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The values of college students in business simulation game: A means-end chain approach

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ABSTRACT

Business simulation games (BSGs) enable students to practice making decisions in a virtual environment, accumulate experience in application of strategies, and train themselves in modes of decision-making. This study examines the value sought by players of BSG. In this study, a means-end chain (MEC) model was adopted as the basis, and ladder method soft laddering was used to conduct in-depth interviews with students who had experience in using BSGs. The chain concept of "attribute–consequence–value" was used to understand students' value cognition structures. Content analysis was used to analyze the attributes–consequences–values for BSGs players, then converted into a Hierarchical Value Map (HVM). The results showed that students consider ***teamwork*** and ***market diversity*** as the most important attributes, and the consequences of a cooperative approach and market diversity are ***emotional exchange*** and ***multi-thinking***, with the ultimate value brought to users by exchanges between teams and constant thinking being ***interpersonal relationships*** and a ***sense of accomplishment***.

1. Introduction

Although playing games in the classroom does not solve all of the problems with education, it can be a useful tool, one of many different methods and techniques used to involve students with their learning (Nemerow, 1996). Technology can help facilitate the knowledge-constructed classroom. Computer games as educational tools also have an intrinsic motivational factor that encourages curiosity (Kumar, 2000). Computer simulations have been used in specific scientific disciplines such as engineering, bio-sciences and for high-risk occupational training such as military, aviation and medicine (Jackson, 2004). Meanwhile, simulation games have been shown to be an effective tool in the teaching of management techniques (Birknerová, 2010; Gilgeous & D'Cruz, 1996; Mawdesley, Long, Al-jibouri & Scott, 2011; Tal, 2010; Wall & Ahmed, 2008; Yasarcan, 2010). When used appropriately, these tools can increase a student's engagement in the learning process (Anderson, 2006).

A substantial body of literature indicates that the use of non-traditional interventions, such as games, simulations, multimedia instruction and interactive activities are valuable teaching methods (Glynn, Aultman, & Owens, 2005). Many researchers have advocated the use of simulation games to complement traditional lectures for enhancing students' learning (Kiili, 2005; Tan, 2007; Tan, Tse, & Chung, 2010). There are studies which pointed that the use of computer games may improve thinking and educational effective (Aliya, 2002; Virvou, Katsionis, & Manos, 2005). Computer games can create a new learning culture that corresponds better with students' habits and interest and provide the necessary support for effective teaching and learning to take place (Prensky, 2001). Creating opportunities for students to practice applying the material, such as in a game or simulation, can bridge the distance between learning concepts presented in a classroom and using that information to solve a problem met outside of the school (Kumar & Lightner, 2007).

As business globalization and advances in software technology continue to occur, more diversification in education and training in schools has led to exciting developments in online teaching, competition-style teaching and simulation systems. If operators of business

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simulation systems want to enhance their competitiveness, the key is to provide appropriate customer value to users. To do this it is necessary to first understand users' customer value cognition frameworks as a basis for developing marketing strategies.

While simulations games are becoming more and more widespread in education, very little is known about how they work. Much of the research in this area has focused on comparing game playing to lecturing. Although business simulation games (BSGs) intrigued a substantial number of gamers, the majority of these gamers were uncertain of the experience they were expecting from the games. If game publishers want to enhance their competitiveness, the key is to provide the correct customer value to the users of BSGs, and to provide the correct customer value, it is necessary to understand first the players' value cognition framework as a basis for developing marketing strategies. And as such, if game publishers could identify the final value that BSGs players pursue, it would give them an edge by allowing them to align their game development and marketing strategies closer to gamers' values. Consequently, game publishers would be able to accomplish the goal of increasing profits.

As has been observed in this brief overview, research into BSGs has used a variety of methods obtaining quantitative and qualitative data. Students' responses to classes using simulation games are a critical indicator of the widespread use of simulation games in higher education. It is therefore important to know how the college students think the business simulation games are being promoted for their formal learning (Lim, 2008; Prensky, 2008). Does using a business simulation games improve students' motivation to learn classroom material? The teachers would normally like to know the students' response to the new technology. The purpose of this study was to understand student experiences with and value perspectives on the business simulation games.

In this study, we adopted BSG as a case study to discover the value obtained by students using simulation systems. Means-end chain (MEC) was used for exploring the value in the marketing sector. Qualitative research with an emphasis on individual experience helped us understand the linking of the product attributes to the chain's consumption results and personal values. The means-end chain model can explain consumers' choice of services, whether products have reached consumers' target values, customer values from a rational point of view, and whether customers gain benefits through product attributes or assessment of quality. Therefore, this study investigated whether or not MEC constructs are also suitable for analysis of ultimate value in use of simulation systems. We hope this will make an empirical contribution and also bring positive benefit to the industry. This study adopted MEC to explore and link the three elements of the attributes of students when using BSGs, the consequences, and the personal ultimate value after use, to form a logical framework, while soft laddering of the Ladder method for in-depth interviews was used to understand the students' value cognition in use of BSGs.

The correlations between the ultimate values that students seek through their use of BSGs, product traits and resulting benefits identified in this research not only serve as a useful reference for system operators in the development of relevant products but can also be used as references for teachers promoting/encouraging students to use BSGs.

