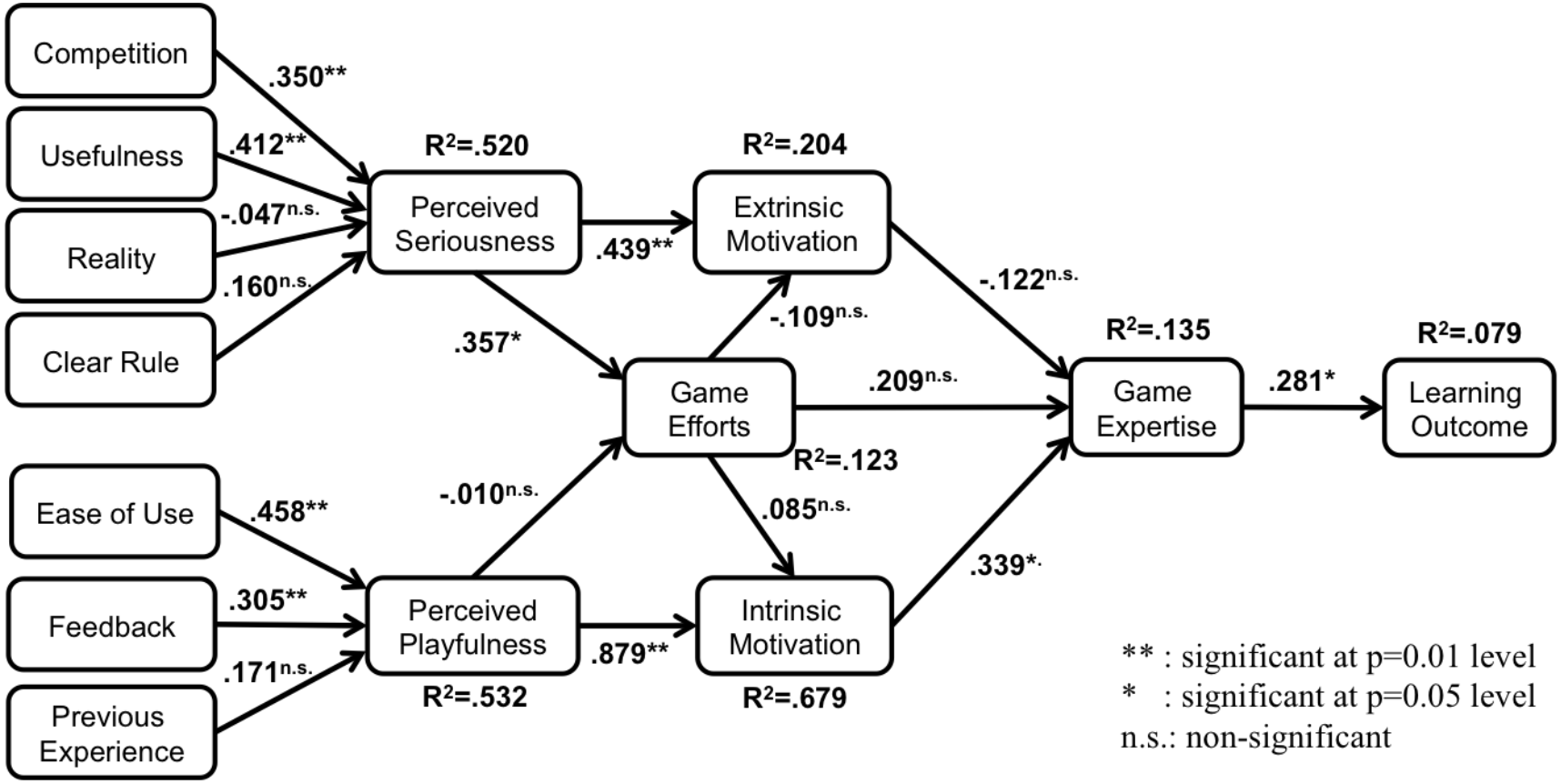


Figure 10. PLS-SEM structural analysis result

To have more understanding of the proposed model, PLS-SEM analysis is also conducted. To obtain path coefficeints and corresponding t-values, the model with the data was run through SmartPLS ver. 3.2 using the bootstrapping method with 1,000 iterations. Similar to the result of CB-SEM, in the result of PLS-SEM analysis, while most of the path coefficients are significant, some appear insignificant.

Specifically, the paths from reality and clear rule to seriousness, and path from previous experience to playfulness are shown insignificant. In addition, the path from playfulness to game efforts, the paths from game efforts to extrinsic motivation, intrinsic motivation, and game expertise, and the path from extrinsic motivation to game expertise appear insignificant in the analysis result, as shown in Figure 10.

This model appears to explain about 52% and 53% of the variance in seriousness and playfulness, respectively. For extrinsic motivation and intrinsic motivation, the model explains about 20% and 68% of the variance. The variances explained by the model for game efforts, game expertise, and learning outcomes were 12.3%, 13.5%, and 7.9%, respectively.

Comparison of CB-SEM and PLS-SEM results

Comparing the results of the CB-SEM and PLS-SEM analyses, it is noticeable that both analyses provide similar results. This is not unusual since both analysis techniques are aimed to estimate an optimal path in a given structural model. Studies have been shown through simulation that the estimation differences between the two statistical methodologies are very small (Reinartz, et al., 2009; Hair et al., 2011).

Looking more specifically at the two analyses results, it is shown in both analyses methods that seriousness and playfulness have strong positive effect on extrinsic motivation and intrinsic motivation, respectively, which support H1a and H2a in the proposed model. Meanwhile, the effect of seriousness on game efforts is mixed. While it is shown insignificant in CB-SEM

analysis, it has significant and strong effect in PLS-SEM analysis, which partially supports H1b. The effect of playfulness on game efforts is insignificant in both analyses, thus fails to support H2b. As for effects of game efforts on extrinsic and intrinsic motivation, in CB-SEM analysis, only the effects on intrinsic motivation is significant, whereas in PLS-SEM both paths are insignificant. Therefore, H3a fails to be supported and H3b is partially supported. The effect of extrinsic motivation on game expertise is shown insignificant in both analyses, which suggest fail to support H4a. For the effect of intrinsic motivation on game expertise, while it has an insignificant and small path coefficient in CB-SEM, it is shown significant and intermediate path coefficient in PLS-SEM, which suggests partial support for H4b. Likewise, the effect of game efforts on game expertise also has mixed result. It is shown significant in CB-SEM, but insignificant in PLS-SEM, thus H4c is partially supported. For both analyses, the path from game expertise to learning outcomes is shown significant although the explained variance is relatively small. Table 13 presents a summary of the results from the both analyses.

DISCUSSIONS

This study aims for exploring the role of perceived seriousness and playfulness in the learning process of participants who actually experience multiple serious games in MBA course. Given that there are increasing interests in use of serious games in education/training context (Brandão et al., 2012; Michael & Chen, 2006), this study tries to identify the cognitive and behavioral mechanisms of learning process in the context of game-based learning. By adopting the existing theories related to the game process and individual motivation, this study found how perceived seriousness and playfulness affect the factors of game-based learning process including extrinsic and intrinsic motivation as well as game efforts and expertise, and ultimately learning outcomes. In addition, some anticipants of seriousness and playfulness were also identified through the analysis.

Table 13. Summary of analysis results

Hypothesis	Analysis result (standardized path coefficient / significance)		Findings
	CB-SEM	PLS-SEM	
H1a	0.453**	0.439**	Supported
H1b	0.057n.s.	0.357*	Partially supported
H2a	0.828**	0.879**	Supported
H2b	0.062n.s.	- 0.010n.s.	Not supported
H3a	- 0.043n.s.	- 0.109n.s.	Not supported
H3b	0.134**	0.085n.s.	Partially supported
H4a	0.106n.s.	- 0.122n.s.	Not supported
H4b	0.009n.s.	0.339*	Partially supported
H4c	0.390**	0.209n.s.	Partially supported
H5	0.255**	0.281*	Supported
H6a	0.485**	0.350**	Supported
H6b	0.257*	0.412**	Supported
H6c	- 0.210n.s.	- 0.047n.s.	Not supported
H6d	0.191*	0.160n.s.	Partially supported
H7a	0.632**	0.458**	Supported
H7b	not tested		
H7c	0.212n.s.	0.305**	Partially supported
H7d	0.066n.s.	0.171n.s.	Not supported
*: $p < 0.05$, **: $p < 0.01$, n.s.: not significant			

By analyzing the data obtained from different class formats using the same business simulation games, it is revealed that seriousness and playfulness play significant roles in game-based learning process. First, seriousness and playfulness strongly affect learners' extrinsic and intrinsic motivation, respectively. That is, the more a learner perceives seriousness about the games used in the class, the more she would feel extrinsic motivation to work on the games. Likewise, more playfulness a learner perceives from a serious game, the more she would have intrinsic motivation to play the game. Therefore, to motivate learners when serious games are

used in learning context, it is required to focus on both seriousness and playfulness at the same time.

Second, the analysis result suggests that it is seriousness rather than playfulness to drive more efforts from learners. It might be interpreted in this way. When students are given to play serious games in the coursework, those who are more serious about the coursework are likely to play the games more frequently. As they play the game over and over, their game skills increase and consequently their game expertise would be enhanced.

Third, comparing the role of extrinsic and intrinsic motivation, it is identified that extrinsic motivation is less effective on learner's behaviors (i.e., game performance) in game-based learning process. Instead, intrinsic motivation is shown to have some effects on game expertise along with game efforts. This is consistent to the previous literatures that claim intrinsic motivation is more effective than extrinsic motivation for learning (Harlow et al., 1950; Amabile, 1979; Deci, 1975; Harackiewicz et al, 1984; Lepper et al., 1973).

Fourth, this study finds several antecedents for perceived seriousness and playfulness in game-based learning process. Specifically, seriousness is highly affected by feeling of competition during game playing as well as usefulness of the game. Given that seriousness is related to learner's concerns about the game, by perceiving they are competing with others, they would give more concerns to the game. Likewise, if a learner perceives the game useful to learn something, she would pay more attention to the game. As for playfulness, ease of use is shown a strong antecedent. As claimed in the previous studies (e.g., Venkatesh, 2000; Hsu & Lu, 2004; Chung & Tan, 2004), players are more likely to feel playful in playing games when they feel it is easy to use or control.

Theoretical Contributions and Implications

This study gives several theoretical contributions to the areas related to game-based learning research in general as well as game motivation research in particular. First, this study suggests a new perspective to investigate game-based learning process. There were numerous attempts to reveal the mechanisms of determination of learners' performance and learning outcomes in the game-based learning process. Many claimed that playfulness is positively related to the performance (Webster & Martocchio 1992; Potosky, 2002). However, few have considered seriousness in the learning process. By identifying the role of playfulness and seriousness in game-based learning process simultaneously, this study sheds light on the comprehensive understanding of how the learners' perception toward educational games can affect their motivational aspects including both intrinsic and extrinsic motivations, as well as behavioral aspects, that is, game efforts and game performance.

Second, this study identifies several antecedents of perceived playfulness and seriousness in game-based learning, which gives contributions to educational game research area. Especially by revealing the factors affecting perceived seriousness, this study provides an expanded perspective regarding the elements of game-based learning process. As Wilson (1998) pointed out, seriousness is an important element in education but has been neglected. This was too the same in game-based learning research. Even though serious games including educational games have obviously serious elements in their design, it is often ignored while only fun part has been focused on. This study would be an initial heads-up to the area concerning the issue and give opportunity for the area to have richness in research.

Third, by revealing the mechanisms of individual perceptions and behaviors in game-based learning process, this study would help instructors who use educational games in their class/training session. Especially, many previous theories of game-based learning focus on

learners' experience "trial-and-error" process to achieve a certain goal (Higgins, 2000; Wideman et al. 2007). However, it is also essential to lead the students to get the goal at a most effective way. As revealed in this study, perceived seriousness and playfulness could be a key to solve the issue. Snow et al. (2002) suggested that different styles of introducing simulation games could make difference in students' attitude and performance. As such, designing games and facilitating class environments to make players feel more serious or playful would increase students' seriousness and playfulness toward the games and consequently enhance the learning effectiveness.

Limitations

As with all research, this study has some limitations. First, this study tries to incorporate game process model (Garris, et al., 2002), which is characterized by a cyclical process of learning through game playing, into research model. By achieving that, the proposed research model includes relationships between game efforts and intrinsic/extrinsic motivations. However, actually, as the surveys are conducted after all the game plays are completed, it is not easy to capture the actual dynamics between the two elements. This might be partly the reason why some paths related to game efforts and intrinsic/extrinsic motivations were not clear in analyses results. In the future study, multiple measurement design during the game-learning process could be used for overcome this limitation.

Second, the study was conducted in a single subject course context even the data was obtained from classes with different formats. All courses in the study have very similar course materials and organizations and taught by the same instructor. Instructional style could give an important influence toward the students' attitude and performance in game-based learning (Whiteley & Faria 1989; Snow et al. 2002). This study didn't capture the difference in instructional styles. In addition, even though this study uses students' data on three different business simulation games,

all three games are in same course topic (i.e., Operations Management). It could possibly change the result if data was gained from different topic areas (e.g., Marketing, Finance, etc.). Future study might consider including different contexts to overcome the limitation.

Third, another limitation lies in measuring behavioral variables. In this study, only one indicator (combined across the three games) each was used to measure behavioral variables, such as game efforts, game performance, and learning outcome. However, these aspects could be measured by multiple instruments for more accuracy. For example, game effort was measured by a single indicator that is the average of the standardized number of runs in the three games. However, there could be different ways to measure students' degree of efforts put on the games, such as the amount of time spent playing the games. Indeed, in PLS-SEM analysis result, the explained variance of the three variables are from about eight to fourteen percent, which is relatively low. In the future research, more diverse measurements could enhance the explaining power.

