The Influence of Business Simulation Game Experience on Students Perceived Learning Outcomes and Satisfaction

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Abstract

The objectives of this research were to examine students' perceived learning outcomes and satisfaction with the management accounting course at a private university in Guangdong, China, which integrated the business simulation game, iBizSim. Sample data was collected from target population by using quantitative method and questionnaire as a tool. The researchers have encountered challenges in incorporating experiential learning, game-based learning, and authentic team-based learning into the business curriculum, despite mounting evidence that collaborative learning can enhance learning outcomes and satisfaction. Previous studies exploring the impact of concept understanding, skills development, and affective evaluation on learning outcomes remain limited, and there are no existing hypotheses relating to these latent variables. By addressing these gaps, this research contributes to the advancement of knowledge in the field. In this study, 427 surveys were collected and analyzed using Structural Equation Modeling (SEM) with SPSS 26.0 and Amos 23.0 to test hypotheses and confirm causal relationships among variables. The quantitative results supported the proposition that experience generation from the business simulation game positively influences learner perceived learning outcomes and satisfaction. Improved conceptual understanding, affective evaluation, and teamwork were identified as contributing factors. However, no significant influence was found between skills development and perceived learning outcomes, consistent with limited previous research on this aspect. Based on these findings, it is recommended that teachers of business management courses adopt simulation-based instruction in team-based and experience-generated environments to enhance perceived learning outcomes and satisfaction.

Keywords: The Influence of Business Simulation Game; Experience on Students' Perceived Learning outcomes; Satisfaction

Introduction

The content of the accounting curricula is changing from the rules-based transmission to the simulation-based learning approaches in recent years. In China, the Ten-year Development Plan for Education Informatization (2011-2020) proposed the integration of information technology into teaching, the provision of high-quality digital education resources and software tools, and the use of information technology to promote heuristic, exploratory, discussion, and participatory teaching (Cui & Zhao, 2020). The current academic research achievement for the business simulation games in Chinese academic circle are almost emphasis on qualitative research, while in the limited amount of the quantitative research.

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The theories which have been employed in this quantitative research were Experiential Learning (EL) theory, Game-based learning (GBL) theory, and Authentic Team-based learning (ATBL) theory. Based on Experiential Learning (EL) theory, learning happens as individuals transform experiences and respond to environmental and personal demands (Kolb & Kolb, 2009: 297-327). This process is represented by a learning cycle where learners acquire knowledge from real-life experiences, reflect on them, integrate their understanding through abstract concepts, and apply their newfound knowledge through active experimentation. Furthermore, studies of survey feedback on students' learning in business simulation settings showed that students focus more seriously and positively about simulation teaching than lectures and case discussions (Lovelace et al., 2016: 100-121). Studies have also shown several key relationships: the creation of experiences has a strong impact on conceptual understanding, which in turn has a moderate to high influence on the development of skills. The students' emotional evaluation of the simulation game experience is significantly influenced by their perceived skills development, according to Ranchhod et al. (2014: 75-90).

Game-Based Learning (GBL) as a pedagogical method leverages games as a means of teaching knowledge and skills in an engaging and hands-on game environment (Jaccard et al., 2022). Digital GBL solutions can create a learning environment full of reflective, experiential, and intriguing. The GBL method can provide students with an unforgettable learning experience by influencing their emotions (Jääskä et al., 2022).

Authentic Team-based learning (TBL) requires students to have good teamwork skills, and an increasing number of business schools now expect students to collaborate in teams to fulfill learning and evaluation requirements. (Gros & López, 2016:28). When simulation teaching is designed without focusing on the interdependence of tasks or roles, students perceive little value in cooperating to achieve common goals, create knowledge together, and share experiences. The tendency of students to divide team projects limits opportunities to develop more advanced business skills (Lohmann et al., 2019: 455-472).

Variables

A summary of the factors indicated in the literature as relevant to assess the perceived learning outcomes and satisfaction of using iBizSim in the course is presented in Table 1.