2. Background theories

2.1. Game-based learning

Simulations and drill and practice games already are used in the military, schools, and industry for learning (Thiagarajan, 1998). There are many successful examples of digital game-based learning experiences (DGBL), particularly in the fields of business simulations, military war games and procedure based manipulations such Prensky's Monkey Wrench Conspiracy or medical procedures such as ResusSim (Smith & Mann, 2002). The game is an example of problem-based learning because it provides students with an initial set of problems and requires them to collect information and reason on their own in order to solve the problems (Mann et al., 2002). Of course, many educators are already using simulations and games to foster learning for decades (Gredler, 1996; Heinich, Molenda, Russell, & Smaldino, 1996; Reigeluth & Schwartz, 1989).

Games provide structure for interactions, reward students for collaborating and problem solving (Schwartzman, 1997), and promote cooperative learning, individual accountability, positive interdependence, and the need for group processing and feedback (Millis & Cottell, 1998). Such a context for learning supports the development of social competence (Huyen & Nga, 2003; Nemerow, 1996; Schwartzman, 1997) or the impact of games on student learning (Kumar & Lightner, 2007).

Previous studies have discussed the role of the teacher in constructing DGBL experiences. This takes the form of structuring and framing the activity of the learner in DGBL in achieving learning outcomes, integration of the DGBL into classroom activities and post-game discussion of scenarios (Henderson, Klemes, & Eshet, 2000; Lyman, 1995; Smith & Mann, 2002). Burguillo (2010) digested that game-based learning can be combined with similar learning methodologies as collaborative-based learning (Slavin, 1980), problem-based learning (Hmelo-Silver, 2004; Hmelo-Silver & Barrows, 2006; Merrill, 2007) and project-based learning (Barrows & Tamblyn, 1980; Boss & Krauss, 2007).

Numerous researchers continue to examine the performance benefits from active learning strategies or the impact of games on student learning (Angelo & Cross, 1993; Bonwell, 1996; Butler, Phillmann, & Smart, 2001; Hake, 1998; Terrell & Rendulic, 1996). Past research has shown that games are designed to generate a positive effect in players (Kiili, 2005; Kirriemuir, 2002; Tao, Cheng, & Sun, 2009; Terrell & Rendulic, 1996; Webster, Trevino, & Ryan, 1993). Games can lead to increased learning (Schwabe & Goth, 2005; Skadberg & Kimmel, 2004) and encouraged to interactive (Gosen & Washbush, 2004; Proserpio & Gioia, 2007; Randel, Morris, Wetzel, & Whitehill, 1992; Schwabe & Goth, 2005; Zantow, Knowlton, & Sharp, 2005). Especially, educational simulation games can increase the motivation to learn (Randel et al., 1992). However, a few focus on the business management curriculum teachings in higher education (Ebner & Holzinger, 2007; Tao et al., 2009; Virvou & Katsionis, 2008).

Learning through games becomes an interactive way to deliver knowledge (Gosen & Washbush, 2004). Tan et al. (2010) proposed game pathway would provide four advantages to support learning: (a) making knowledge accessible; (b) making thinking visible; (c) making learning fun; and (d) promoting autonomous learning. Tao et al. (2009) show that perceived playfulness and learning performance positively influence students' satisfactions, which further influence the intention to use computer simulation games. Perceived ease of use and perceived attraction play a critical role in determining perceived playfulness. The students' perspective provide a strong support for the teachers to adopt or continue using computer simulation games in classrooms.

2.2. Business simulation games

A survey of current business simulation game users, former users and never users among business faculty across disciplines concludes that the number of never users (52.3%) is higher than that of the current users and former users combined (Faria & Wellington, 2004).

There are many operations management simulation games such as Beer Game, Buckingham Game, Dice Game, Rope Game, Simlogistics, Prisoner's dilemma, and Nagare Game. For example, *Beer Game* is mainly used to illustrate the bullwhip effect and *Buckingham Game* is training about the concept of just-in-time manufacturing. There are also many business simulation games (BSGs) such as Business Tycoon, Mall Tycoon, Informatist, IndustryPlayer, IndustryMasters and Business Operational Simulation System (BOSS). In the BOSS, players can create and manage own company. In real-time, players experience a multiplayer competition for market leadership and shareholder value within a simulation of real world economy. In such BSG, participants experience the fundamentals of strategic management within their own, interactive virtual economy. Players develop a strategy, undertake an entrepreneurial start-up and compete with each other in a real-time multiplayer competition.

Several studies argue that business schools do not adequately prepare students to understand and cope with the ambiguities they will inevitably face in real world organizations (Lee, Koh, Yen, & Tang, 2002; Tesch, Braun, & Crable, 2008). BSGs present an effective alternative to traditional teaching methods; that they provide a link between abstract concepts and real world problems; that they offer additional practicality to the learning setting and give students the chance to practice decision-making cases, which represent the temporal and process characteristics of the real world environment (Tal, 2010). Ones that are worth mentioning, Whiteley and Faria (1989) pointed that simulation games are an effective means by which to improve quantitative skills but are not an effective means by which to improve the acquisition of applied or theoretical knowledge. Wu and Katok (2006) found that training improved individual's knowledge but not the supply chain performance unless communication between partners was allowed and knowledge shared. Whatever, in this study, most students thought that they had gained a lot of management knowledge.