CHAPTER CONCLUSIONS

Serious games are one of the most interesting areas regarding a new ways of using IT. In this study, through an investigation of game-based learning process that especially focuses on game players' perceived seriousness and playfulness, it is found that both seriousness and playfulness are important elements in game-based learning process. Seriousness plays its role by affecting extrinsic motivation as well as game efforts. On the other hand, playfulness plays its role by affecting intrinsic motivation. Game performance is influenced by game efforts and intrinsic motivation, and ultimately affects learning outcomes in game-based learning process. Recognizing those mechanisms would be crucial in understanding game-based learning and for a better education through serious games.

CHAPTER 4: STUDY II - "EXPLORING PRACTICAL POTENTIALS OF BUSINESS SIMULATION GAMES"

INTRODUCTION TO BUSINESS SIMULATION GAMES IN WORKPLACES

The rapid development of information technology enables innovation in the use of games. Serious games may be the most promising way to introduce games in non-entertainment sectors. Ultimately, such games may allow serious tasks to become pleasurable as well as productive by incorporating both enjoyment and seriousness in the task. Indeed, there are many potential areas where serious games may be applied. Among them, the business sector is one of the most promising areas where games can assume an important role. As Werbach and Hunter (2012) asserted, the use of games in a right way would be a powerful asset for a business organization. Games in business may be used not only to motivate employees, but also to engage customers. A resourceful game may be applied to marketing, productivity enhancement, innovation, customer engagement, human resources, and sustainability (Werbach & Hunter, 2012). New generations, familiar with playing similar games, now enter the business place; as a result, technological games could present effective tools for educating and training a younger workforce (Donovan & Lead, 2012).

Among the various games applied in the business sector, business simulation has become one widely used for both business education and training purposes. A game, solely by its nature, is associated with fun and play. Introduction of a game in the business learning environment allows instructors to engage learners in a more focused fashion, thus encouraging students to spend more time in learning. The rewards are that the learner ultimately absorbs a better understanding of the subject issue, as opposed to traditional methods. Indeed, business simulation games are widely adopted in business education institutes across various areas (Faria, 1998; Faria & Wellington, 2004). Due to an increased use of games in business education, prior studies

investigated various topics related to games in business education and training context (Wells, 1993; Cullingford et al., 1979; Lane, 1995; Faria & Wellington, 2004; Wolfe, 1993; Faria et al., 2009). However, the studies did not address how working professionals might view the value of business simulation games as related to the work environment.

This study will analyze written arguments reported by 43 professional informants, with a focus on applying business simulation games to personal business practices. The study will present the informants with multiple business simulation games, presented in an operations management course of a professional MBA program. The research questions in this study will analyze the data as follows:

1. How do working professionals discursively make sense of the potential connection of business simulation games to real business practice?
2. What kinds of patterns exist in the arguments for or against the potential connection of business simulation games to real business practice?

For an analysis of the informants' arguments, Toulmin's (2003) sensemaking framework will be adapted. Toulmin's sensemaking framework presents an effective tool to deconstruct practical reasoning; this method is implemented in order to capture, analyze, and elicit patterns within the arguments (Berente et al., 2011). By using such a framework, this study identifies the types of sensemaking arguments which relate the value of business simulation games to real business practices. Thus, the patterns of sensemaking are revealed and interpreted.

In the organization of this chapter, I will introduce the theoretical background through the Toulminian lens, which initiates a sensemaking process. Then the description and findings of the qualitative study will be presented. Lastly, discussions and conclusions based on the study findings will follow.

THEORETICAL BACKGROUND

Sensemaking Framework

As Weick et al. (2005) averred, sensemaking is the ongoing process of rationalizing what people are doing. More specifically, it "involves turning circumstances into a situation that is comprehended explicitly in words and that serves as a springboard into action (p. 409, Weick et al., 2005)." Weick (1995) suggested seven properties of sensemaking: (1) identity construction; (2) retrospection; (3) sensible environment interaction; (4) socialization; (5) ongoing action; (6) focus on extracted cues; (7) choice of plausibility over accuracy. Simply put, sensemaking is the social process of an individual and/or organizational understanding of phenomena through the iterative interactions (Weick et al., 2005; Berente et al., 2011). The sensemaking concept has been applied to various organizational contexts (Berente et al., 2011), especially in emerging areas where people usually feel an ambiguity toward reaction. As a result of the sensemaking process, these individuals may construct a method of understanding the phenomena (Weick, 1979).

One of the main features of the sensemaking process is its emphasis on discourse. Sensemaking may be accomplished by means of individual notions within several environments, and is consequently formed by discourse with others. The discourse includes structured collections of meaningful text, but is not limited to other venues (Parker, 2004). The texts may be written transcriptions, as well as "any kind of symbolic expression requiring physical medium and permitting of permanent storage (p. 109, Taylor & Van Every, 1999)." Therefore, discourse may be found in various forms, inclusive of written documents, verbal reports, artwork, spoken words, pictures, symbols, buildings, and other artifacts (Phillips et al., 2004).

Weick (1995) mentioned that individual and social facets are inseparable in a sensemaking process. This corresponds to the tradition of those social theories that place an emphasis on

discourse analysis (Boden, 1994; Boland et al., 1994; Czarniawska, 2004; Berente et al., 2011). By analyzing communication and language among people, discourse analysis may understand the social production of organizational and interorganizational phenomena (Phillips et al., 2004).

Table 14. Components of Argument

Components of Argument	Description
Claims	The central assertion of the argument (Berente, 2011); the "conclusion whose merits we are seeking to establish" (Toulmin, 2003, p. 90); the statement put forward for the audience to believe (Fletcher & Huff, 1990; Hirschheim et al., 2011)
Grounds (data or evidence)	The statements offered in support of the claim answering the question: "What do you have to go on?" (Berente, 2011); identified on the basis of primary function within the context of the argument (Fletcher & Huff, 1990; Hirschheim et al., 2011)
Warrants	The principals or rules of inference answering the question "How did you get there?" (Berente, 2011); the logical connection between claim and grounds (Hirschheim et al., 2011)
Qualifiers	The statement used for showing the degree to which the claim is accepted as true (Hirschheim et al., 2011); reflects genuine doubts of speaker with regards to a claim (Fletcher & Huff, 1990)
Rebuttals	The statement for managing potential objections by stating conditions under which the claim might hold or not hold (Fletcher & Huff, 1990; Hirschheim et al., 2011)

Toulmin's Argument Model

The process of discourse always draws from an iterative nature. Speech act theory (Austin, 1975; Searle, 1975) emphasizes the interaction between discourses and actions. According to the theory, the nature of discourse and its effects on social reality may be understood as situated symbolic action. (Heracleous, 2004). Moreover, discourses can form individual cognition, in which one can identify an interpretational situation, and then generate novel texts, which create a new action of discourse (Brente, 2011; Heracleous, 2004). The interpretation of the situation is accompanied by a content, which may be called an *argument* (Habermas, 1984; Toulmin, 2003; Weick, 1995). Habermas' definition of argument is "a mode of communication whereby an

individual makes an explicit claim and then supports, or thematizes, this claim to persuade others to accept it while anticipating criticism (Berente, 2011, p. 688)."

This approach of argument is consistent with Toulmin's (2003) model of argumentation, which basically claims that argument is *movement* from accepted *grounds* (*data*), through *warrant*, to a *claim* (Brockriede & Ehninger, 1960; Fairclough, 2003). In his model, Toulmin identified different components of argument, further developed by Fletcher and Huff (1990), and described in Table 14.

In this study, the assumption is that sensemaking in learning outcomes occurs by means of discursive arguments as interpreted by Toulmin's framework. For analysis purposes, I especially focus on informant arguments. The key components of Toulmin's argument model are considered to be essential for argument analysis: These components are claims, grounds, and warrants (Fairclough, 2003; Berente et al., 2011). Qualifiers and rebuttals are generally accepted as second tier of argument components, which may be included in an argument, but not necessarily (Brockriede & Ehninger, 1960). In addition, in this study the arguments are made by individual informants through written reports in relatively limited space, which constraints the informants to use more diverse arguments components, such as qualifiers and rebuttals. Therefore, the three key components are mainly focused for the analysis in the study.

RESEARCH METHODS

To achieve the research goals proposed in the previous section, I explore the sensemaking process of informants' arguments, used to evaluate the potential of business simulation games for use in a real-world business practice. To this end, I asked 43 informants to provide written reports regarding the issue. All 43 informants were working professionals, enrolled in an MBA-level Operations Management course, who had experienced multiple business simulation games throughout the course. The details of the business simulation games used in the course are

described in Appendix C. Having experienced all the business simulation games, the informants then were asked to submit a written report regarding the research. To keep the scope of the informants' response within the research focus, thus enhancing the quality of data, informants were given both verbal and written instructions about the intention of the study. The informants were allowed to have adequate time (i.e., two weeks) to consider the issue before submitting the report. An example of the written instruction given to the informants is presented in Appendix D. As a reward for participating, credits were granted to a part of final exam grade.

Coding and Analysis Method

A ground theory approach was incorporated to analyze the arguments and to draw results that were meaningful from the data of the informants. Ground theory in the pursuit of theoretical findings is widely used in IS studies, garnered through an intensive, data-driven, analysis process (Corbin & Strauss, 2004; Berente et al., 2011). The nature of grounded theory requires iterative data collection and analysis (Corbin & Strauss, 2004). In addition, Morse (2007) claimed that theoretical sampling provides a key component in the pure application of grounded theory. Based on the research procedure, this study includes only a convenience sampling, whereas a purposeful sampling and a theoretical sampling were unheeded. However, Corbin and Strauss (2004) suggested that since qualitative data analysis could be readily adapted and used for various research activity, more flexibility in adopting qualitative data analysis could be accepted. Hence, although strict guidelines for grounded theory procedures are effective, some studies use the set of rules less restrictively for a better discovery of relationships in the data (Strong & Volkoff, 2010; Urquhart, 2007). Actually, Berente et al. (2011) successfully investigated the value of a virtual world approach through the use of a grounded, theory-based application, i.e., convenience sampling. Therefore, to analyze the data from single-iteration sampling, this study

uses three types of coding techniques: open coding, axial coding, and selective coding, which are suggested for grounded theory research approach (Corbin & Strauss, 2004).

Open coding is associated with breaking-down, comparing, conceptualizing, and categorizing data (Boudreau & Robey, 2005). In this coding phase, each written report by informants was carefully read, highlighted, and identified for relevance to the study (Corbin & Strauss 1990; Glazer & Strauss, 2009; Layder, 1998). Any relevant segments of text then were coded. As a result of open coding, 107 codes were created, as related to the application of business simulation games to a business practice. Each code was associated with one or more test segments, identified as being related to the value of business simulation games.

Axial coding is involved in identifying the structure of text segments that mention the application of business simulation games. The process seeks the assertions and supports used in the text segments and their relationships. By using Toulmin's (2003) framework (i.e., claim-ground-warrant), each text segment is analyzed and labeled as one of the three components of argumentation (Brockriede & Ehninger, 1960; Fletcher & Huff, 1990; Berente et al., 2011). For example, text segments that contained explicit evidence for the argument were labeled as claims. On the other hand, evidences that explicitly supported the arguments were labeled as grounds. Warrants are the logical connection between an argument and its grounds. Yet in many cases, warrants were not explicitly detailed in the data. Hence, warrants were interpreted based on the assumptions, together with argumentation found in the data (Berente et al., 2011).

Lastly, selective coding is conducted to integrate the result of analyses into categories. Specifically, the themes of claims, the contents of grounds, and the types of warrant were coded and categorized accordingly. Throughout the process, patterns of arguments were identified. All of the above coding procedures were conducted with MAXQDA software (version 11).

ANALYSIS RESULTS

The results of analysis reveals several types of claims regarding the application of business simulation games to business practice. The four main categories of claims resulting from analysis are: (1) learning and training; (2) decision-making; (3) business point of view; and (4) restraint of application.

Learning & Training

Analysis of data reveals claims in applying business simulation games to enhance both learning and training experiences in business context. Under the category, various themes of argumentation are proffered to support the claims; these themes are inclusive of enhanced learning experience, demonstration capacity of processes, engagement and addiction, and better retention. More details of argumentations follow.

Enhancing Learning Experience

First, there are claims that business simulation games may be beneficial to business practice in that the games may enhance individual learning and training experiences. Beyond the limit of traditional learning/training methods, business simulation games may provide new experiences by their novel characteristics. According to Sophcle[1], experiencing something is a most effective way to the understanding of it. The argumentation presented by informants provides a good support for using business simulation games in business education/training.

For example, an informant [#2] argued that business simulation games add a unique experience to the learning process, which may increase the problem solving skills used in the real work

[1] "One must learn by doing the thing, for though you think you know it-you have no certainty, until you try." (adopted from Gentry, 1990, p. 9)

environment. The warrant used to leverage the ground is the general principle that the similarity of business simulation games to the real world provides learners opportunity to prepare for the real-world situations.

Claim: "[…] I will be able to apply some of these lessons and principles learned through working through the simulations to my own professional realm. […] they add the element of experience to our learning process, in addition to the text portion of the material." [Enhancing learning experience]

Ground: "One great aspect about these simulations is you have to carefully plan and attack each situation and adjust to the challenges presented just as you would in the real work environment." [General principle]

Warrant: With the similarity of to real world, it will be a good learning tool. [Causal reasoning]

In addition, informants argued that such games are good learning tools for understanding the business phenomena by providing an opportunity to experience them directly. One informant [#37] mentioned that he could learn concepts related to the course topics (i.e., bullwhip effect) by going through the phenomena with first-hand experience. He supported his claim by his firsthand experience with the business simulation game (i.e., Root Beer simulation).