Table 1 Summary of factors in Simulation identified in the literature

Factors	Description	References
Experience Generation	This refers to the students' perception on the decision, the experimental with ideas and strategic management concepts.	Mohsen et al., (2018)
Conceptual Understanding	During the instructional portion of the module, students can apply the concepts learned to inform their strategic decisions in the game.	Mohsen et al., (2018)
Skills Development	The practical experience gained from participating in simulation game exercises offers a valuable opportunity. These simulations authentically replicate real-world business environments, enabling students to develop crucial skills including data analysis, strategic	Mohsen et al., (2018); Ranchhod et al., (2014)

	planning, decision-making, problem-solving, and teamwork.	
Affective Evaluation	This pertains to the favorable results concerning motivation, engagement, and overall satisfaction derived from the simulation game experience.	Ranchhod et al., (2014)
Team Work	Establishing the work-related relationships essential for accomplishing outcomes within a workgroup, or attaining goals through collaborative teamwork. In contrast to individual learning, students engaged in collaborative learning teams experience enhanced outcomes in terms of knowledge acquisition.	Arbaugh & Benbunan-Finch, (2006: 435-447)
Perceived Learning Outcomes	Learning outcomes are the process of students interacting with the learning environment to upgrade their behavior. This study discusses learning outcomes based on cognitive outcomes, for example, trouble-shooting ability, planning skills, motivation and develop theoretical and practical capabilities.	Ikhsan et al., (2019)
Satisfaction	Simulation-based learning fulfilled students' perceived psychological needs and boosted their motivation.	Lohmann et al., (2019: 455-472)

To investigate the influential factors to the simulation games experience students, the research scope of this study in terms of geography is to identify the financial management students located in a private undergraduate university in Guangdong, China. The course of management accounting is the core course of financial management major in this university, and it is the first-class course in Guangdong Province. To improve the practical teaching in Management accounting for better students' performance, the teachers tried to integrate a Business Simulation Game (SG) whose name was the Enterprise Competition Simulation System (iBizSim) during the course to evaluate the effectiveness of virtual simulation technology in Management Accounting. The iBizSim is a business simulation software developed by a professional team from Guanghua Management School of Peking University and experts form a virtual company. There are mainly 5 decision-making parts in iBizSim: marketing (Sales), production, transportation, manpower and procurement and financial decision-making. For each battle, overall score is based on the factors (http://www.bizsim.cn/). To meet the cultivation path of the capability objective of the Management accounting course, the iBizSim game was learned in the class totally about 420 minutes teaching schedule in one semester, and two competitions were raised during the course.

In this study, practical guidance is provided to effectively use SG in management education and improve students' learning. It will provide a positive reference for more effective integration of business SG into the teaching of business courses in the future semesters.

Research Objectives

Nine research objectives corresponding to the research questions are constructed as below:

1. To determine the effectiveness of the students' experience generation using iBizSim in improving the students' conceptual understanding.
2. To determine the effectiveness of the students' experience generation using iBizSim in improving the students' skills development.
3. To determine the effectiveness of the students' experience generation using iBizSim in improving the students' affective evaluation.
4. To determine the effectiveness of the students' conceptual understanding using iBizSim in improving the perceived learning outcomes.
5. To determine the effectiveness of the students' skills development using iBizSim in improving the perceived learning outcomes.
6. To determine the effectiveness of the students' affective evaluation using iBizSim in improving the perceived learning outcomes.
7. To determine to what extent the students' teamwork using iBizSim influence the students' perceived learning outcomes.
8. To determine to what extent the students' perceived learning outcomes using iBizSim influence the students' satisfaction.
9. To determine to what extent the students' teamwork using iBizSim influence the students' satisfaction.

Research Methodology

1. Quantitative Sample

The researcher employed priori power analysis using an existing sample size calculation for the structural equation model based on the Analytics Calculators. By using the purposive sampling method, this study purposively selected students majored in financial management who have the course of management accounting integrated the iBizSim study at the university. Therefore, all students for 3 grades about 450 students who are taking the management accounting course with iBizSim are included in the sample.

2. Research instrument

The study employs an attitude test questionnaire as the research instrument to evaluate the influence of a game-based learning approach on student contentment with a simulation game tailored for business management. The survey instrument was constructed based on previous literatures from Mohsen et al., (2018) and Lohmann, et al., (2019: 455-472). All 32 survey items took a value using a Likert scale of 1 to 5 (1 = Strongly disagree to 5 = Strongly agree). To ensure the validity of the research instrument, item-objective congruence with 3 experts was used. After formulating the initial questionnaire, two highly experienced experts, proficient in both Chinese and English with over 20 years of English teaching experience, meticulously assessed the Chinese version of the questionnaire to ensure the translation's utmost precision. After that, the 40-student pilot test's internal consistency reliability was estimated through the Cronbach alpha coefficient.