2.3. Means-end chain

The means-end chain is a marketing theory derived from the means-end theory. The means-end chain is the cognitive representation of the connections between a person's knowledge about a product attributes, consumers' perceived positive consequences, and personal values (Gutman, 1982, 1997). Means-end analysis offers a method for explaining how and why program outcomes occur, and thus have the potential to provide practitioners with information for more effective program design and delivery (Frauman, Norman, & Klenosky, 1998). Unlike factor analysis or multi-dimensional scaling, means-end analysis considers program attributes, proximal outcomes, and distal outcomes fundamentally interrelated and integrate them into a single framework (Reynolds & Gutman, 1988).

Three important constructs in these networks are attributes (A), consequences (C), and values (V). The level of product attribution of a consumer can range from being physical/concrete or abstract (brand image), to those that are either functional or psychological, to those of the consumer's "instrumental and terminal values" (Woodside, 2004). Walker and Olson (1991) suggested that the three lower levels in the means-end chain (concrete attributes, abstract attributes, and functional consequences) represent the product-knowledge of consumers while the three higher levels (psycho-social consequence, instrumental value, terminal value) represent the self-knowledge of consumers. In this study, means-end chain model was integrated by some researchers (Mulvey, Olson, Celsi, & Walker, 1994; Olson & Reynolds, 1983; Walker & Olson, 1991) (as shown in Fig. 1).

Kahle (1983) and Verhoff, Douvan, and Kulka (1981) developed the List of Values (LOV) which was based on Kahle's (1983) Social Adaptation Theory. In recent years, the LOV has been used in various market research. LOV identified nine core values, which include a sense of belonging, excitement, warm relationships with others, self-fulfillment, being well respected, fun and enjoyment of life, security, self respect, and a sense of accomplishment (Joubert & Mabunda, 2007).

3. Methodology

3.1. Sampling

In recent years, universities and colleges in Taiwan have begun to introduce business operation management games in courses, with students from business management schools as the primary participants. Since BOSS, Marketing Winners and Beer Games by TOP-BOSS Corporation were the games chosen for the courses, only the students who are familiar with BOSS have been chosen for the interviews

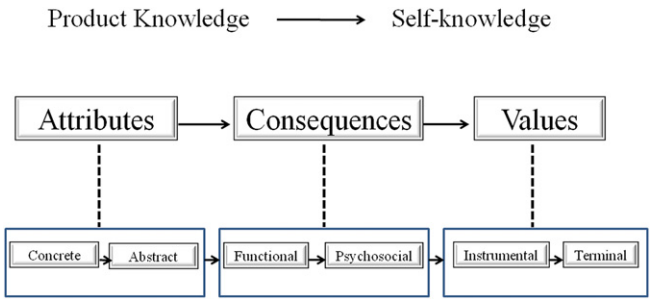

Fig. 1. Means-end chain model. Source: Mulvey et al., 1994; Olson & Reynolds, 1983; Walker & Olson, 1991.

in order to prevent discrepancies resulting from the use of different systems, while some subjects were chosen from the teams that took part in the nationwide BOSS contest.

There are many means-end studies that have sample sizes of 30 informants (Kuisma, Laukkanen, & Hiltunen, 2007; Sun, Cheng, & Finger, 2009; Vriens & Hofstede, 2000). Reynolds and Gutman (1988) recognize that a pool of 50–60 informants provides the opportunity to address the research questions by evaluating several different solutions during the generation of the hierarchical value map. The participants for this study were 70 college students. The laddering interviews were conducted over the end four months of 2010. Before the 70 ladder interviews we carried out 5 pilot interviews with the aim of testing the interview guide. In order to ensure that interviewees could relax and have their interviews in a comfortable environment, the interviews for this study have been conducted at the researchers' interview laboratory and other locations that interviewees have requested in Taiwan.

A total of 70 subjects were interviewed with a male–female ratio at roughly 3:7. About 85.71% ($n = 60$) of the subjects were undergraduate students and 14.29% were graduate students. All respondents were between 20 and 30 years old. Most of the interviewees have had one to two years of experience with BOSS and most of them became familiar with the system because it was the designated system chosen by their course instructors. 54% of the subjects have had prior experience in school/interschool BOSS competitions and among them, 61% received outstanding results. With regard to students' motivation to take part in relevant contests, 55% have done it voluntarily; 30% were drawn by the cash prizes and 21% were chosen by their instructors.

3.2. Measures and data collection

Laddering is a specific technique used to identify means-end chains. The aim of the technique is to determine the links between attributes, consequences and values (Reynolds & Gutman, 1988). Soft laddering allows people to go back and forth within the hierarchy. The researcher could dig below consumers' knowledge about the perceived product attributes and consequences to their underlying beliefs about value satisfactions (Peter & Olson, 2005). Semi-structured in-depth interviews also allowed the researcher control over the line of questioning but also provided participants with enough reign for rich descriptions.