Claim: "Even though Process Management and Benihana were my favorite of the simulations, each of the others also was a good addition to the learning experience. […] The simulations have been useful in learning not only the basics of Supply Chain Management but also have some valuable real life applications" [Enhancing learning experience]

Ground: "Falling smack dab into the bullwhip effect was a humbling experience and nice to overcome with communication from my teammates on the beer assignment." [Personal experience]

Warrant: My experience with business simulation games will be applied to learning process of others similarly. [Generalization]

Another informant [#40] also asserted that business simulation games could give one the opportunity to have a hands-on experience, described by theory. He mentioned that by means of the simulation game, he could learn lessons by experiencing the phenomena. He also stated that he saw the possibility to apply lessons in the future.

Claim: "Overall, I thought the simulations were the highlight of the class and I learned a great deal, even more than what I am writing down now. […] I learned more from the simulations than I did reading stagnant theory and equations from the textbook. Putting hands and eyes on real world problems truly drove home the point of what we are learning." [Enhancing learning experience]

Ground: "I know that [with] even more reflection over time, other lessons will begin to emerge from these simulations." [Personal projection]

Warrant: Based on my thoughts, business simulation games will be useful to many other areas. [Generalization]

After all, arguments related to the learning experience of business simulation games rely on the ability of business simulation games to give a novel experience that would be relatively difficult by other learning methods. To support the claims, informants used various types of grounds, including the general principle of the benefits of business simulation games in a learning process;

the personal experience obtained by business simulation games; and personal future projections concerning the lessons gained from business simulation games. In addition, the claims were mostly supported by a causal reasoning or generalization of the grounds. Namely, I found warrant–ground patterns in this category, such as *causal reasoning – general principle*, *generalization – personal experience*, and *generalization – personal projection*.

Illustration Capability

Another claim that informants listed with regard to learning aspects is the illustration capability that business simulation games may provide in the learning process. Most recently, business simulation games offer qualified, graphical user interfaces (GUI), as well as a visualization of game plays that enables players to see what is occurring in the game. Business simulation games also offer an illustration of business concepts to game players by means of a visual stimulus provided by the various graphics/animations. Hence, players may understand the concept of the games more easily than through texts or lectures. For example, informant [#12] asserted that simulations games have the capability to illustrate the complex relationships that may be applied to business organizations. He supported his claim based on a causal reasoning that the characteristics used in simulation games may be used in most organizations.

> Claim: "We as students are given a lot of "tools" in our courses to use in the real world. […] The simulations showcased the amount of complexities and variables that go into making operations management decisions." [Illustration capability]
>
> Ground: "Business organizations can also make use of these tools to improve their operations processes, and to train their employees in a controlled setting without the real-world risk of making costly, ill-informed decisions." [General principle]

Warrant: The benefits of business simulation games will be applied to organizations generally. [Causal reasoning]

Another informant [#25] also mentioned the capability of illustrating topics that business simulation games provide. He argued that the business simulation games used in the course illustrated certain topics, thereby assisting him in understanding those topics. He based his assertion on personal experience.

Claim: "Each simulation helped me gain a better understanding of the topic being taught. […] all helped to better illustrate the topic and lessons being covered." [Illustration capability]

Ground: "Many of the end results of the calculations I had seen before in my job, but this simulation helped me understand their meaning even better." [Personal experience]

Warrant: My experience with business simulation games will be same to others. [Generalization]

Yet another informant [#9] also mentioned the illustration capability of the business simulation games, supported by personal experience.

Claim: "I look forward to taking the lessons learned with me throughout my career in whatever function of the organization I might be in. […] These simulations really illustrate the surrounding topics and the application of these concepts can reach beyond just the operations function." [Illustration capability]

Ground: "The Beer Game, which illustrates the bullwhip effect, immediately reminded me of a challenge that I had to overcome in my most recent

deployment to AAA in 2012. … It was coordination that allowed us to overcome this issue and the Beer Game really illustrated the importance of this." [Personal experience]

Warrant: My experience with business simulation games will be same to others. [Generalization]

Overall, arguments that are based on the illustration ability suggest that business simulation games could be applied in training workforces effectively. To support the arguments, informants used the warrant-ground patterns of *causal reasoning – general principle* and *generalization – personal experience*.

Engagement and Addiction

Engagement and addictive characteristics of business simulation games were found to be another element that informants mentioned in regard to the learning/training aspect of a simulation game application. Many informants stated that they felt enjoyment while they were playing business simulation games; some even described the games as so addictive that they found it difficult to stop. Based on its unique characteristics, a simulation game may be applied in any business education/training context. There are several types of warrants that support such argumentation. For example, one informant [#23] mentioned that business simulation games can engage people by providing a similarity to the real world environment.

Claim: "The simulation games were a refreshing departure from the day-to-day academic experience. […] the games were a peek at certain aspects of the business environment that I feel I may never be exposed to on my current career path. […] I like the incorporation of computers and games in the classroom as it keeps the material fresh and provides an alternate way to engage the students." [Engagement]

Ground: "I found it interesting that I had to actually make decisions as if the people in the game were real and their emotions and moods were real." [General principle]

Warrant: The feeling of reality in business simulation games will make people engaged in the business simulation games. [Causal reasoning]

Another informant [#35] also stated that he was addicted toward playing the business simulation games to achieve higher goals. He suggested that one reason he could feel addiction was the similarity to the real world as provided in the simulation game. More similarity would give players the impression that they are involved in real-world tasks, motivating them to continue the work until they are satisfied with their performances.

Claim: "I thoroughly enjoyed running the different simulations during our module. I found myself addicted to perfecting my processes to achieve a higher score with every run" [Engagement]

Ground: "I liked the variables that we came across during the run time that made them unpredictable, just as the real world is." [Personal experience]

Warrant: My addictive experience with business simulation games will be [the] same to other simulation game players. [Generalization]

From the data analysis of the informants' claims related to engagement and addiction, I found *causal reasoning – general principle* and *generalization – personal experience*.

Better Retention

The last claim listed by informants regarding the learning and training is that business simulation games provide an easy learning method for trainees to remember lessons. Consistent with comparing the retention rate to other learning methods as illustrated in the previous chapter, a

number of informants suggested that business simulation games could enhance the trainees' abilities to recall lessons learned from playing experience for a long time.

For example, an informant [#25] stated that the knowledge obtained from business simulation games would be in personal memory for a long time. Although no explicit warrant is stated, it is assumed that the ground relies on his personal projection.

Claim: "I thought the simulations were valuable [in] taking the lessons and actually demonstrating the topics." [Retention]

Ground: "I am sure I'll remember these lessons far longer this way." [Personal projection]

Warrant: My expectation to remember lessons from business simulation games for long will be the same to other people. [Generalization]

Only a single warrant-ground pattern was found in the claims associated with better retention of business simulation game, which is *generalization – personal projection*.

Overall, informants argued that business simulation games may be applied to business practices used in training a workforce, due to the unique characteristics of the games. Informants' argumentations identify that the values of business simulation games reside mostly in an 1) enhanced learning experience, 2) illustration capability, 3) engaging and addictive attributes, and 4) assisting learners to remember lessons better and longer. It was also found that many of these arguments were based on personal experience or a personal-projection type of grounds. It also could be interpreted that as informants went through the simulation, they gained knowledge with confidence, causing them to feel that other learning methods were unsatisfactory in comparison. They felt that others in business training procedure would have a similar experience with the effectiveness of business

simulation games. Finally, the informants found business simulation games may readily be applied to the business learning and training area.

Decision-making

The second category of claims revealed from data analysis was decision-making. A number of informants argued that a simulation game would be well applied to the decision-making process in business practices. More specifically, informants found a definite value in the business simulation games through 1) assisting decision-making processes, 2) demonstrating decision-outcome relationships, 3) providing structured problem-solving processes, and 4) offering a risk-free exercise in business practices.

Decision-making Assistance

First, there are claims that business simulation games may be beneficial in assisting managers' decision-making. Business simulation games usually require players to make various decisions in game play. By providing opportunities to make decisions with appropriate information, business simulation games could assist business professionals to make better decisions.

For example, an informant [#36] argued that business simulation games increase decision-making skills by providing information in simulated real-time settings. The individual noted that he would be able to do the same in his current job as he did in the business simulation games, because the core conditions of the two environments were basically parallel.

> Claim: "The simulations provided a great avenue to experience the concepts learned […] It is good to think and talk about the concepts from a theoretical standpoint, but to apply [them] to a simulated real word experience is invaluable. […] You get to see in real time how your decisions as a manager affect the productivity of your work force. […] [Y]ou can work the formulas out yourself on pen and paper or work

through a guided exercise[,] but to have the computer assist with the presentation of unknown variables, simulate […] passage of time, or provided[sic] computations of numbers quickly to allow for quick decision making […] [−] the consequence of those decisions is a priceless tool." [Decision-making assistance]

Ground: "This connection between the theoretical and the application is key for persons like myself who are […] hands on learner[s]. … I will be able to use this in my day to day work. As a manager of a medical practice, the concept of the product or units moving through a work space is the same as patients moving through our office." [Personal projection]

Warrant: The principles of decision-making gained from business simulation games can be converted to real-world situation. [Causal reasoning]

This type of claim presented a single pattern: *causal reasoning – personal projection*.

Demonstrating Decision-Outcome Relationship

Some informants argued that business simulation games effectively show how certain choices might affect the outcomes. One novel feature of a business simulation game is to provide a rapid feedback based on a player's choice. Further, playing business simulation games would allow decision makers to become aware of possible decision outcomes, thus allowing more knowledge toward future decisions.

An informant [#4] mentioned that he found business simulation games useful in business practice by showing the outcomes of decision-making. His argument was based upon personal experience.

Claim: "Simulations are beneficial tools to allow a person to experience various situations before experiencing them in real life. […] It allows the

opportunity to learn how different decision[s] can affect the overall outcome." [Demonstration of decision-making]

Ground: "I enjoyed being able to see how different decision[s] can affect the overall outcome." [Personal experience]

Warrant: My experience with simulation game in decision-making will be applied to other people. [Generalization]

Another informant [#20] also argued that a simulation game could help decision-making by showing how the variables related to one another. He also supported his argument by his own experience with the simulation game in the course.

Claim: "[…] [S]imulations provided the opportunity to apply concepts discussed in class to real world situations in a consequence free environment. […] [T]he lessons learned can still be applied to almost all business environments. […] The sophisticated structure of the simulations gave insight to how seemingly independent decisions are in fact intertwined and how those decisions and relationships impact the bottom line." [Demonstration of decision-making]

Ground: "Understanding these intricate interactions and how management can severely impact team performance is easily applied to my field: Oil and Gas Manufacturing (more specifically a Maintenance organization in a chemical plant) […] While establishing a challenging and demanding schedule can be used in some situations, relying on this approach can lead to team member burnout – a scenario I've personally seen many times." [Personal experience]

Warrant: A decision-outcome relationship in a simulation game reflects what I've experienced in my organization, which will be the same to other organizations. [Generalization]

Finally, the demonstration of a decision-outcome relationship is a unique way in which business simulation games may be applied to business practice. Most of the argumentation regarding this issue relies on a *generalization – personal experience* pattern.

Structured Problem-Solving

When managers encounter a difficult problem in business practices, each one must choose an approach to solve the problem. Business simulation games provide a model approach toward solving problems, thus allowing players to learn the most efficient way to attack the problem. Applying this perspective, some informants argued that business simulation games could be applied to business practices by providing managers with a structured problem-solving method. For example, an informant [#4] asserted that while textbooks provide relevant concepts, business simulation games provide the manner in which to apply the concepts to the real world. He supported this assertion by taking his personal experience with business simulation games into his workplace.

Claim: "[T]he simulations provided a glimpse of how concepts can be interpreted in the real world. […] Textbooks provide the concept and the simulation puts the concept in a real world application to see them in action. The real world shows that nothing is ideal[,] but the knowledge gained through the simulations and defined concepts can provide structure to answering the toughest problems." [Structured problem-solving]

Ground: "I translated this experience to the real world by taking a glimpse into my current job." [Personal experience]

Warrant: The translation of the simulation game experience to my job environment will be also applied to others. [Generalization]

Generalization – personal experience presented the only pattern that was found with regard to the structured problem-solving claim.

Risk-Free Exercise

The last claim associated with decision-making where informants found value was that business simulation games provide a risk-free decision-making exercise. Generally skills for good decision-making are not easily obtained from traditional learning methods, such as textbooks and lectures. Rather, these may be gained from numerous trial-and-error tactics in actual decision-making practices. However, conducting trial-and-error practices in real-world situations could be costly.

All the decisions made in business simulation games are controlled within the game system. Business simulation games could produce an ideal method to enhance managers' decision-making skills by providing opportunities to choose various decision-making options, while avoiding real-world consequences. In fact, several informants pointed out the value of business simulation games in terms of the risk-free decision-making exercise. Amongst these, an informant [#12] mentioned the application of simulation gaming based on his personal experience.

Claim: "Business organizations can also make use of these tools to improve their operations processes, and to train their employees. […] in a controlled setting [,] without the real-world risk of making costly, ill-informed decisions." [Risk-free exercise]

Ground: "These games gave me an opportunity to test my understanding of the information and to appreciate the balance of so many variables that are needed to arrive at a decision. A simulation game gives me the opportunity to improve on my decision-making abilities within operations management without costly repercussions." [Personal experience]

Warrant: My experience with business simulation games about decision-making exercise will be applied to others as well. [Generalization]

Another informant [#27] also claimed that business simulation games have value in business by providing a risk-free exercising opportunity. He argued that business simulation games could bring benefits to business decision-making, due to such features as providing a base knowledge for a decision-making framework. This warrant, connecting the claim and the ground, displayed causal reasoning.