3. Data collection procedure

This study utilized "Wen Juan Xiang," a professional online survey platform that offers questionnaire design, data collection to distribute and collect questionnaires during the end of the semester in June 2023. The digital research survey was distributed via WeChat, a widely used mobile communication app in China, to students' online WeChat group. Each student was required to anonymously complete all questions within three weeks.

4. Data analysis

In addressing the research questions, the SPSS 26.0 and Amos 23.0 statistical software were employed to conduct confirmatory factor analysis and structural equation modeling. These analyses were utilized to scrutinize the interconnections among key variables, evaluate the proposed hypotheses, and gauge the strength of path coefficients.

Data Analysis

Addressing the research questions pertaining to the factors influencing students' perceived learning outcomes and satisfaction, a series of analytical findings were presented.

1. Descriptive statistics of Variables

A total of 490 questionnaires were distributed to students from three different grades in the course, and 455 were successfully collected. From the applied questionnaires, 427 valid responses were received. Among the participants, 28.1% (n = 120) were male students, while 71.90% (n = 307) were female.

To analyze the data, an aggregate variable was computed for each of the seven identified factors by taking the average of its individual variables. Subsequently, the mean values for both individual and aggregate variables were calculated, indicating the magnitude of each educational value aspect or type. The results of mean are presented in Table 2 and should be interpreted in the context of the Likert scale, which includes interpretation for five ranges: 1.00-1.50 strongly disagree, 1.51-2.50 disagree, 2.51-3.50 neutral, 3.51-4.50 agree, 4.51-5.00 strongly agree (Norman, 2010: 625-632). On average, participants perceived high value for all factors, including experience generation, conceptual understanding, skills development, affective evaluation, teamwork, perceived learning outcomes, and satisfaction, with mean scores of 3.93, 3.84, 3.90, 3.85, 4.08, 3.84, and 3.94, respectively. These findings suggest a strong consensus among students regarding the positive impact of playing iBizSim on various aspects, including their ability to generate meaningful experiences, grasp course concepts, develop skills effectively, evaluate their emotions, engage in collaborative teamwork, perceive improved learning outcomes, and experience higher satisfaction.

Additionally, the reliability of the data was assessed using Cronbach's alpha, and each construct yielded a value over 0.9 higher than the threshold level of 0.7, ensuring a satisfactory level of internal consistency (Cronbach, 1951: 297–334).

Furthermore, to determine the data's adherence to a normal distribution, skewness and kurtosis values were examined. The approximate skewness ranged from -0.313 to -0.946, and kurtosis ranged from -0.064 to 1.345, all within the acceptable range of -2.00 to +2.00, as recommended by George and Mallery (2010).

Table 2 Survey Instrument

Code	Item Statement	Mean	SD	Cronbach's Alpha
	iBizSim gave me the opportunity to:			
EG1	better grasp the application of Management Accounting knowledge.	3.89	0.827	0.928
EG2	experiment with different business ideas	3.96	0.82	
EG3	have strategic perspective.	3.94	0.839	
	Experience Generation Total	***3.93***	**0.775**	
CU1	**Playing iBizSim enabled me to better understand:** product quantity strategy.	3.82	0.831	0.939
CU2	competition analyze and pricing strategy.	3.86	0.798	
CU3	distribution strategy.	3.81	0.788	
CU4	Research & Development.	3.85	0.771	
CU5	advertising and promotion strategy.	3.82	0.807	
CU6	financial performance.	3.89	0.823	
	Conceptual Understanding Total	**3.84**	**0.704**	
	iBizSim enabled me to:			
SD1	evaluate the success of particular strategies that were adopted.	3.81	0.853	0.927
SD2	extend knowledge that they would not normally have picked up in a class situation.	3.95	0.827	
SD3	analyse information more effectively.	3.95	0.8	
SD4	use the learned skills in future jobs.	3.89	0.884	
	Skills Development Total	**3.90**	**0.762**	
AE1	The iBizSim motivated me to want to succeed in the simulation.	3.84	0.897	0.95
AE2	The iBizSim motivated me to learn about business/marketing strategies.	3.85	0.891	
AE3	I find this type of experience conducive to learning effectively.	3.82	0.908	
AE4	I find a competitive environment helpful in learning business issues.	3.87	0.865	
	Affective Evaluation Total	**3.85**	**0.831**	
TW1	Teamwork draws agreement on important issues more effectively.	4.04	0.839	0.94
TW2	Key decisions about our team were made by the entire team.	4.07	0.824	
TW3	I was comfortable sharing my ideas with my team.	4.15	0.78	