In this study, researchers applied a soft-laddering technique to analyze how student perceive the outcomes of BSGs use. In laddering technique, respondents are first asked questions intended to elicit the attributes of the BOSS in question that influenced their use behavior. Laddering primarily using a series of directed probes, by the repeated question "why is this important to you?…", with the express goal of determining sets of linkages between the key conceptual elements across the range of attributes, consequences, and values (Grunert & Grunert, 1995; Reynolds & Gutman, 1988). Follow-up questions are then asked in order to learn why specific attributes are important. The series of questions continues until the respondent mentions a value or could no longer provide any further information (Klenosky & Saunders, 2007).

Using a laddering technique, respondents attended individual interview sessions, of between 45 min and 1 h. Each student was individually interviewed by a trained research. The interviews were conducted in a semi-structure (open) way. After collection of the demographical data, the researcher asked each player to identify motives of their BSGs experience that they felt were most meaningful. The interview continued along the "chain" questions like "Why is this attribute important to you?" Participants were told that there are no wrong or right answers.

3.3. Data analysis

Coding of the data and content analysis was performed according with the relevant literature (Kassarjian, 1977; Reynolds & Gutman, 1988). After conducting the interviews the raw material had to be analyzed in order to introduce so called content codes. Each code is identified as an attribute, consequence, or value, which means that all data are categorized into elements. Respondents' individual verbatim were then grouped together around a similar theme and assigned to a corresponding element code. The data collected from the interview were coded and categorized independently by four researchers who have experience of using BSGs.

The analysis of laddering data involves summarizing the key elements of the interviews by means of a standard content analysis procedure into a diagram displaying the dominant connections among attributes, consequences and values. Based on Gengler and Reynolds (1995), Veludo-de-Oliveia, Ikeda, and Campomar (2006) summarized the laddering analysis and interpretation steps as follows.

- Data reduction (data conversion into separated phrases);
- Content analysis of the element selected in the previous step;
- Summation of relations in content codes, resulting in an implication matrix (IM) of all paired relationships; and
- Construction of a diagram to meaningfully represent the main implications of the study, the hierarchical value map (HVM).

After coding, the reliability should be test. Inter-rater reliability addresses the consistency of the implementation of a rating system. The index of reliability was 0.875 (as shown in Table 1), exceeding the recommended guideline (interrater reliability = 0.70) (Perreault & Leigh, 1989). Once initial intercoder reliability was determined, researchers worked together to resolve differences in coding of the data. All disagreements were resolved by discussion.

Table 1
Intercoder reliability.

Researcher	A	B
B	0.8	
C	0.67	0.63

Average of agreement = $(0.8 + 0.67 + 0.63)/3 = 0.7$.
Reliability = $(3 \times 0.7) \div [1 + (3 - 1) \times 0.7] = 0.875$.

4. Results and discussion

4.1. Attributes–consequences–values

The means-end analysis began when a list of attributes, consequences, and values was created based on phrases and key words that emerged from the interviews. The content analysis results comprised extraction of eleven attributes, ten consequences, and nine values. In terms of frequency, the attribute of ***teamwork*** ($n = 46$) came first, followed by ***simulated business operations*** ($n = 29$), ***enterprise reports*** ($n = 29$), and ***serving as business executives*** ($n = 23$). The ***multi-thinking*** of the ten consequences was the highest ($n = 50$), followed by ***emotional exchange*** ($n = 36$), ***accumulated experience*** ($n = 32$), and ***understanding business concepts*** ($n = 31$). In the last nine values, ***fun and enjoyment of life*** was the highest ($n = 46$), followed by ***sense of accomplishment*** ($n = 40$) and ***self-satisfaction*** ($n = 36$). The higher the number of occurrences, the more attention was given to the samples (as shown in Table 2).

Simulations allow students to temporarily have control over a virtual company, to see whether their decisions lead them to success or failure (Cruz, Escudero, Barahona, & Leitao, 2009). Hence, BSGs can help participants gain realistic managerial experience as ***accumulated experience*** benefits. In BSGs, students create and manage their own company. The system can help to understand business operating processes and concepts, and the latter, through the management process, can enhance learning and help to understand what management concepts are needed. Many respondents felt that the characters they play in the BOSS could realize their fantasies by being master of powerful skills, capable of performing incredible feats and doing things that are difficult in real life. BSGs allow users to take on fictional characters such as general manager, department manager and so forth. In real-time, they experience a multiplayer competition within a simulation of real world economy. The majority of training simulations involves working in groups or teams of people (Wellington & Faria, 1992). The teams compete against each other in order to gain market share. Success is measured and compared by both operational and financial key indicators.

4.2. The implication matrix – the hierarchical value map

From a total of 70 respondents, 192 value ladders were constructed, and the average number of times the ladder was mentioned was 2.74. Based on the implication matrix (IM) results, the respondents produced a total of 387 links, with the average number of links being 5.53. The IM rows and columns represent the links between A–C–V, and the figures in the table indicate the links between variables (as shown in Appendix A).

Fig. 2 is constructed according to the ACV links. The links relationship presented by the hierarchical value map (HVM) was used to understand what benefits and value BSGs brought to the students. Grunert, Beckmann, and Sørensen (2001) indicate that the cutoff level should be at least three when the number of samples is between thirty and sixty when Gengler and Reynolds (1995) pointed that the cutoff is usually 5% of participants. Hence, the cutoff value is set at five in Fig. 2.