Claim: "Ultimately, I believe that the simulations provide a great opportunity to get the experience of making decisions within a supply chain […] without the actual negative consequences that can be experienced in the real world." [Risk-free exercise]

Ground: "All of the simulations are fully controlled, with the simulations leading the decision making process in place of a person in real life. They provide a base level of knowledge that can be adapted as a framework to make business decisions in an individual's real work environment[,] although the real world environment is much more dynamic with seemingly unlimited outcomes. The best aspect of the simulations [was]

the opportunity to apply class learning into "real world" applications." [General principle]

Warrant: The features of business simulation games will enable them to be applied to decision-making exercise well. [Causal reasoning]

The patterns of *generalization – personal experience* and *causal reasoning – general principle* from the arguments of informants strongly related to risk-free exercise. Overall, argumentations gathered from informants with regard to the decision-making process revealed that business simulation games could be applied to enhance the decision-making process in business practices. Accordingly, there are four aspects of decision-making where business simulation games may be used, inclusive of 1) decision-making, 2) decision-outcome relationship, 3) structured problem-solving, and 4) risk-free exercise. Mostly, argumentations supported by generalizations were based upon personal experience or personal projection. However, causal reasoning from a general principle was also used to support some argumentation.

Business viewpoint

Another frequent category of argumentation theme was that business simulation games have the capability of posing various business viewpoints to individuals in a business organization. Since business simulation games deal with variable relationships in differing business areas, players often become aware of the *big picture* perspective. Hence, a number of informants emphasized the benefits associated with finding the macro view, as well as a new perspective.

Macro View

Business simulation games are often designed to emulate the real business environment. As in most business organizations, various areas are interconnected to one another. Thus, business simulation games require players to deal with managing wide areas in business functions such as

1) operations, 2) marketing, 3) finance, 4) human resources, etc. Some informants found a value of business simulation games, in regard to broadening their views of business processes. Most informants who noted the business simulation games' capabilities to broaden their business views would base arguments on their own experiences or projections with business simulation games. These individuals mentioned that they could gain wider perspectives on business processes by playing simulation games in the course. They presumed that others in the organization would have the same benefits from business simulation games.

An informant [#32] emphasized that he could obtain a macro perspective about the processes in his company through playing the simulation games in the course.

Claim: "I really enjoyed the ones that we had and how much they opened my eyes to how closely they resemble current processes going on around us. … At least[,] given the simulations that we have[,] allowed us to get an insight on 5 real-world scenarios: project development of a new product, the total amount of time it takes to complete requests along the chain, how batch systems work and how to allow inventory to make money for you rather than just sit and collect carrying cost, the results of ineffective communications and poor forecasting methods, delivering a product to market and seeing the results of decisions made regarding the financial aspect, and the macro-view of the entire supply chain." [Macro view]

Ground: "Going from the macro-view to the micro-view, to the complete set up of each decision made in the supply chain really gave me a new view of every day operations and gave me a lot to consider when being

approached with real world scenarios – each scenario is really not that much different from another." [Personal experience]

Warrant: My experience with business simulation games that broaden views of business will be similar to others. [Generalization]

Meanwhile, another informant [#42] argued that business simulation games are helpful in understanding the other areas in her organization by allowing a projection of her personal thoughts.

Claim: "Working CCC, every one of these simulation games can be related to some aspect of the company. […] [S]imulations now have me thinking on a broader scale with respect to CCC […] One bit of wisdom that I take away from running through these simulations is that no matter what our role is[,] we are all on the same team." [Macro view]

Ground: "[…] Although I am not currently in these positions[,] I can see how one group impacts another group. This is most obvious in process. CCC is compiled of many smaller plants within its perimeter. Many plants feed other plants that eventually make final products. So shutting down one unit will cost millions of dollars in lost inventory for another unit. This is something that we practiced in the Process Analytics simulation. In possible future roles[,] I will have the mindset of being responsible for lean and efficient production. I can also have forward thinking in my current role by buying electrical equipment that is sustainable and efficient." [Personal projection]

Warrant: My projection that business simulation games widen the perspectives towards business will be the same to other people in the organization. [Generalization]

Importantly, there were two ground-warrant patterns found in the claims relating to the ability of business simulation games to provide macro views; these are *generalization – personal experience* and *generalization – personal projection*.

New Perspective

The other advantage of business simulation games is that there are many games in various subject areas in business (e.g. marketing, finance, operations, etc.); these games are available in the current market. Also the games are relatively easier to access than other learning methods. Thus, business simulation games could help people understand the business process in other areas quickly, especially for those who have little knowledge about other areas than where they have worked. Actually, for those who have worked long in one area, it might be difficult to understand other areas. Some informants found a particular value of business simulation games at this point. This argument could be entitled a *new perspective.*

Informants suggested that the value of business simulation game lay in providing new business perspectives to those who little understood other areas than those they had experienced; therefore, they were able to consider how different business functions are nevertheless connected to one another. Informants usually used their personal experience in their own workplace to support their argumentations.

An informant [#22] argued that business simulation games are useful for an understanding of how different business functions are connected to one another. He based his claim upon his own

experience, relating that now he could understand the areas in his company that he had not previously considered.

Claim: "[…] [S]imulations certainly achieve their objective of enhancing the knowledge and assisting the student in real world application. […] […] [S]imulation helped illustrate how [one] function of the business is connected to another. Here we got to see how the design was linked to forecasts, and how the forecasts affected our decisions with production. While each of us know[s] these items are linked, being able to interact with the decision, manipulate the forecasts, adjust the numbers, and feel the consequences help bring the learning experience full circle." [New perspective]

Ground: "These simulations, in one aspect or another, taught me about a facet of my company [...] which I hadn't previously understood or thought about." [Personal experience]

Warrant: My experience with business simulation games that introduce new perspective will be the same to others. [Generalization]

Another informant [#43] argued that he focused on business processes that were not usually considered.

Claim: "I feel that I learned a great deal from the simulations this semester. […] The simulations exposed me to the planning and execution aspects of operations that I have never experienced before." [New perspective]

Ground: "I work in Accounting and Finance, so I rarely get to see or experience the dynamics of the operations environment. The simulations have

tremendously increased my understanding of the business environment that I work in. […] I was able to get a view of the world from the opposite end of the spectrum" [Personal experience]

Warrant: My experience with business simulation games that introduce new perspective will be the same to others. [Generalization]

The arguments regarding new perspective were mostly grounded on personal experience with business simulation games.

Largely, informants found two advantages in the potential use of business simulation games that provide business viewpoints. One was to provide a macro view to those who lacked a *big picture* perspective in the organization. Thus, employees on both the higher and lower levels of organizational structure, could glean a better and wider understanding of how business processes work; this approach would enable these persons to effectively consider a macro view of their workplace.

The other value of business simulation games opens a new perspective by incorporating the other side of business processes. Usually, people who have worked in a limited area for a long time might lack an understanding of other areas in the business. Through playing business simulation games, these persons can realize other perspectives, which would lend to a more efficient cooperation with various areas. Most of argumentations under this category were based upon personal experience or personal projection, whereas a few of them postulated causal reasoning as their grounds.

Restraints of Application

Business simulation games might not be applicable in all business practices. The games would definitely display some limitations and/or contingencies in comparison with a real-world business environment. In the analysis, not all informants revealed a positive attitude toward the

values of business simulation games. Some informants pointed out certain negative aspects of business simulation games, especially with regard to those factors that could restrain the application of business simulation games to the real world business environment. Factors listed were 1) dissimilarity from the real world, 2) high degree of game play, and 3) resistance from management.

Dissimilarity from Real World

One of the limitations that business simulation games have is the fact that it is impossible to emulate the real world perfectly. Even though these games are designed with a certain degree of reality, some degree of dissimilarity between business simulation games and the real world business practice would exist. Hence, people in business practice might find less value from the game due to the lack of reality.

For example, an informant [#1] argued that one drawback of business simulation games would emanate from dissimilarity with the real-world business environment. She based the argument on a general principle that the real world typically deals with more diversity in decision-making processes.

Claim: "The drawback to simulations is that they're only as accurate as they're programmed to be. […] The simulations themselves are made to emulate situations that could be encountered in the workplace, but they're only as diverse and realistic as the logic the programmer used." [Dissimilarity from real world]

Ground: "Real life situations present a lot more diversity to the challenges faced during the decision making process." [General principle]

Warrant: Lack of reality in business simulation games will prevent them from being applied to business practice. [Causal reasoning]

Another informant [#28] pointed out the lack of reality in business simulation games used in the course. Her argumentation was based on her own experience with simulation games that mirrored her previous work environment.

Claim: "I also assumed [that] the components of the simulation that were not common sense[,] I would have [to] be able to figure out[,] as the simulations would be building blocks from the lessons in the module. This was certainly not always the case. While each simulation, some more interesting than others, was to be a good indication of what the real world would be like, it did not always feel that way. Nor did I always feel like I could apply what I was currently learning in class to the simulations. […] This simulation, in my opinion was not like that of the real world[,] or at least as I had experienced." [Dissimilarity from real world]

Ground: "I spent my college career working as a waitress and bartender. I spent a lot of time speaking with management and discussing how and why we operate the way we do. […] The game was no longer fun and I couldn't get my restaurant to be profitable. I did not understand why. I tried numerous combinations and the thought became overwhelming as to this was an actual grade. For this specific simulation, I find what I learned here difficult to apply to a real world situation." [Personal experience]

Warrant: My experience with simulation games with lack of reality will be same to others. [Generalization]

For claims related to dissimilarity from the real world, two types of patterns were among the informants' argumentations; these were *general principle – causal reasoning* and *personal experience – generalization*.

High Degree of Game Play

Another limitation of business simulation games when it comes to application to real-world business practice is that the unique characteristics of the game itself might give a negative impression to the serious purpose of business. More specifically, business simulation games, as mentioned in the first chapter of this dissertation, have two facets of novelty, which are *playfulness* (*enjoyment*) and *seriousness* (*learning*). From time to time, people who are given to play business simulation games might focus too much on playing the game itself and rarely learn lessons from the game, especially when they feel the business simulation game are playful, or "game-ish." An informant [#19] noted this issue by reflecting on his experience with the business simulation games in the course.

Claim: "Overall, most of the games did not seem really beneficial in the current work atmosphere I was in. […] [T]o me[,] they seemed to be more of a game and not as much of a learning tool." [Too much game-ishness]

Ground: "Was I really learning about printers? I just knew that if you finish it by week 8[,] you were going to get your max points. I did not learn why it is that way." [Personal experience]

Warrant: My negative experience with business simulation games due to the lack of similarity will be applied to others. [Generalization]

Another informant [#18] also stated that his experience with business simulation games was mixed, due to certain game-ish characteristics that prevented him from learning.

Claim: "For me, the computer simulations that we ran were something of a mixed bag. […] While I found some to be very educational and illustrative of the concepts we were discussing in class, I at times found others to be too "game-y" and lacking in instructive nature." [Too much game-ishness]

Ground: "In my current job as an attorney, I do not have much occasion to put some of the lessons learned to work." [Personal experience]

Warrant: My negative experience with business simulation games due to the lack of similarity will be applied to others. [Generalization]

With regard to the high degree of game play in business simulation games which limit application to business practice, only one warrant – ground pattern was found: *personal experience – generalization.*

Management's Resistance

The last concern that informants noted as a restraint of business simulation games in addressing business practices was the resistance of management to application in learning knowledge. Basically, business simulation games are relatively new to business. In addition, games are traditionally considered to be solely for entertainment. Thus, the resistance of management toward the adoption of business simulation games might be expected. An informant [#27] argued that in order to persuade businesses to accommodate simulation games in business practice, it would be necessary to prove the benefits.

Claim: "Another major roadblock would be management buy-in." [Management's resistance]

Ground: "To get any traction in implementing change, you have to prove to management that it would be beneficial to the system." [General principle]

Warrant: It will be reasonable that persuading management is essential to adopt business simulation games. [Causal reasoning]

From an analysis of data, this study found that management resistance is one of the claims related to the restraints on business simulation games. In addition, it is also found that *causal reasoning – general principle* presents the general pattern of the argumentation.

Overall, the arguments regarding the restraints of applying business simulation games to business practices include 1) dissimilarity from real world environments, 2) high degree of game play in business simulation games, and 3) management's resistance. These arguments are mostly based on a generalization of informant personal experience or personal projection, as well as causal reasoning from general principles.

DISCUSSIONS

From the analysis of written reports obtained from 43 informants, various arguments as well as argument patterns were identified. Table 15 presents the categories of claims, specific claims, types of grounds, and types of warrants used in the informants' reports. More specifically, there were four categories of claims discovered: learning and training, decision-making, business viewpoint, and restraints toward the application of business simulation games to real-world business practice.

Application of Business Simulation Games

Business simulation games were considered to be effective learning and training methods in prior studies (Michael & Chen, 2006; Corti, 2006; Pasin & Giroux, 2011; Landers & Callan,

2011). Various skills required for successful business practice, such as strategic thinking, planning, communication, collaboration, group decision-making, and negotiating skills, could be developed through business simulation games (Susi et al., 2005; Kirriemuir & McFarlane, 2004; Squire & Jenkins, 2003; Gee, 2007). According to Iverson (2004), business simulation games provide a revolutionary change in corporate training by changing the trainee's role from passive to active, as well as the trainer's role from a material delivery person to a facilitator (Susi et al., 2005). Together with the prior literature, the findings from data analysis in this study revealed that the working business practitioners deeply agree with the potential application of business simulation games to employees training for various benefits.