TW4	Most of the time, members of my team asked each other for feedback on their progress.	4.07	0.799	
	Teamwork Total	**4.08**	**0.746**	
LO1	**I feel that I have learned below on management accounting with the iBizSim:** Planning skills	3.82	0.784	0.958
LO2	Understanding of finance.	3.76	0.805	
LO3	Understanding of marketing.	3.85	0.769	
LO4	Understanding of human resources.	3.81	0.771	
LO5	Understanding of operations.	3.89	0.773	
LO6	Understanding of strategic management.	3.88	0.79	
LO7	The ability to analyze data.	3.9	0.776	
	Perceived Learning Outcomes Total	**3.84**	**0.698**	
SA1	The iBizSim made the course more interesting.	3.94	0.88	0.958
SA2	The skills and knowledge learnt during the iBizSim will be useful for my future career.	3.91	0.859	
SA3	Overall, I learned a lot from the iBizSim.	3.93	0.845	
SA4	Overall, I am satisfied with the iBizSim as a learning tool.	3.97	0.843	
	Satisfaction Total	**3.94**	**0.808**	

2. Hypotheses Testing. The Structural Equation Modelling (SEM) methodology was employed to examine the overall fit of the proposed model and the formulated research hypotheses. Before conducting SEM, a Confirmatory Factor Analysis (CFA) was conducted to validate the investigated constructs, utilizing AMOS 23.0 software.

2.1 Evaluation of the Goodness of Fit for CFA Matrix

The results of the Goodness-of-Fit for the Measurement Model are presented in Table 3. Overall, all items demonstrated significant and substantial loadings on their respective underlying constructs, providing evidence of convergent validity. The calculated indices indicate an acceptable model fit, with the following values: CMIN/DF = 2.254; GFI = 0.872; AGFI = 0.848; NFI = 0.936; CFI = 0.965; TLI = 0.961; RMSEA = 0.054.

Table 3 Goodness-of-Fit for Measurement Model Results

Index	Acceptable Values	Statistical Values	Source
CMIN/DF	< 3.00	998.676/443 or 2.254	Hair et al. (2006)
GFI	≥ 0.85	0.872	Sica and Ghisi (2007)
AGFI	≥ 0.80	0.848	Sica and Ghisi (2007)
NFI	≥ 0.80	0.936	Wu and Wang (2006)
CFI	≥ 0.80	0.965	Bentler (1990)
TLI	≥ 0.80	0.961	Sharma et al. (2005)
RMSEA	< 0.08	0.054	Engel et al. (2003)
Model Summary		In harmony with empirical data	

Remark: CMIN/DF = The ratio of the chi-square value to the degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index, NFI = Normed fit index, CFI = Comparative fit index, TLI = Tucker-Lewis index, and RMSEA = Root mean square error of approximation.

2.2 Evaluation of the Confirmatory Factor Analysis

For SEM, Fornell and Larcker (1981: 39-50.) proposed two criteria to evaluate convergent validity: Firstly, all factor loadings should be statistically significant ($P < 0.05$) and greater than 0.70. Secondly, the Average Variance Extraction (AVE) value for each model component must exceed 0.5. Additionally, a Composite Reliability (CR) greater than 0.7 is considered acceptable. Table 4 presents the results for the construct's factor loadings, which were both statistically significant and greater than 0.7, ranging from 0.807 to 0.953. The CR values for the entire population were between 0.929 and 0.958, all surpassing 0.7. Furthermore, the AVE ranged from 0.723 to 0.852, all exceeding 0.5. These findings provide evidence that the model demonstrates convergent validity.