4.3. Primary path analysis

Fig. 2 shows the important linkage paths of students using BSGs. The following explains the major three paths respectively.

1) Teamwork (A10) – Emotional Exchange (C07) – Interpersonal Relationship (V06)

In the linking path of ***emotional exchange***, the attribute source is ***teamwork***, mainly because each person can play different roles (such as general manager and department manager) in BSGs. Because of the variety of roles, every manager must play to his or her strengths and draw on the attribute of teamwork to co-operate in division of labor and discussion to come to an optimal decision. In this process, students can make friendships within the team to achieve ***emotional exchange*** results ($n = 33$). In the environment of cooperation amongst a number of people, each student must learn how to interact and get along with other participants, so in using BSGs, the opportunity arises to know the people with different modes of thinking, to share experiences, and thus to contribute to good ***interpersonal relationships*** ($n = 16$).

Through BSGs, students were willing to communicate and share with others and most of the subjects mentioned ***emotional exchange*** as a beneficial consequence. This is consistent with literatures that proposed BSGs would improve students' learning capabilities through interaction and cooperation (Wellington & Faria, 1992). The ***interpersonal relationship*** value can encourage exchange between teams, enhance mutual friendship, and result in other benefits. This value is similar to prior studies that SG can encourage interactive and

Table 2
Content codes and frequencies considering all the ladders.

Attributes	Frequency	Consequences	Frequency	Values	Frequency
A01 Simulated Business Operations	29	C01 Full Use of Time	9	V01 Self-fulfillment	36
A02 Serving as Business Executives	23	C02 Accumulated Experience	32	V02 Excitement	10
A03 Role Play	4	C03 The Use of Statements	10	V03 Self Respect	9
A04 Simulation Game Software	7	C04 Understanding of Business Concepts	31	V04 Being Well Respected	3
A05 Without actual Risks	9	C05 Expectations for Continuing Contacts	4	V05 Sense of Belonging	9
A06 Enterprise Reports	29	C06 More Detailed Thoughts	8	V06 Interpersonal Relationships	23
A07 Challenging	5	C07 Emotional Exchange	36	V07 Sense of Accomplishment	40
A08 Market Diversity	22	C08 Multi-thinking	50	V08 Security	16
A09 Competitions among Companies	17	C09 Enhancing Fun	10	V09 Fun and Enjoyment of Life	46
A10 Teamwork	46	C10 Enhancing Judgment Power	5		
A11 Multi-phase Competition	1				

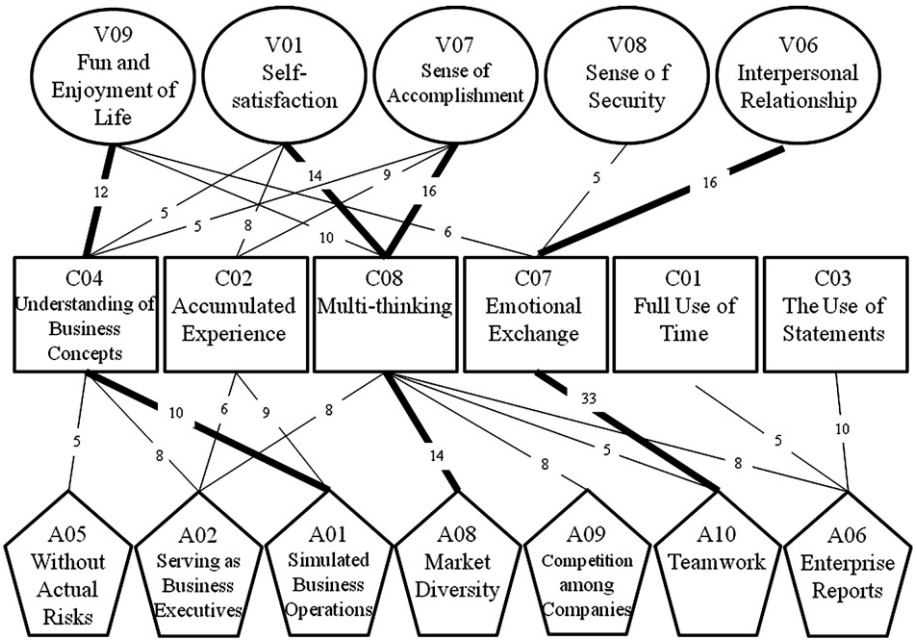

Fig. 2. HVM for all BSGs participants.

cooperative (Gosen & Washbush, 2004; Schwartzman, 1997; Zantow et al., 2005). In order for simulation games to be successful, members of the groups had to create harmonious relations by means of getting to know and supporting each other (Birknerová, 2010). So when there is a difference between teams in direction of thinking, the student in the role of general manager must consider all the views to make an appropriate decision. In the process of discussion and analysis, there may be differences of opinion, but after full communication, the team, in addition to sharing their ideas with each other, will also form a stronger consensus.