Table 15. Patterns of Argumentations

Category	Claim	Type of Ground	Type of Warrant
Learning & training	Enhancing learning experience	General principle	Causal reasoning
		Personal experience	Generalization
		Personal projection	Generalization
	Illustration capability	General principle	Causal reasoning
		Personal experience	Generalization
	Engagement & addiction	General principle	Causal reasoning
		Personal experience	Generalization
	Better retention	Personal projection	Generalization
Decision-making	Decision-making assistance	Personal projection	Causal reasoning
	Demonstrating decision-outcome relationship	Personal experience	Generalization
	Structured Problem-Solving	Personal experience	Generalization
	Risk-free exercise	Personal experience	Generalization
		General principle	Causal reasoning
Business viewpoint	Macro view	Personal experience	Generalization
		Personal projection	Generalization
	New perspective	Personal experience	Generalization
Restraints	Dissimilarity from real world	General principle	Causal reasoning
		Personal experience	Generalization
	High degree of game play	Personal experience	Generalization
	Management's resistance	General principle	Causal reasoning

Learning & Training

The analysis in this study identifies the four particular reasons why business simulation games are predicted to be beneficial from a learning and training standpoint. These reasons include 1) enhanced learning experience, 2) illustration capability, 3) engagement and addiction, and 4) better retention.

First, working professionals argue that business simulation games could enhance learning experience. Unlike traditional learning methods, simulation games offer students a novel experience, which is called *experiential learning*. Through business simulation games, students can explore theory and practice with a critical way by experiential learning (Kolb, 1984; Lewis & Maylor, 2007). It is also claimed that business simulation games could fill the gap between the theory and the practice outside the classroom by creating an opportunity to apply the learned concept to the real problem-solving situation (Kumar & Lightner, 2007; Lin & Tu, 2012). For these reasons, it is said that business simulation games typify experiential learning methods (Faria & Wellington, 2005; Garris et al., 2002; Ruben, 1999). Accordingly, a number of working professionals who served as informants in this study fully acknowledged the potential benefits of business simulation games in terms of enhancing learning experience, and averred the same in their written reports.

Second, informants argue that business simulation games can help working professionals learn business concepts through illustration capability. The capability offered by business simulation games can provide students with realistic environments to demonstrate strategic and critical thinking (McGlarty et al., 2012). By observing illustrations of how things work in business simulation games, students tend to absorb business concepts more efficiently than by means of other instructive methods. According to research, seeing an illustration culminates in higher retention rates than other traditional learning methods such as audio-visual, reading, or lecture

(Tao et al., 2009). As a result, the visual/graphical illustration of concepts enabled by digital technology becomes a powerful advantage in learning and training context. Indeed, a number of informants in the study claimed that they actually received benefits in learning the concepts through the business simulation games' illustrating capability during the course. These informants also argued that the illustration features of business simulation games could be used to train employees generally.

Third, a number of informants argued that business simulation games could be an effective learning tool due to engaging and addictive characteristics. Enjoyment is one of the most unique features of business simulation games compared to other learning and training methods (Michael & Chen, 2006; Gee, 2007; Breuer & Bente, 2010; Prensky 2001; Rieber 1996; Ritterfeld & Weber, 2006). Enjoyment by nature leads to further engagement, sometimes even addiction from trainees, which motivates them toward better learning outcomes (Csikszentmihalyi, 1991; Funk et al, 2006; Brockmyer et al., 2009; Fu et al., 2009). An increased engagement among trainees permits business simulation games to enhance the effectiveness of training in a business context. This study found that a number of informants perceived that due to the engaging characteristics, the potential value of business simulation games in learning and training perspectives increased. In their written reports, many informants mentioned feeling enjoyment while they were playing the business simulation games in the course. Hence, working professionals find that a business simulation game would be an effective training tool in business practice.

Lastly, informants argued that business simulation games provide them with a better retention of the knowledge learned from playing. It was previously found that learning by games would improve an individual's retention rate when compared to other learning methods (Hays, 2005; Pierfy, 1977; Fu et al., 2009; Randel et al., 1992). Interestingly, a retention rate of knowledge is

generally related to a student's interest in the learning content (Naceur & Schiefele, 2005). That is, more interest in learning would yield better retention. Researchers noted that business simulation games tend to aptly engage trainees, since engagement and interests in learning are closely related (Skinner & Belmont, 1993). Business simulation games lend to more vigorous engagement, coupled with more interest among trainees; this universal response is due to unique characteristics involved in gaming, such as playfulness. The result tends to be a better retention of knowledge. Informants of the study expected that the knowledge gained from playing the business simulation games in the course would last longer and better for each player.

Decision-making

An analysis of arguments made by working professionals in the study reveals that business simulation games could be applied to decision-making in business practice. Since decision-making is one of the most important business activities, it is important for professionals to have good decision-making skills in order to be successful in the workplace. From the analysis, business simulation games were deemed to be applicable to business decision-making in four aspects: 1) decision-making assistance, 2) demonstrating decision-outcome relationship, 3) structured problem-solving, and 4) risk-free exercise.

First, working professionals argued that business simulation games could assist them to make better decisions. Games display a collection of decision-making activities: Players pursue the goals within the game context (Abt, 1969). At the same time, games provide a good opportunity for decision-making exercise. Likewise, business simulation games are designed with decision-making assistance features for players. They feed players with relevant information such as current status, factors influencing outcome, anticipated consequences based on the decision, and so on. Also, many recent business simulation games offer players decent graphical user interface and a cockpit-style management control screen, which enables players to make a good decision.

Researchers opine that business simulation games offer instructional benefits not only in strategic decision-making, but also toward integration of a complex decision process (Pasin & Giroux, 2011; Zantow et al., 2005; Salas et al., 2009). Beck and Wade (2004) also found that employees who received game-based training were more accomplished at making decisions than non-game employees. Correspondingly, informants in the study found a value of business simulation games toward enhanced decision-making skills. Those informants who touted the decision-making assistance of business simulation games based their comments on their personal experiences with the business simulation games.

Second, working professionals find that business simulation games are useful in demonstrating how a certain decision causes the outcome. Many business simulation games present players simplified and manageable situations, so the players can easily understand the relationships among the factors (Cook & Swift, 2006). Business simulation games usually require players to make a series of decisions in playing activities. Participants also can receive feedbacks on their choices quickly and clearly (Bakken et al., 1992; Faria & Dickinson, 1994; Hoberman & Mailick, 1992; Pasin & Giroux, 2011). Hence, through playing business simulation games, players could acquire a clear understanding of the relationship among the business elements, as well as gain insights on how different decisions would yield various outcomes. As Cook and Swift (2006) averred, business simulation games allow players to experience the change over time. Further, the games are helpful for players to understand systemic effects and consequences (Machuca, 2000). Some informants in the study fully appreciated this advantage of business simulation games: Working professionals understand the interactions among various business elements by means of their experiences with the various games.

Third, the business simulation game is found to be effective as a tool that projects a structured, problem-solving approach to working professionals. One of the benefits that a participant experiences is an encounter with significant but rare business problems in order to solve them (Baker et al., 2005; Salas et al., 2009). The problem-solving skills for those rare business situations could not be easily attained by traditional learning methods, usually due to the inter-relation of many complex factors. Business simulation games suggest a structured approach to the business problems by virtue of certain game design structures that compromise relevant information and resources. Through playing business simulation games, participants could develop skills related to problem-solving and strategic decision-making, as well as behavioral skills (Salas, et al., 2009, Tompson & Dass, 2000). Informants found a value in the potential application of business simulation games, based on their personal experience in the course. Fourth, business simulation games are useful toward the practice of the decision-making process, due to the risk-free exercise feature. Although a decision-making skill is one of the most critical requirements of business professionals, it is not easy to learn the skills through conventional learning methods. One reason is that decision-making skills can be learned effectively through an empirical trial-and-error approach (Etzioni, 2001). By allowing participants to iterate the decision-making process with different strategies, business simulation games help the participants acquire decision-making skills efficiently (Baker et al., 2005; Faria & Dickinson, 1994; Salas et al., 2009). In addition, all the consequences made in business simulation games are risk-free (Adobor & Daneshfar, 2006; Baker et al., 2005; Faria & Dickinson, 1994; Fripp, 1993; Salas et al., 2009). Contrary to the decisions made in real-world situations that could be associated with various financial/social consequences, all activities in business simulation games are only orchestrated within the game itself. Thus, participants can strategize to see multiple

consequences. This risk-free, trial-and-error approach provides business simulation game players with more confidence and less stress (Alnier, 2003). The informants in the study accordingly noted the value of business simulation games in risk-free decision exercises, mostly based on their own experience or causal reasoning.

Business vision

It is found from an analysis of the data that business simulation games could be applied to enhance the business vision of business professionals. By means of dealing with a wide range of business processes and functions, business simulation games effectively aid business professionals to understand overall business environments, which in turn enables better performances. There are two types of claims gathered from the informants' arguments related to business viewpoint: macro view and new perspective.

First, informants pointed out that business simulation games allowed an individual a wider business perspective, since business simulation games essentially emulate the real-world business environment. Faria and Dickinson (1994) argued that business simulation games allow participants to learn in all areas of management. Business simulation games are usually designed to compel players to go through the processes in one or more business units in order to generate a relationship or structure among the information components (Wittrock, 1985; Zantow et al., 2005). Hence, by offering participants an opportunity to view how various areas of business organizations intertwine and cooperate with one another, business simulation games could widen the participants' viewpoints toward business processes, which can be called, a *macro view*. Some informants in the study stated that in playing the business simulation games in the course, they obtained a macro view of their organizations.

Similarly, some informants suggested that business simulation games could provide a new business perspective to working professionals. Many business professionals work at a specific

part or area of an organization, yet even these individuals switch their concentrations from time to time. Hence, for those who have worked a single area for a long time, it might be difficult to understand how other parts of the organization work and what their priorities might be. By letting participants experience business processes of various areas in a business organization, business simulation games could permit business professionals to grasp a new perspective about business, which would enhance their managerial skills as well. Several informants in the study mentioned that they could experience attaining new business perspectives through play business simulation games in the course.

Restraints of Application

Finally, several informants pointed out that business simulation games are not always beneficial to business professionals. There are definitely limitations in the application of business simulation games to business practices. Informants listed three distinctive limitations of business simulation games as 1) dissimilarity from the real world, 2) too much game-ishness, and 3) management resistance.

First, one of the elements of business simulation games is to engage the participants by means of reality in the game design. Participants can develop personal, situational perspectives and thereby connect learning to a real business practice, accomplished through the resemblance of the business simulation game to the real world (Faria & Dickinson, 1994; Haapasalo & Hyvönen, 2001; Hoberman & Mailick, 1992; Lainema & Hilmola, 2005). Nonetheless, for business simulation games to exactly mimic the real world is impossible. There must be some degree of simplification in the design of business simulation games (Cook & Swift, 2006). However, the discrepancy generated in the simplification process might cause players to become less intrigued with playing the business simulation games; ultimately, players may become reluctant to use the games in a real-world business practice. Several informants in the study noted the dissimilarity in

the business simulation games from the real world. The result was that the players felt a caution toward transferring their learning outcomes from the business simulation games to their work environments.

Second, as a sub-category of serious games, business simulation games are a combination of two distinctive cognitive concepts: enjoyment and learning. Only a well-balanced structure of the two elements could coalesce to make a business simulation game successfully instructive. Should business simulation games have too much playfulness or game-ishness, the games would be able to engage the players, but might fail to teach them. Too much emphasis on game-ishness could encourage hedonic usage patterns in the consumption of business simulation games (Hirschman & Holbrook, 1982); in turn, this gaming outcome could prove to affect instructional goals. A few informants pointed out the issue based on their personal experience in playing the business simulation games.

Lastly, informants mentioned that the application of business simulation games in the business environment could be prohibited by management resistance. Business simulation games are considered to be a relatively new concept, even though they actually have a long history. Any change in a business organization usually encounters some degree of resistance (Lawrence, 1969). Bringing business simulation games into the workplace might evoke concern from the management, especially regarding the effectiveness of the new tool. De Jong and Van Joolingen. (1998) found that resistance may be found from students as well as teachers when a computer simulation is adopted as a new learning tool. This response is partly connected to the earlier discussion of the game-ishness of business simulation games. Even though more and more interests are directed to the serious application of game, which is called serious games, across the

society, it is true that there still exists a perspective that game is not suitable to serious domains such as education, training, business, and the like (Van Eck, 2006).

Patterns of Argumentation

Given that the study concerning the application of business simulation games to business practice is innovative as well as still nascent, it is worthwhile to understand how the most potential users, as working professionals, make sense of these new business tools. While sensemaking is an individual activity (Weick, 1995), it can be socially applied, since individuals project themselves in the context of social groups or organizations (Berente et al., 2011). Hence, sensemaking could be also called social activity (Billig, 1996; Dodds et al., 1997). In regard to the discourse of the working professionals toward business simulation games, I expect to find argumentation patterns, which would focus on an inherent direction of organizational strategy toward adoption or use of business simulation games.

Reviewing the written reports obtained from the 43 informants, I found that their arguments are mostly based upon their firsthand experience with business simulation games in the course. One pattern revealed by the analysis of the arguments is *generalization – personal experience* pattern, through which informants assume that their experience with business simulation games will be generalized in a business environment. This type of pattern was observed frequently throughout the informant arguments. This would be natural; individuals who go through a certain phenomenon and gain a positive experience tend to insist on the positive value of the phenomenon, based on their experiences. This type of retrospective sensemaking conforms well to Weickian social psychology (Weick, 1979; Berente et al., 2011). However, this evaluation of value should be accepted with caution, because the choice could be biased for confirmation. More specifically, people might select only a positive evidence of ground to support their claim, however non-intentional (Nickerson, 1998). Nonetheless, some arguments that tap a negative

perspective in the application of business simulation games also use this type of argument pattern. It would show that this pattern is a most frequent and powerful pattern, used to make sense when identifying the value of business simulation games in business practice.