Table 4 Results for Factor loading, Composite Reliability, and Average Variance Extracted

Factors	Observed variables	Factors loading	T-value	CR	AVE
Experience Generation (EG)	EG1	0.833	26.852***	0.933	0.823
	EG2	0.931	37.372***		
	EG3	0.953	-		
Conceptual Understanding (CU)	CU1	0.871	21.646***	0.94	0.723
	CU2	0.854	20.986***		
	CU3	0.877	21.835***		
	CU4	0.840	20.498***		
	CU5	0.850	20.844***		
	CU6	0.807	-		
	SD1	0.898	24.966***	0.929	0.767
	SD2	0.847	22.472***		

Skills Development (SD)	SD3	0.909	25.537***		
	SD4	0.847	-		
Affective Evaluation (AE)	AE1	0.890	-	0.951	0.829
	AE2	0.939	31.553***		
	AE3	0.916	29.646***		
	AE4	0.895	28.012***		
Teamwork (TW)	TW1	0.876	27.182***	0.941	0.798
	TW2	0.926	31.143***		
	TW3	0.868	27.182***		
	TW4	0.903	-		
Perceived Learning outcomes (LO)	LO1	0.849	-	0.958	0.766
	LO2	0.867	23.787***		
	LO3	0.873	24.101***		
	LO4	0.863	23.621***		
	LO5	0.892	25.079***		
	LO6	0.901	25.59***		
	LO7	0.880	24.474***		
Satisfaction (SA)	SA1	0.921	-	0.958	0.852
	SA2	0.899	31.14***		
	SA3	0.932	34.788***		
	SA4	0.939	35.702***		

Note: CR = Composite Reliability, AVE = Average Variance Extracted, ***=p<0.001; **=p<0.01.

The findings regarding discriminant validity reveal that the square roots of the average extracted variations were as follows: 0.907 (EG), 0.850 (CU), 0.876 (SD), 0.910 (AE), 0.894 (TW), 0.875 (LO), and 0.923 (SA). Notably, the square root of the AVE for each construct, along the diagonal line, exceeded the corresponding inter-scale correlations. These results provide strong evidence that the model indeed demonstrates discriminant validity, confirming that the constructs are distinct from each other.

2.3 Evaluation of Structural Equation Model

After confirming that there were no measurement issues in the model, SEM was conducted to estimate the path coefficients using Maximum Likelihood estimation. The overall after adjustment model fit, as presented in Table 5, is considered good, as all the measures fall within acceptable limits: CMIN/DF = 2.539; GFI = 0.860; AGFI = 0.836; NFI = 0.931; CFI = 0.957; TLI = 0.952; RMSEA = 0.060).

Table 5 Goodness-of-Fit for Structural Model

Fit Index	Acceptable Criteria	Statistical Values	
		Before adjustment	After adjustment
CMIN/DF	< 3.00	1360.018/453 or 3.002	1142.675/450 or 2.539
GFI	≥ 0.85	0.834	0.86
AGFI	≥ 0.80	0.806	0.836
NFI	≥ 0.80	0.918	0.931
CFI	≥ 0.80	0.943	0.957
TLI	≥ 0.80	0.938	0.952
RMSEA	< 0.08	0.069	0.06
Model summary		Not in harmony with empirical data	In harmony with empirical data

The main results, representing the structural relationships between constructs that are statistically significant, are depicted in Figure 2 below.