2) Market Diversity (A08) – Multi-thinking (C08) – Sense of Accomplishment (V07)

BSG combine five management areas (production, marketing, personnel, development and finance) and provides different market models and economic environments to choose from. In the decision-making process, different economic environments, such as seasonal fluctuations, impact of marketing activities, price flexibility, and other factors should be considered. In the competition process, students observation of the opponent's direction of investment and marketing budgets can allow analysis of whether or not the investment of the team is correct, allow further modification of the strategy, and through ***multi-thinking*** ($n = 14$) develop a decision-making model. High profits and market share will create ***sense of accomplishment*** ($n = 16$).

The essential pedagogical goal of the simulation game method is to increase the students' thinking flexibility (Randel et al., 1992) and solve the problems (Mann et al., 2002). Through BSG, students would be able to practice various models of thinking that management personnel adopted. Through different dimensions of deliberation, students would benefit from the consequence of ***multi-thinking***. With regard to the conclusion that BSGs would facilitate the development of logical deduction for students appearing in numerous SG researches (Faria, 2001), it was only mentioned by the subjects in a relatively lower frequency. This might be because students would have no way of knowing if their capacity for deduction improved within such a short time and they were only certain that they improved in the area of thinking.

3) Simulated Business Operations (A01) – Understanding Business Concepts (C04) – Fun and Enjoyment of Life (V09)

If students want to understand business operation models, through the BSGs system, they can understand a business from purchase of raw materials, production planning, input of marketing budgets, pricing strategies, research and development costs, capital utilization, selection of markets, equity enhancement, capacity allocation, and other business management processes. Most students believed that they had gained a lot of management knowledge and experience from the simulation games and got to ***understand business concepts*** ($n = 10$) as a result. Thus, the students were favored with the ultimate value of ***fun and enjoyment of life*** ($n = 12$) as representatives of happiness and joy.

The interviewees pointed out that through the games; they were able to better understand the contents of accounting, marketing, production, and financial operations in addition to general corporate management. This had in turn boosted their management related knowledge, thus helping them to achieve the benefit of ***understanding business concepts***. SG enables participants to develop analytical decision-making skills, including problem identification and solving skills; data handling skills and thinking skills (Birknerová, 2010; Gorgone et al., 2002; Parker & Swatman, 1999; Tal, 2009, 2010) so that the key knowledge, abilities, and skills could be more effectively used (Birknerová, 2010). Students not only can learn or combine knowledge in the process of BSG education (Birknerová, 2010), but also gain the grade in the relative courses. The results make students feel got the ultimate value of ***fun and enjoyment of life.***

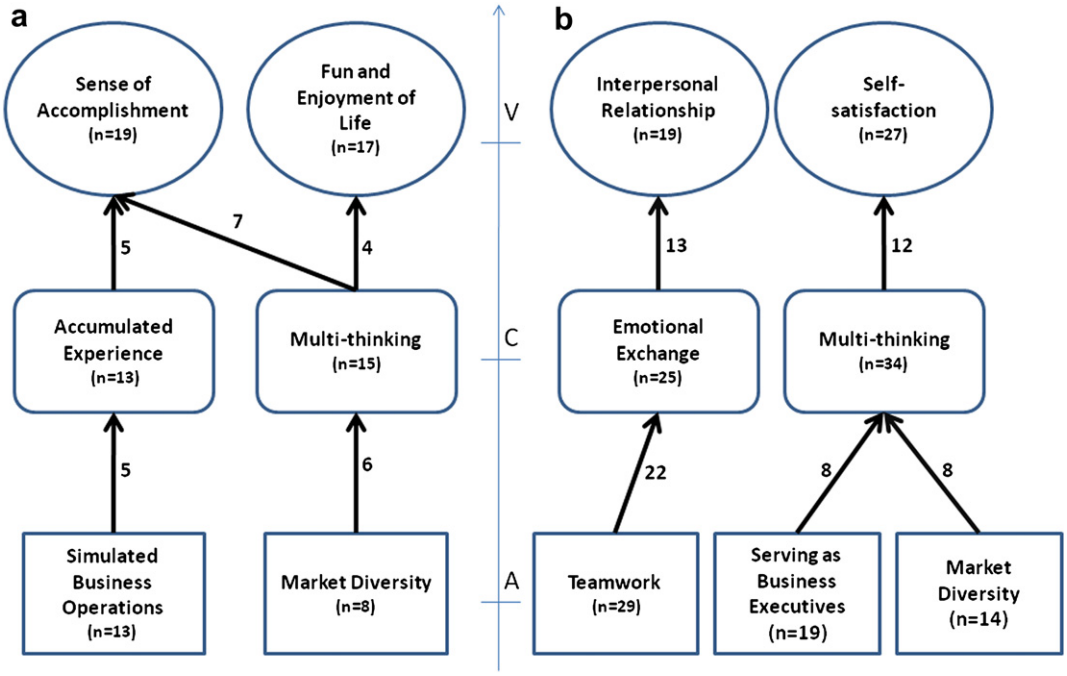

Fig. 3. a: HVM for male participants; b: HVM for female participants.

4.4. Secondary path analysis

The study further explored the difference in values in gender groups (as shown in Fig. 3a & b). The one attribute all students focused on was ***market diversity***, which in BSGs can be based on different environments and changing trends when selecting the appropriate market to carry out decision-making.