Another pattern identified is *generalization – personal projection*. This is similar to the previous pattern, except the ground is based on an individual's projection that she plans to continue with business simulation games in her own working environment. In this pattern, informants usually grounded their claim on their opinions of the business simulation games or their expectations that they can proceed with the business simulation games. These project their opinions/expectations, obtained from playing business simulation games, to their workplace environment. Then they assume that their projection would be generally accepted by other working professionals or business practices. This pattern also might be susceptible to confirmation bias. However, given that this is a most frequent pattern of argument throughout the analysis, with no negative value of business simulation games emergent, it could be accepted as an appropriate pattern of making sense in an application of business simulation games to business practice.

There are also arguments based on a *causal reasoning – general principle* pattern, which relates to the informants' reasoning of value of business simulation games. In this pattern, informants asserted that business simulation games are effective toward bringing values into business practice. To support the claim, these respondents apply a general principle regarding the learning or management process. In most cases, the informants consider that general principles are applicable to the use of business simulation games in the business environment. This pattern frequently appeared in the analysis of informants' argumentations, which suggests that it is a valid argument pattern for making sense of application of business simulation games to business practice.

The analysis of the study reveals that there are largely three types of grounds and two types of warrants. And the argument patterns are basically the combinations of the identified grounds and warrants. At this point, it would be worthwhile to note why there are only the limited numbers of argument patterns appear from the analysis. Largely two reasons could be come up with regarding the issue.

First, the objective of this study is to understand how business professionals accept the values of business simulation games and transfer the values to their workplace. Brockriede and Ehninger (1960) argued that arguments can be classified into three main types: substantive, authoritative, and motivational. Given that the request of information for the informants in the study is basically asking them to provide their own opinions regarding the research topic, the arguments that the informants made are likely to be a substantive type argument, in which warrants usually reflect an assumption regarding the way that they see the world around them (Brockriede & Ehninger, 1960). Thus, there would be not much room for authoritative arguments or motivational arguments to be used in this type of topic. This would be one of the reasons that only limited patterns of arguments are revealed through the analysis.

Second, this study mainly asks individual informants for providing their arguments regarding the potential transferable values of business simulation games to their workplace based on their involvement in business simulation games throughout an operations management course in their MBA program. Hence, the most of their answers come from their personal experiences or thoughts they gained from playing the business simulation games in the course. This is why many grounds are based on personal experience/projection. Hence, informants make sense of values of business simulation games (i.e., their claims) and generalize them to a generic situation in many cases.

Implications

Despite recent interests in using games in serious contexts, including business areas (Van Eck, 2006), there are still gaps in practice and academic research with regard to how business professionals successfully apply business simulation games in their workplaces. This study attempts to fill the gap by analyzing the arguments about business simulation games from those working professionals who have experienced business simulation games extensively in the MBA course. It is also intended to seek a better understanding in the application of business simulation games by viewing the sensemaking patterns of arguments. In addition, this study sheds further light on the theories related to the sensemaking process of business professionals when they accept a new business tool.

This study will enlighten practitioners who seek a successful application of business simulation games in the diverse discussions of business simulation games. The four identified main categories in the application of business simulation games, as well as the specific claims obtained from working professionals, are proffered to broaden practitioners' knowledge. Further, those who consider using business simulation games in the business education/training sector would gain insights from this study. With its compatibility to a new, generational learning method, the importance of business simulation games in business education/training is expected to grow exponentially. In order to educationally introduce business simulation games to classes, it is vital to understand where business professionals place importance and the value on business simulation games. Further, this study sheds light on business educators' considerations of how an enhanced business education lends itself to future generations.

Limitations

This study has some limitations in its research. First, the analysis in this study is basically grounded on the written reports from informants who have taken a course in an MBA program.

Although most of the informants are business professionals, the source of data must be considered limited. They are students who were taking the same course in a part-time MBA program. Also, they played the same business simulation games. As discussed in the discussion section, the homogeneity in data source might have constrained the diversity of data. In addition, the written reports obtained from the informants were a part of course works, which also might limit the richness of information. In fact, there were a number of cases where students mentioned that the value of business simulation games could only be related to their course learning experiences and therefore could not be connected with their particular workplace circumstances. Also, there might not have been sufficient time for informants to reflect on the real value of business simulation games in the workplace. Many students actually mentioned it was their first experience in playing business simulation games extensively. To overcome these limitations, a future study might be based on data from more general situations, such as data gathered from individuals who have experienced business simulation games for years in various business areas. Another issue to be noted is the theoretical lens I adopt for this study. Although a Toulminian sensemaking framework is a useful way to exhibit the sensemaking process of IT adoption (Berente et al., 2011; King & Lyytinen, 2004; Hirschheim et al., 2011), the framework is mostly effective to interpret *past* or *current* practices rather than *future* expectation. Therefore, that contribution to this study might pose a constraint in providing the value of business simulation games that have been identified by working professionals to date. Given that business simulation games are not yet widely adopted in business practice, it is still worthwhile to reflect on the previous and current values, since few discursive analyses are available. However, in order to anticipate the future direction of the application of business simulation games in business practices, other analysis framework would be suitable.

CHAPTER CONCLUSIONS

Business simulation games carry a tremendous potential for application in a business context. Yet despite the growth of interest in this area, few works have interpreted how business professionals might accept this innovative technology by applying it to business practices. This study identifies the sensemaking process of business professionals in regard to the application of business simulation games to business practice. The findings of this study suggest that patterns of argumentation exist at present. This study found potentially applicable areas for these patterns in business simulation games; nevertheless, there exists restraint factors. The results concur with the informants' findings: The conclusions contribute to theories related to business simulation games, and thus benefit those practitioners who would use business simulation games.

CHAPTER 5: DISSERTATION CONCLUSIONS

Games have been a part of human culture for hundreds of years. With the explosive advances in information technology over the past thirty years, computer-enabled digital game playing has rapidly penetrated into our daily lives. Many people who play games by themselves also spend a lot of hours watching, and reviewing, others' game playing. For instance, the growth of eSports is so fast that the time spent watching eSports has increased from 1.3 billion hours in 2012 to 3.7 billion hours in 2014. The eSports loyal audience has increased from 58 million people to 89 million people (Casselman, 2015). YouTube, the world's largest streaming video provider, lists gaming as the category that has the second largest followers next to music. The computer-enable digital game playing audience is quite diverse. Newzoo (2014) revealed that 75% of eSport enthusiasts have full-time job, are 38% female, and 84% are over 21 years old. This shows that a significant amount of our workforces is familiar with computer-enabled games. This makes serous game more so a new means for innovative business education and training.

Serious games are relatively a new tool that combines the advantage of gaming and education. It basically refers to games with a specific primary serious purpose (Klabblers, 2003; Michael & Chen, 2006). Serious games can be used for education, training, and many other areas related to instruction. Serious games can be especially beneficial in business education and training because with its unique educational advantages including situated cognition, assimilation/accommodation, and engagement (Van Eck, 2006), combined with characteristics of business learning subjects and business learners (Michael & Chen, 2006; Hunter, 2013).

As a method of learning, serious games are not without their limitations and downsides. To maximize the benefits from serious games, it is necessary to understand more about how the learners' learning process works when using serious games in the business education and

training context. While the concepts of seriousness and playfulness are important constructs to consider when studying serious games, little was known regarding how these elements play roles in individual learners' game-based learning process. The findings of this dissertation research suggest that seriousness and playfulness are indeed significant components of the game-based learning process. Seriousness and playfulness influence extrinsic and intrinsic motivation as well as the participants' effort in the game-based learning process, which ultimately relates to the game performance and the learning outcome. Hence, future studies regarding serious games need to consider the existence of these two elements to understand how people learn something through playing games.

Another issue regarding the use of serious games in business education and training context is the transferability of the values of serious games to real-world business practices. It was often claimed that business simulation games, a subgroup of serious games used in business education and training, are beneficial to enhance the business students' ability to apply learning outcomes to real-world situation better than other learning methods (Wells, 1993; Faria & Wellington, 2004). However, no previous studies have been done about how business professionals evaluate the value of business simulation games and how they connect the values to real-world business practices. By analyzing the argumentations of working business professionals who have experienced various business simulation games, this research finds the various types of values of business simulation games transferrable to real-world business environment.

In addition, by analyzing patterns of argumentation of transferability of business simulation game values, this research suggests that direct experience is important for business professionals to gain the most value out of using serious games for business learning. This could give significant insight to business education and training area in terms of finding a learning method

that actually works for business professionals. Because they already have their own set of knowledge and beliefs towards their working practices, it is not an easy task to introduce them to a new theory or concept. However, letting them actually experience the new method can be a good way for the business professional to evaluate the values of the new concepts and decide to adopt it.

The future of serious games is promising. Though, many still focus on the entertainment value, but not on the educational value of games. By combining entertainment and serious purposes, serious games can be a revolutionary method of teaching and learning. This research makes contributions to both theory and practice by providing a precursory investigation regarding various aspects around using serious games in business education and training. The findings will not only provide useful insights that can be applied directly to the use of serious games in business education and training, but also offer a direction for further research.

In brief, this research explores the use of serious games in business education, especially with regards to the role of seriousness and playfulness in the game-based learning process, and the transferrable values of business simulation game learning to the real world.

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APPENDIX A: CONSTRUCT DEFINITIONS AND MEASUREMENT ITEMS

Construct	Definition	Measurement Items [Item code]
Perceived Seriousness	Participant's readiness to perceive, act, or communicate seriously. In a high seriousness state, the individual is attentive, involved in something perceived as really important, applies a sober or objective perspective or style, is earnest in purpose, and not mentally set for levity or amusement (Ruch et al., 1997)	• I am prepared to play the simulation game in earnest. [SR1] (Dropped) • Playing the simulation game is a important thing on my mind. [SR2] • When playing the simulation game, I have a serious mental attitude. [SR3] • When playing the simulation game, I regard my situation objectively and soberly. [SR4] • When playing the simulation game, I am a serious frame of mind. [SR5] • When playing the simulation game, I am in a thoughtful mood. [SR6] • When playing the simulation game, I am not prepared for silliness or nonsense. [SR7] (Adopted and revised from Ruch et al., 1994; Ruch et al., 1997)
Perceived Playfulness	Participant's perception that the simulation game will fulfill the participant's intrinsic motives, including factors such as enjoyment and curiosity (Moon & Kim, 2001); Play a game within the game itself (Riezler, 1941); Voluntariness, spontaneity, intrinsic worthiness (Makedon, 1984)	• Playing the simulation game gives enjoyment to me. [PL4] • Playing the simulation game gives fun to me. [PL5] • Playing the simulation game keeps me happy. [PL6] (Dropped) • Playing the simulation game stimulates my curiosity. [PL7] (Dropped) • Playing the simulation game leads to my exploration. [PL8] (Dropped) • Playing the simulation game arouses my imagination. [PL9] (Adopted and revised from Moon & Kim, 2001)
Extrinsic Motivation	Playing the simulation game to attain the outcome from outside of the simulation game, e.g. grades, higher rank among classmates (Ryan & Deci, 2000); Participants' belief that s/he is stimulated to do well in the simulation game seeking for rewards (Guthrie & Wigfield 2000)	• Identified o I think that playing the simulation game will help me better prepare for my job. [EM_ID1] (Dropped) o Playing the simulation game eventually will enable me to get the better job that I like. [EM_ID2] o Playing the simulation game will help me make a better choice regarding my job. [EM_ID3] o I believe that playing the simulation game will improve my competence as a worker. [EM_ID4] (Dropped) • Introjected

		○ I play the simulation game to prove to myself that I am capable of completing this course successfully. [EM_IJ1] ○ I play the simulation game because of the fact that when I succeed in this course I feel important. [EM_IJ2] ○ I play the simulation game to show myself that I am an intelligent person. [EM_IJ3] ○ I play the simulation game because I want to show myself that I can succeed in this course. [EM_IJ4] • External regulation ○ Without playing the simulation game I would not find a better job later on. [EM_RG1] ○ I play the simulation game in order to obtain a more prestigious job later on. [EM_RG2] ○ I play the simulation game because I want to have "the good life" later on. [EM_RG3] ○ I play the simulation game in order to have a better salary later on. [EM_RG4] (Dropped) (Adopted and revised from Vallerand et al, 1989)
Intrinsic Motivation	Playing the simulation game for the inherent satisfaction of the simulation game playing itself (Ryan & Deci, 2000); Participants' willingness to participate in the simulation game itself regardless of rewards (Shernoff et al. 2003; Reeve, 2002)	• Challenge ○ I like playing the simulation game because it's a challenge. [IM_CH1] (Dropped) ○ I like to learn as much as I can from the simulation game. [IM_CH2] ○ I like to go on to new simulation game that is at a more difficult level. [IM_CH3] (Dropped) ○ I like complex simulation games because I enjoy trying to figure them out. [IM_CH4] ○ I like difficult simulation games because I find it more interesting. [IM_CH5] • Curiosity ○ I ask questions about the simulation game because I want to learn new things. [IM_CU1] ○ I do extra effort in simulation game because I can learn about things that interest me. [IM_CU2] ○ I play the simulation game because I am interested in the subject. [IM_CU3] (Dropped) ○ I play the simulation game really hard because I really like to learn new things. [IM_CU4] • Independent mastery ○ I like to try to figure out how to do well in the simulation game on my own. [IM_MA1] ○ When I don't understand something in the simulation game right away, I like to try to figure it out by myself. [IM_MA2] (Dropped) ○ When I make a mistake in the simulation game, I like to figure out the right answer by myself. [IM_MA3] ○ If I get stuck in the simulation game, I keep trying to figure out the problem on my own. [IM_MA4] ○ I like to play the simulation game without help. [IM_MA5]