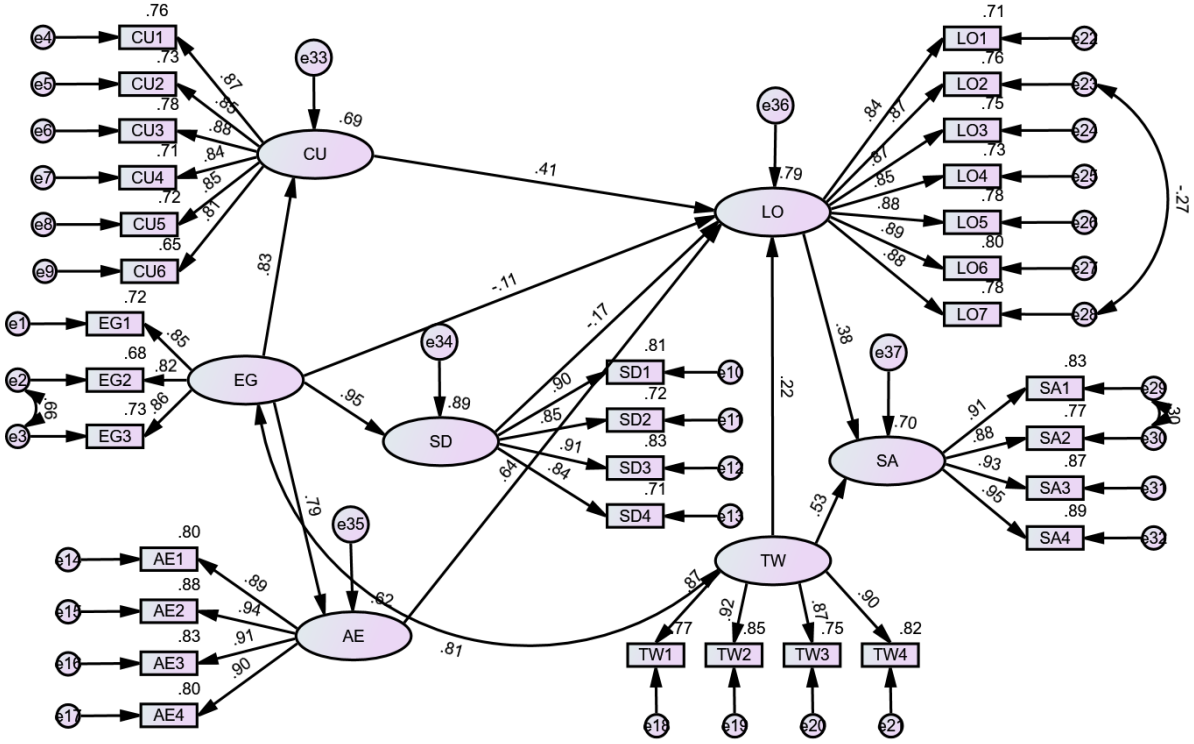

Figure 2 Structural Model after adjustment

Research Conceptual Framework

Prior studies show that the experience generation has positive relationship with the conceptual understanding, skills development and affective evaluation (Mohsen et al.,2018; Ranchhod et al., 2014: 75-90.), and teamwork has positive relationship with the perceived learning outcomes and satisfaction (Lohmann et al., 2019: 455-472). Despite previous studies, the exploration of the connection between conceptual understanding, skills development, and affective evaluation on perceived learning outcomes remains limited. To address this gap, this research delves deeper into the relationship between conceptual understanding, skills development, affective evaluation, and their impact on perceived learning outcomes within a simulated environment.

The following hypotheses are proposed according to the iBizSim used in the course in response to the research questions:

H_a1 Experience generation has significant influence on students' conceptual understanding.

H_a2 Experience generation has significant influence on students' skills development.

H_a3 Experience generation has significant influence on students' affective evaluation.

H_a4 Conceptual understanding has significant influence on students' perceived learning outcomes.

H_a5 Skills development has significant influence on students' perceived learning outcomes.

H_a6 Affective evaluation has significant influence on students' perceived learning outcomes.

H_a7 The team work has significant influence on students' perceived learning outcomes.

H_a8 The perceived learning outcomes has significant influence on students' satisfaction.

H_a9 The team work has significant influence on students' satisfaction.

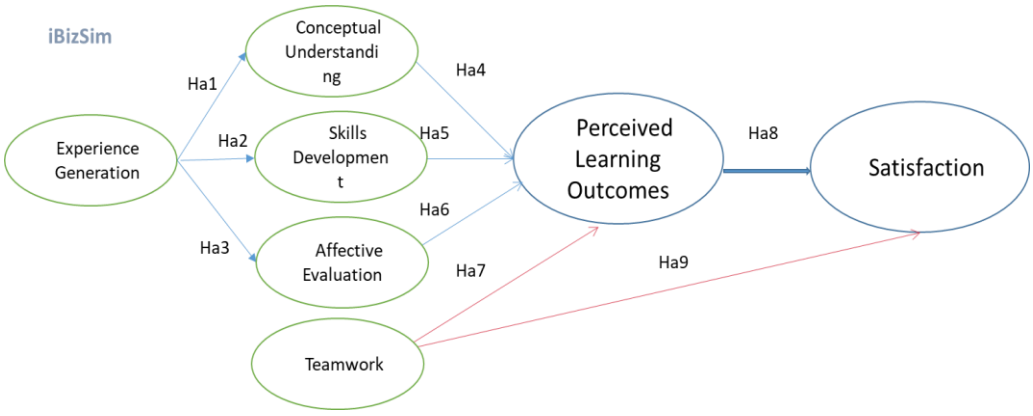

Figure 1 Research Conceptual Framework

Research Results

The magnitude of correlation among the independent and dependent variables proposed in the hypothesis is measured by regression coefficients or standardized path coefficients. The path analysis in this quantitative investigation was performed using AMOS version 23.0 statistical software. As the consequence, the correspondence that accompanies provides nine the alternative hypotheses, providing the summarization of the details in Table 6. Eight out of nine proposed hypotheses were supported in Table 6, which represent this detail information.