Fig. 3a shows the HVM of male students. The attributes most boys focused on were the two specific attributes of ***simulated business operations*** and ***market diversity***, indicating that male students were more concerned about entities and visible elements. In the process of simulated business operations, for changes and trends in the environment, the process of choosing a lucrative market for the team in market competition can be analyzed, so analysis can be accumulated of the decision-making process and knowledge on how to respond to different marketing strategies. When a correct decision helps beat opponents (such as grabbing market share and the occurrence of net income and growth), male students were rewarded with a ***sense of accomplishment*** as the ultimate value.

Fig. 3b shows that in female students' HVM, the attributes most female students focused on were ***teamwork***, ***market diversity***, and ***serving as business executives***. ***Teamwork*** was the abstract attribute most characteristic of female students' as a group, which includes a greater likelihood to contact with others and exchange views and knowledge in the competition process. The team members will be more likely to establish common values and enhance ***emotional exchange*** between individuals and the group. The ***emotional exchange*** will bring about a more profound mutual understanding, and mutual exchange will also enable learning from each other through the process of interpersonal interactions. Through this mode of getting along with people, better ***interpersonal relationships*** can be achieved.

In terms of attributes, male students emphasized more on practical and specific ***simulated business operations***, while female students put more emphasis on abstract ***teamwork***. However in terms of results, both considered that in following ***market diversity***, students needed to analyze competitors and market trends and think about how to achieve operational objectives, thus promoting ***multi-thinking***. However, the values that ***multi-thinking*** brought to the male and female students were different. The value brought to the male students was a ***sense of accomplishment***, indicating that male students place emphasis on winning the competition as an ultimate value; while the value that ***multi-thinking*** brought to female students was ***self-satisfaction***, indicating that female students focused more on whether or not they really had access to knowledge and had enriched themselves. They did not care so much about gains and losses in the competition itself, thus emphasizing the value of helpfulness.

5. Conclusions and implications

5.1. Conclusions

In this study, a soft laddering one-to-one interview approach was adopted to grasp step by step the attributes, results, and values in students' minds, and to link the three levels to be presented in the HVM, in order to understand the linking relationship among the three variables, facilitate understanding of the attributes valued by the students using BSGs and the consequences of the benefits, and thus meet the different ultimate values of the students. Because of the different roles played in BSGs or other factors, students may focus on different results and values. HVM can be used to explain the students' psychology in the use of BSGs, indirectly explain the ultimate values the students pursued, and also explain the process of the student's behavior paths. In the pursuit of a particular ultimate value, hierarchical analysis can guide students in the operation of BSGs.

Students consider ***teamwork, simulated business operations*** and ***enterprise reports*** as the most important attributes, and the consequences of a cooperative approach and market diversity are ***multi-thinking*** and ***emotional exchange***, with the ultimate value brought to users by exchanges between teams and constant thinking being ***fun and enjoyment of life*** and ***sense of accomplishment***.

The study results showed that important links existed between the three values of ***interpersonal relationships***, ***sense of accomplishment***, and, ***fun and enjoyment of life*** while ***interpersonal relationships*** and ***sense of accomplishment*** had the highest number of links. In BSGs, students should work with others to co-operate to achieve ***emotional exchange*** results, and then to contribute to good ***interpersonal relationships.*** Through ***multi-thinking***, if users gain high profits or market share that would be create ***sense of accomplishment*** or ***self-satisfaction*** for them. Especially male students were rewarded with a ***sense of accomplishment*** the ultimate value; female students were rewarded with ***self-satisfaction***. As representatives of happiness and joy, some students through ***simulated business operation*** to ***understand business concepts*** that make them feel got the ultimate value of ***fun and enjoyment of life.*** Both female and male students, they all focused on the attribute of ***market diversity.*** However, male students emphasized on ***simulated business operations,*** while female students emphasized on ***teamwork.*** In terms of results, both considered ***market diversity***.

5.2. Managerial implications

The results revealed that students placed heavy emphasis on the attribute of ***market diversity***. This suggests that students prefer competitive environments that are enriched, diversified and unpredictable. Therefore, the study would suggest that system developers may want to include random environmental crises (i.e. financial crisis, natural disaster and so forth) in the system. This would not only make their simulation closer to actual business environments but also allow students to benefit from the consequence of ***multi-thinking*** (driven by the environmental crises). If students could overcome crises through ***multi-thinking*** in competitions, it would allow them to achieve other values of ***self-satisfaction***, ***sense of accomplishment*** and ***enriched life***.

BSG provides attributes for various types of ***business reports***, and although it can link and apply to the particular report that students have studied, it cannot bring students to the ultimate value. So it is suggested that the BSG industry could design small units such as comprehension tests, so that users can immediately become aware of related reports in use thus increasing the ultimate value; teachers in the teaching of enterprise reports courses can be more diverse and varied, so that students in the use of enterprise reports can generate more interest and the ultimate value.

Furthermore, in certification and evaluation aspects BSG has some shortcomings, and it is proposed that system operators should provide a way to increase the value of students' ***sense of accomplishment***.