		(Adopted and revised from Lepper et al., 2005)
Feedback System	Participants' perception that an appropriate feedback system exists in the simulation game (Fu et al., 2009)	• I received feedback on my progress in the game. [FE1] • I received immediate feedback on my actions. [FE2] • I was notified of new tasks/events in the game immediately. [FE3] • I received information on my success (or failure) of intermediate goals immediately. [FE4] (Adopted and revised from Fu et al., 2009)
Challenge	Participants' perception that there exists a goal to achieve (Fu et al., 2009)	• The challenge was adequate, neither too difficult nor too easy. [CH1] (Dropped) • The difficulty of challenges decreased as my skills improved. [CH2] (Dropped) • The game provided appropriate challenges. [CH3] (Dropped) (Adopted and revised from Fu et al., 2009)
Reality	Participants' perception that the simulation game resembles the real world situation (Witmer & Singer, 1998)	• I was able to control the event in the game. [RE1] (Dropped) • The game environment was responsive to actions that I performed. [RE2] • My interactions with the game environment was natural. [RE3] • My experience in the game environment seemed consistent with my real-world experiences. [RE4] (Dropped) • I was able to anticipate what would happen next in response to the actions that I performed. [RE5] (Adopted and revised from Witmer & Singer, 1998)
Clear Rule	Participants' perception the game rule is clear and fair (Fu et al., 2009)	• The game rules were presented in the beginning of the game. [RU1] • The game rules were presented clearly. [RU2] • I understood the simulation game rule clearly. [RU3] (Adopted and revised from Fu et al., 2009)
Ease of Use	Expectation of the prospective user that the target system to be free of effort (Davis et al., 1989)	• The simulation game was easy to use. [EU1] • Interacting with the simulation game was unambiguous and easy to understand. [EU2] • Using the simulation game to learn the related concepts was easy. [EU3] (Adopted and revised Tao et al., 2009; Davis et al., 1989)
Usefulness	Subjective probability that a simulation game will increase his or her learning performance within an course context (Davis et al., 1989)	• The simulation game allowed me to learn the concepts faster. [USE1] • The simulation game increased my learning efficiency. [USE2] • The simulation game improved my learning performance. [USE3] (Adopted and revised Tao et al., 2009; Davis et al., 1989)
Competition	Participants' perception that they compete against each other to achieve in-game goals	• The game created an competitive environment. [CO1]

	(Giannetto et al., 2013; Liu et al., 2013)	• I tried to do my best to get better performance in the simulation game than other students. [CO2] • I spent significant amount of time playing this simulation game to get a better score. [CO3] • Playing the game made me be very competitive. [CO4]
Previous Experience	Participants' experience with similar simulation games in the past (Venkatesh & Morris, 2000; Davis, 1989)	• I have previous experience with other simulation games similar to this one. [PE1] • Simulation games were something new to me until I did this one. [PE2_R] (Reversed) • I was familiar with simulation games before I did this one. [PE3]
Game Efforts	Participants' behavior to make efforts to the game	• Standardized score based on the number of runs a participants played in a simulation game [Effort]
Game Performance	Set of psychological adaptations to the constraints of the simulation game (Ericsson & Lehmann, 1996); Performance that is yielded from more understanding, skills and abilities in simulation game (Salas et al., 2009)	• Standardized score of game result (Best result if multiple runs is applicable) [Perform] (Sheldon et al., 2002; Salas et al., 2009)
Learning Outcomes	Understanding of subject topic and applying the concepts appropriately; Constructing meaning through interpreting, exemplifying, classifying, summarizing, inferring, comparing and explaining; Carrying out or using a procedure through executing, or implementing. (Anderson & Krathwohl, 2001; O'Neil et al., 2005; Salas et al., 2009)	• Standardized score of course grade (from all grading components: quizzes, assignments, exercises, and exams) [Course_total] (Whiteley & Faria, 1989)

APPENDIX B: MEASUREMENT MODEL ANALYSIS (CFA)

To ensure the constructs used in the research model are tapped correctly by the items, the confirmatory factor analysis (CFA) was conducted for each construct by using SPSS software. In addition, Cronbach's Alpha was calculated to see the reliability of the measurement items. The results are as follows.

Playfulness

The CFA result of playfulness shows the items tap the enjoyment part of playing the games (Moon & Kim, 2001).

Construct	Item	Factor loadings	AVE	Cronbach's Alpha
Playfulness	PL4	.921	.813	.953
	PL5	.883		
	PL6	.898		
	PL7	.903		
	PL8	.879		
	PL9	.926		

Seriousness

Seriousness appears as a uni-dimension construct.

Construct	Item	Factor loadings	AVE	Cronbach's Alpha
Seriousness	SR1	.704	.641	.904
	SR2	.801		
	SR3	.860		
	SR4	.842		
	SR5	.861		
	SR6	.821		
	SR7	.716		

Extrinsic Motivation

As discussed in the theoretical background section, extrinsic motivation is generally accepted a multi-dimensional construct. As Ryan and Deci (2001) mentioned, extrinsic motivation is consisted of a spectrum of different types of extrinsic motivation based on the degrees of autonomy. As such, in the study, I divide extrinsic motivation into three different dimensions:

identification, introjection, and regulation, following Vallerand et al.'s (1989) framework. The CFT result of each sub-construct of extrinsic motivation is as follows.

Construct	Sub-dimension	Item	Factor loadings		AVE	Cronbach's Alpha
Extrinsic Motivation	Identification	EM_ID1	.937	.849	.856	.944
		EM_ID2	.928			
		EM_ID3	.935			
		EM_ID4	.900			
	Introjection	EM_IJ1	.912	.604	.852	.942
		EM_IJ2	.919			
		EM_IJ3	.924			
		EM_IJ4	.938			
	Regulation	EM_RG1	.863	.812	.857	.944
		EM_RG2	.961			
		EM_RG3	.949			
		EM_RG4	.930			
					.570	.937

Intrinsic Motivation

Likewise extrinsic motivation, intrinsic motivation is a multi-dimensional construct. It is generally accepted to be composed of three dimensions: challenge, curiosity, and independent mastery (Lepper et al., 2005). The CFT result of each sub-construct of intrinsic motivation is as follows.

Construct	Sub-dimension	Item	Factor loadings		AVE	Cronbach's Alpha
Extrinsic Motivation	Challenge	IM_CH1	.763	.967	.753	.915
		IM_CH2	.874			

		IM_CH3	.889			
		IM_CH4	.904			
		IM_CH5	.908			
	Curiosity	IM_CU1	.888	.904	.813	.885
		IM_CU2	.897			
		IM_CU4	.920			
	Independent Mastery	IM_MA1	.844	.846	.786	.930
		IM_MA2	.903			
		IM_MA3	.911			
		IM_MA4	.870			
		IM_MA5	.904			
					.820	.956

Other Constructs

The CFA results of other constructs are as follows.

Construct	Item	Factor loadings	AVE	Cronbach's Alpha
Reality	RE1	.769	.668	.869
	RE2	.852		
	RE3	.825		
	RE4	.840		
	RE5	.802		

Construct	Item	Factor loadings	AVE	Cronbach's Alpha
Feedback	FE1	.889	.763	.897
	FE2	.888		
	FE3	.819		
	FE4	.899		

Construct	Item	Factor loadings	AVE	Cronbach's Alpha
Challenge	CH1	.727	.624	.698
	CH2	.760		
	CH3	.882		

Construct	Item	Factor loadings	AVE	Cronbach's Alpha
Clear Rule	RU1	.905	.851	.912
	RU2	.945		
	RU3	.918		

Construct	Item	Factor loadings	AVE	Cronbach's Alpha
Competition	CO1	.830	.700	.855
	CO2	.834		
	CO3	.800		
	CO4	.882		

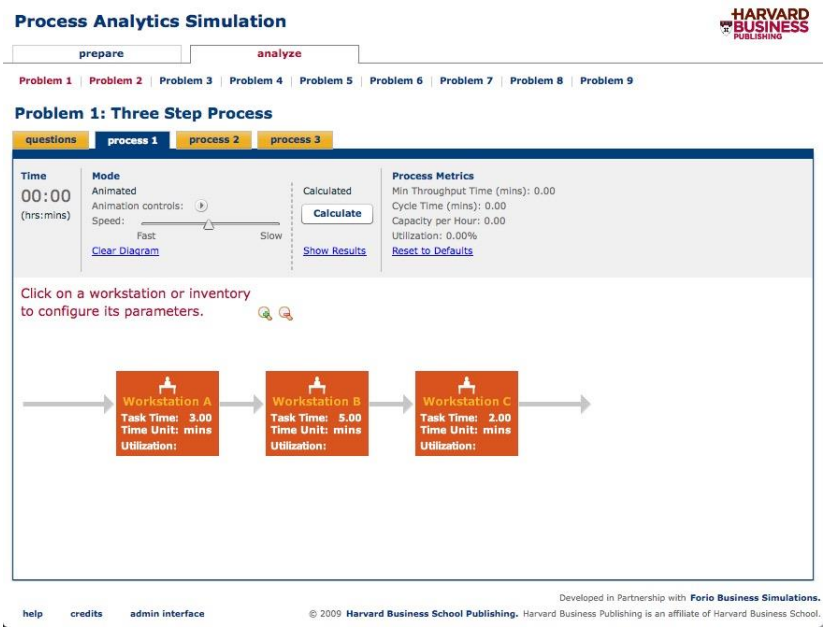
Construct	Item	Factor loadings	AVE	Cronbach's Alpha
Usefulness	USE1	.938	.907	.949
	USE2	.962		
	USE3	.957		

Construct	Item	Factor loadings	AVE	Cronbach's Alpha
Ease of Use	EU1	.899	.842	.905
	EU2	.934		
	EU3	.919		

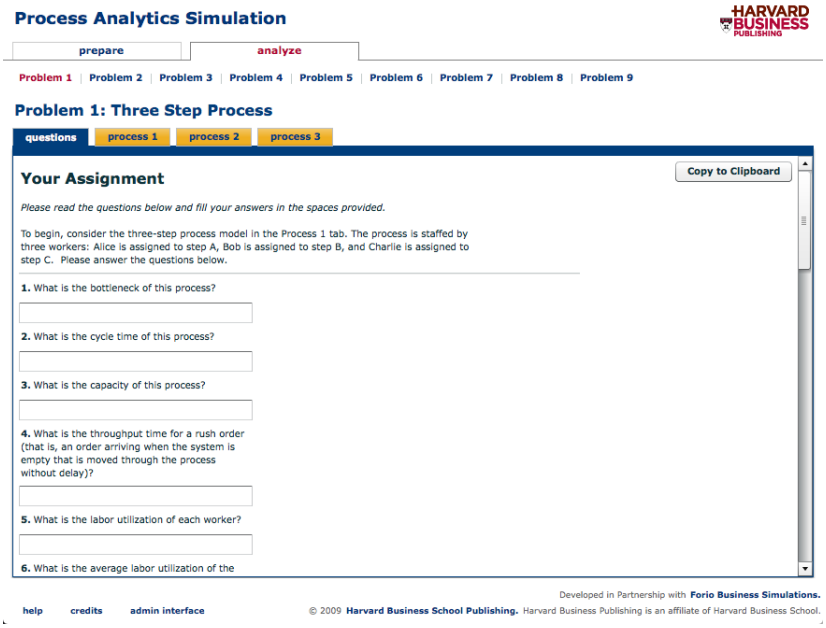
Construct	Item	Factor loadings	AVE	Cronbach's Alpha
Previous Experience	PE1	.895	.760	.842
	PE3	.928		
	PE2_R	.793		

APPENDIX C: DESCRIPTION OF BUSINESS SIMULATION GAMES

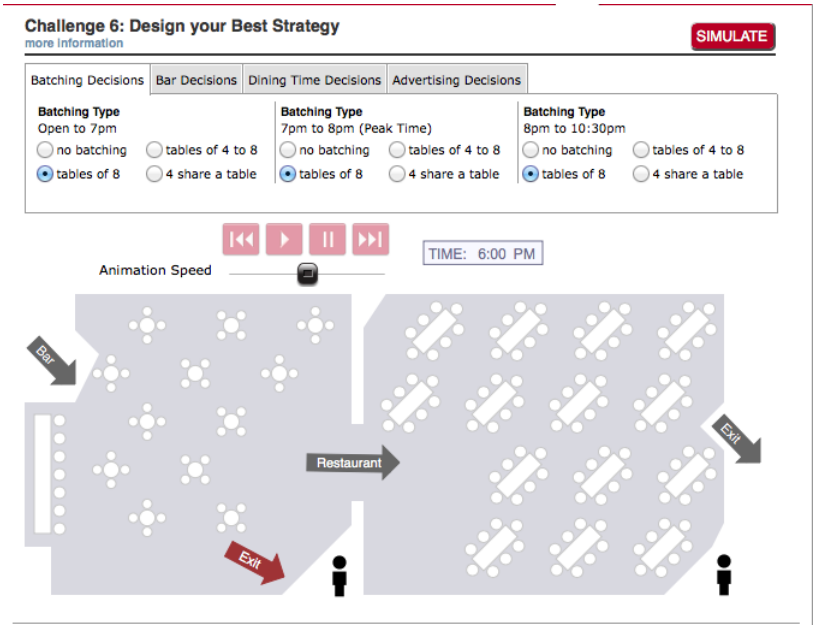
Game	Subject Area	Context	Game Goals	Game Format	Player
Process Analytics Simulation	Project management	- Discrete-parts production line flow. - Analyze processes	- Complete exercises - Answer questions	- Self-paced - Typical completion in 90 min. - Optional repetition - No competition	Individual analyzing
Benihana Simulation	Process analysis, Queueing theory, Capacity management	- Benihana hibachi restaurant - Adjust process parameters such as restaurant design, batching, promotion, and service strategy	- Maximize average nightly profits	- Self-paced - Typical completion in 90 min. - Unlimited repetition - Competitive	Individual analyzing
Project Management Simulation	Project management	- High-tech printer development - Play a role as senior project manager tasked with managing a product development team to develop an innovative consumer printer.	- Maximize multi-objective score card	- Self-paced - Typical completion in 90 min. - Unlimited repetition - Competitive	Individual role playing
Global Supply Chain Management Simulation	Supply chain management, Product design, Forecasting, Inventory management, Production planning	- Global cell phone manufacturer - Supply Chain. Act as a product manager through a four year cycle: each with 4 stages: design, forecast, source, produce, and review of results with feedback by the board of directors.	- Maximize total profits - Maximize board votes	- Self-paced - Typical completion in 120 min. - Limited repetition - Competitive	Individual role playing
Root Beer Simulation	Supply chain management, Bullwhip effect, Inventory management	- Beverage distribution - Play one of four roles in a root beer supply chain: factory, distributor, wholesaler, or retailer; each week placing orders to minimize inventory costs	- Minimize inventory costs	- Real-time play - Typical completion in 60 minutes - No repetition - Competitive	Role playing in team



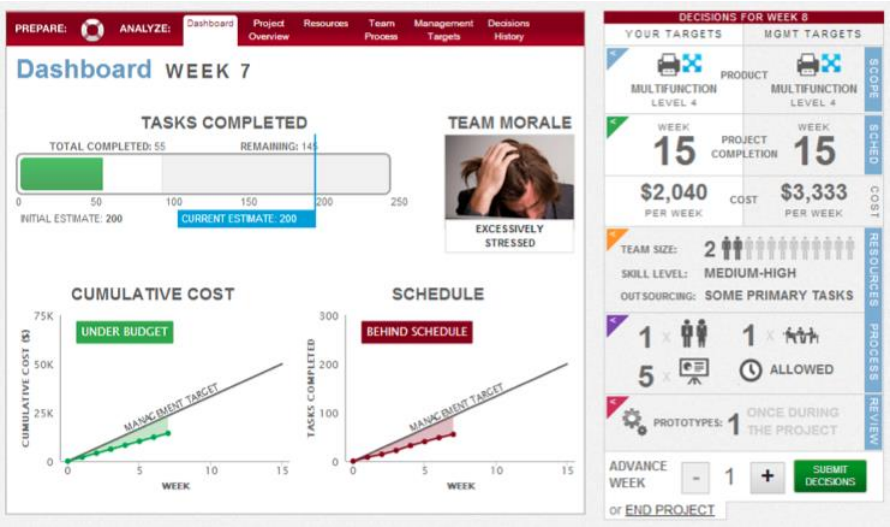
Process Analytics Simulation Screenshot (Simulation)



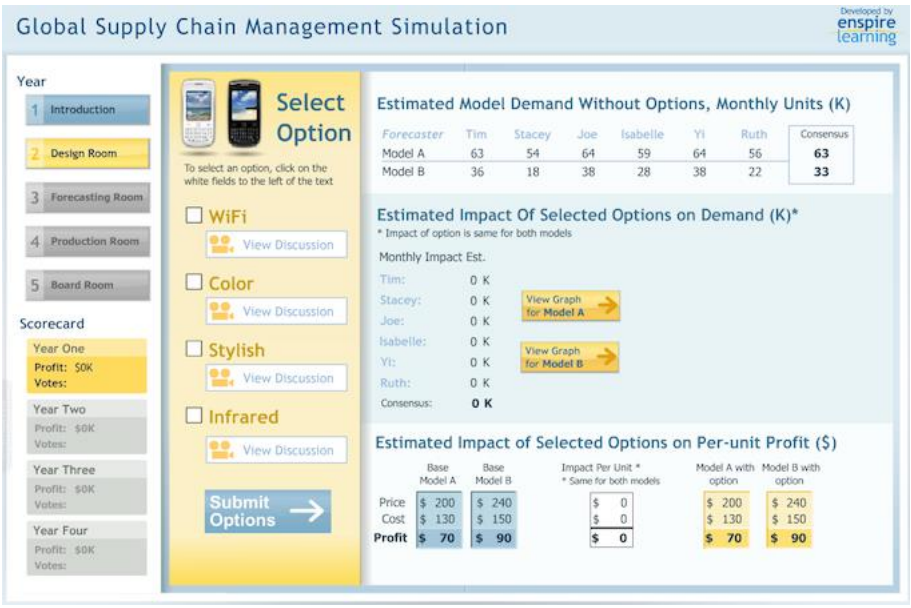
Process Analytics Simulation Screenshot (Questions)



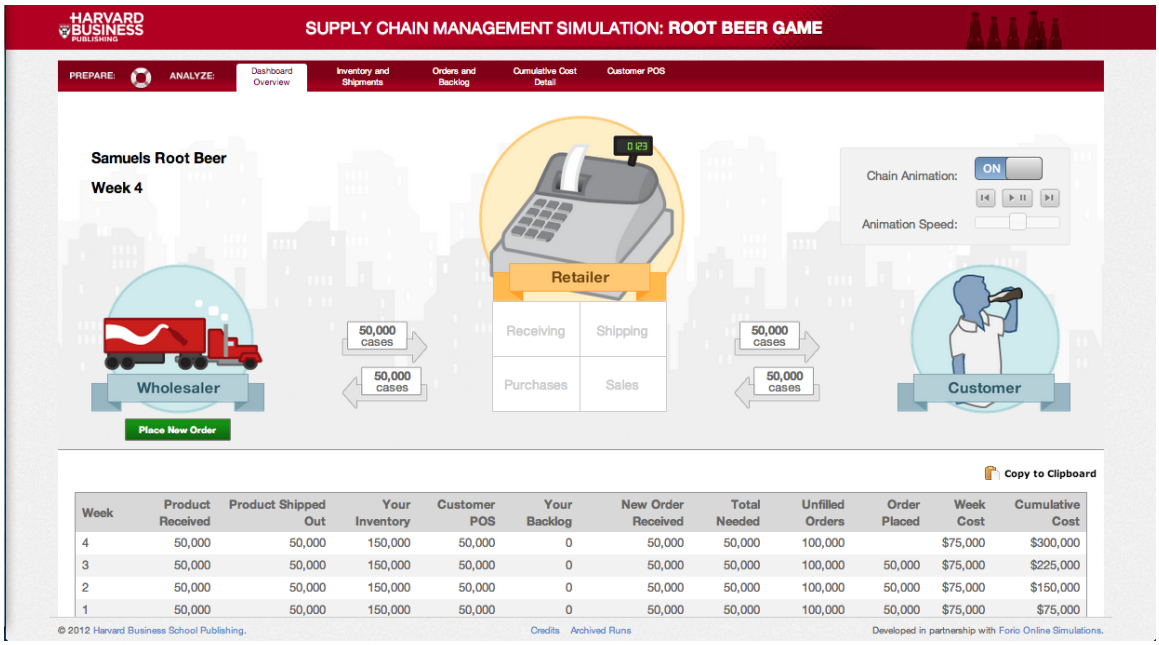
Benihana Simulation Screenshot



Project Management Simulation Screenshot



Global Supply Chain Management Simulation Screenshot



Root Beer Simulation Screenshot

APPENDIX D: INFORMATION REQUEST FORM

Simulation Game Written Report Description

Throughout this course, you have played multiple simulation games. The main objectives we hope to achieve with these games are, first, to enhance your knowledge and skills in the area of operations and supply management. Second, we ultimately would like you to apply what you have learned to your real-world business environment.

There are two key processes necessary to achieve these objectives. First, of course, is the actual implementation (i.e., setting up and running) of the simulation games. By improving your simulation experience, you should improve your chances of achieving the level of learning that we hope you can achieve. Second, we expect that you will be able to apply these lessons to your real-world business environment. Of course, the level of learning and application to the real-world is highly dependent on your individual learning styles and capabilities, and on your daily work environment. You might have already identified areas in your work environment where you can apply what you learned in the simulation games, made better decisions, or where you can better understand your business environment. Alternatively, you might have thought of ways that these learning lessons might have implications or utility in other settings around your organization.

Please think about what you learned from these simulation games. Things through some ways that you did (or can) transfer those lessons to the real work environment successfully. Do you think you can possibly transfer the lessons from the simulation games to the real world? In addition, please consider the opportunities as well as challenges that you may encounter when you apply the lessons to your business environment.

For this assignment, there may not be any one right answer, but your honest response as a business professional is of the utmost importance.
Please prepare to write up your thought on this issue based on your own experience and opinion during the final exam. You may pick only one of the simulation to focus on that had the greatest impact:

- Project Management
- Process Analytics
- Benihana
- Beer Game
- Global Supply Chain simulation

APPENDIX E: CODING PROCESS EXAMPLE

Coding phase	Coding activity	Example (Excerpted from Informant's [#21] report)
Open coding	Step 1: Read the written reports carefully Step 2: Mark segments of text related to the transferring values of business simulation games to business practices	"The first Simulation that we as a class were introduced to was in relation to the subject matter of project management. The Project management simulation introduced the concept of "Scope, Resources, and Schedule," and how tradeoffs within the given resources have to be balanced. The simulations we carried out ranged from simple process analytics to global supply chain management. The additional simulations that followed, the basic concept was a simple one of reinforcing managerial concepts in operations along with providing students an applicable way of exploring and discussing their decisions. *The variety of decisions made and rationale behind the decision making process of the simulation game was intriguing and beneficial providing immediate feedback. It allowed students to see multiple view points for the same problem and discuss the analysis in reaching that point. Though I feel the course could have benefitted from more in class discussions following these simulations, the experience was still enjoyable and mentally stimulating.* *I am truly excited to apply the learned concepts of the material referenced and experience gained through the simulation games. Although I have yet to apply these concepts in my current position as the sales coordinator for the XXX[1] I have begun to outline some proposed changes that have been inspired and encouraged through my understanding of the material and application of concepts in a simulated environment. In addition, this summer I will be on the Global Supply Chain process improvement project for hydroprocessing catalyst. And though the material taught within this course has given me the foundation to provide value to my organization, it is the simulations that have given me the ability to see how the learned concepts are applicable.* *The Global supply chain management simulation played within this course has given me the ability to experience the bullwhip effect in relation to the global environment.* For example one of the identified or defined issues that will be explored in our upcoming supply chain project is the inconsistency with the inventory of raw materials. *The experience gained through the simulation has helped me understand in hypothesizes that one of the possible reason for the inconsistency in raw material inventory could be the bullwhip effect. The opportunity to apply this knowledge and actual experience gained through the simulation will be invaluable both to my organization and me."*
Axial coding	Step 3: Code the claim concerning the value of business simulation games Step 4: Code the ground supporting the claims Step 5: Code the warrant connecting the ground with the claim	Claim: Business simulation games provide learners with opportunity to experience with applying theoretical concepts to real situation. Ground: I could learn the concepts through other materials and simulation helped me understand how the concepts are applied through simulations. Warrant: My experience with business simulation game that helps me understand concepts and apply them to my workplace will be applicable to other people. (Inferred from the context)
Selective coding	Step 6: Identify the topic of claim Step 7: Identify the type of ground Step 8: Identify the type of warrant Step 9: Identify the pattern of argumentation	Topic of claim: Enhancing learning experience Ground: Personal Experience Warrant: Generalization Argumentation pattern: [Enhancing learning experience] – [Generalization] – [Personal Experience]

[1]: anonymized company name

APPENDIX F: IRB APPROVAL FORM

ACTION ON EXEMPTION APPROVAL REQUEST

Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
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TO: Joo Baek Kim
ISDS

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: May 6, 2015

RE: IRB# E9340

TITLE: Serious games in business education (dissertation research)

New Protocol/Modification/Continuation: New Protocol

Review Date: 5/5/2015

Approved X **Disapproved** _____

Approval Date: 5/6/2015 **Approval Expiration Date:** 5/5/2018

Exemption Category/Paragraph: 1; 2a

Signed Consent Waived?: Yes for online; No for in-person.

Re-review frequency: (three years unless otherwise stated)

LSU Proposal Number (if applicable): ____

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman _____

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE**: Signed consent waived for online not for in-person

**All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at http://www.lsu.edu/irb*

VITA

Joo Baek (J.B.) Kim received a Bachelor of Business Administration from Seoul National University in 2003. During his college years, he served in the Korean Augmentation Troops to United States Army in Dongducheon, Republic of Korea, from 2000 to 2002. He also received a Master of Business Administration from Seoul National University with concentration in Operations Management in 2005. While working at Samsung Economic Research Institute (SERI) and Korea Information Society Development Institute (KISDI), he decided to come to the U.S. to continue studying the impact of technology in society. After he earned a Master of Manufacturing Management from Pennsylvania State University and a Master of Information Systems from University of Arkansas, he joined the doctoral program in Information Systems and Decision Sciences at Louisiana State University and will complete the degree in the summer of 2015. His research interests include Serious Games, Gamification, Use of Games in Business, Business Analytics, Online User Behavior, Online Customer Review (eWOM), Information Technology Adoption, Social Aspects of Technology, IS Implementation, Multilevel Research, Statistical Analysis Methods, and Qualitative Research Methods. He was born in Busan, Republic of Korea. He is married to Suim, and has two children, Daniel and Evelyn.