5.3. Pedagogical implications

The interviews revealed that most of the students were satisfied in terms of system operation but they expect more when it comes to the timeliness of feedback and teaching support. The subjects felt that instructor's guidance and rewards was still the key to higher learning motivation and results, even if the course were to be in the format of a game. The integration of commercial computer games needs to be accompanied by instructional activities (Charsky & Mims, 2008). Teacher must be supported with carefully selected tasks, teacher guidance and monitoring, and assessment of the learning outcomes (Miller, Lehman, & Koedinger, 1999). Instructors are expected to stimulate and motivate students to engage in discussions, debates and practical work while providing relevant assistive materials. In order to help students benefit from the value of ***fun and enjoyment of life,*** instructors need to fine-tune the classroom atmosphere to make their lessons feel like competitions or games.

In Taiwan's higher education, BSGs are mostly directly/indirectly introduced to students by their instructors. And as such, it would require careful deliberation in the configuration of BSG to relate to the syllabus in order to prevent additional stress for students. Instructors not only have to familiarize themselves with the operation of BSG but also play the roles of hosts (in competitions) or corporate consultants. And as such, it would be easier to arouse students' ambition to attain victory through the use of BSGs and thereby create an atmosphere for learning. This would allow students to benefit from a ***sense of accomplishment***, which is the ultimate value that students care about.

However, the learning process engendered by simulations does not suit all students (Charsky & Ressler, 2011) and the learning experience could be improved by the application of various learning mechanisms from the field of educational research (Long, 2010). Past literatures also showed that when other methods of instruction end up being more time consuming for students to achieve learning, students would opt for traditional methods of teaching instead (Charsky & Ressler, 2011; Kumar & Lightner, 2007). Incentives for students to use BSGs do not guarantee a better learning performance (Tao et al., 2009). Instructors would have a higher chance of facilitating course promotion and optimizing learning results in their introduction of BSG by aptly inspiring their students or assisting students to achieve the ultimate goals they desire.

In addition, instructors are recommended to host competitions or encourage their students to take part in school/interschool BSG competitions in order to help students satisfy their needs for ***sense of accomplishment***. BSGs are designed to allow students to learn various business operation procedures and the links that connect different processes in a competitive yet risk-free environment. Teaching guidelines for instructors can also be focused on helping students to win relevant competitions to accumulate relevant experiences or be configured to create simulated experiences whereby students have to "operate their businesses to survive in adverse situations".

This can be realized by offering more instruction on the fundamentals of strategic management and configuration of economic environment in negative growth. For instance, in order to help a business achieve the objective of sustained operation in a highly competitive environment, students would not only have to focus on proper business development planning but also be more cautious in the establishment of business strategies. As for female students, ***teamwork*** would be a recommended solution for them to overcome obstacles. Although the outcome of competition is not a consequence or benefit that female students are primarily concerned with, it would nonetheless facilitate ***emotional exchange*** for them with other members in the team and ultimately benefit from the value of enriched ***interpersonal relationships***. It would serve as a means for female students to expand their interpersonal network. As for the male students, they would benefit through the ***accumulation of experience*** through ***business management simulation*** (with relatively more difficult environment settings), ultimately gaining a ***sense of accomplishment*** through the competition and thereby boosting their confidence in job-

hunting in the future. BSGs not only allow students to learn crisis handling, teamwork and effective communication within a short period of time in a risk-free environment but also allow them to cultivate their capacity to handle stress (which students tend lack) and their ability to think quickly.

5.4. Future direction and limitations

By simulations of BSGs to understand enterprise operations, future research could explore users of BSGs, the consequences, benefits, and the ultimate value after students have entered the business world, and whether or not their use experience is different from that while at school, and could also conduct deviation analysis of expected values before and after the students use BSGs, or quantify the results of the study for verification. In addition, future research might concentrate on how BSGs can be applied in studying various aspects of course. A quantitative follow-up study based on the results is useful.

The method of learning through simulated environments is not exclusive to business management faculties; courses such as international negotiations also utilize simulated negotiations as a component of the syllabus (Project ICONS, 2011). The primary limitation of this research would be in the applicability of the conclusions and suggestions we have arrived at in this study (with students of higher education as users of BOSS). It would require further research to determine if the findings of this research could be applied to other education simulation software or for students in lower education.

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Appendix. Implications matrix of BSGs.

	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	V01	V02	V03	V04	V05	V06	V07	V08	V09
A01	2	9		10				3	2	3									
A02		6		8			1	8											
A03		2		1				1											
A04	2	1		1	1				2										
A05		2		5	1			1											
A06	5	2	10	2		2		8											
A07		1			2			1	1										
A08		3		2		1		14	1	1									
A09		3					2	8	3	1									
A10		2		2		3	33	5	1										
A11						1													
C01												(2)		(1)			(2)		(4)
C02								1			(8)	(3)	(2)		(4)		(9)	(2)	(3)
C03											(2)						(2)	(2)	(4)
C04		1									(5)		(3)			(2)	(5)	(3)	(12)
C05												(1)							(3)
C06											(2)		(1)		(1)	(1)	(1)	(1)	(1)
C07						1					(1)		(1)	(1)	(3)	(16)	(2)	(5)	(6)
C08											(14)	(2)	(1)	(1)	(1)	(2)	(16)	(3)	(10)
C09											(1)	(2)				(2)	(2)		(3)
C10											(3)		(1)				(1)		

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