Table 6 Summary of Hypothesis testing and results

Hypotheses	Path	Standardized Path Coefficient (β)	T-Value	Result after Analysis
H_a1	CU ← EG	0.831	17.8***	Supported
H_a2	SD ← EG	0.946	22.857***	Supported
H_a3	AE ← EG	0.788	17.675***	Supported
H_a4	LO ← CU	0.405	6.607***	Supported
H_a5	LO ← SD	-0.169	-1.192	Not supported
H_a6	LO ← AE	0.645	11.521***	Supported
H_a7	LO ← TW	0.218	3.996***	Supported
H_a8	SA ← LO	0.383	8.579***	Supported
H_a9	SA ← TW	0.529	11.624***	Supported

*Note: ***=p<0.001; **=p<0.01; *=p<0.05.*

Alternative hypothesis 1 proposed a causal relationship from the exogenous variable experience generation to the endogenous variable conceptual understanding. The standardized path parameter was found to be 0.831, with a corresponding t-value of 17.8***, indicating a highly significant statistical connection. These results provide evidence of a significant and meaningful relationship from experience generation to conceptual understanding in this study. Consequently, null hypothesis 1 was rejected, and alternative hypothesis 1 was supported.

Alternative hypothesis 2 proposed a causal relationship from the exogenous variable experience generation to the endogenous variable skills development. The standardized path parameter was found to be 0.946, with a corresponding t-value of 22.857***, indicating a highly significant statistical connection. These results provide evidence of a significant and meaningful relationship from experience generation to skills development in this study. Consequently, null hypothesis 2 was rejected, and alternative hypothesis 2 was supported.

Alternative hypothesis 3 proposed a causal relationship from the exogenous variable experience generation to the endogenous variable affective evaluation. The standardized path parameter was found to be 0.788, with a corresponding t-value of 17.675***, indicating a highly significant statistical connection. These results provide evidence of a significant and meaningful relationship from experience generation to affective evaluation in this study. Consequently, null hypothesis 3 was rejected, and alternative hypothesis 3 was supported.

Alternative hypothesis 4 proposed a causal relationship from the exogenous variable conceptual understanding to the endogenous variable perceived learning outcomes. The standardized path parameter was found to be 0.405, with a corresponding t-value of 6.607***, indicating a highly significant statistical connection. These results provide evidence of a

significant and meaningful relationship from conceptual understanding to perceived learning outcomes in this study. Consequently, null hypothesis 4 was rejected, and alternative hypothesis 4 was supported.

Alternative hypothesis 5 proposed a causal relationship from the exogenous variable skills development to the endogenous variable perceived learning outcomes. The standardized path parameter was found to be -0169, with a corresponding t-value of -1.192, indicating a non-significant statistical connection. These results provide evidence of no significant and meaningful relationship from skills development to perceived learning outcomes in this study. Consequently, null hypothesis 5 was supported, and alternative hypothesis 5 was rejected.

Alternative hypothesis 6 proposed a causal relationship from the exogenous variable affective evaluation to the endogenous variable perceived learning outcomes. The standardized path parameter was found to be 0.645, with a corresponding t-value of 11.521, indicating a highly significant statistical connection. These results provide evidence of a significant and meaningful relationship from affective evaluation to perceived learning outcomes in this study. Consequently, null hypothesis 6 was rejected, and alternative hypothesis 6 was supported.

Alternative hypothesis 7 proposed a causal relationship from the exogenous variable teamwork to the endogenous variable perceived learning outcomes. The standardized path parameter was found to be 0.218, with a corresponding t-value of 3.996, indicating a highly significant statistical connection. These results provide evidence of a significant and meaningful relationship from teamwork to perceived learning outcomes in this study. Consequently, null hypothesis 7 was rejected, and alternative hypothesis 7 was supported.

Alternative hypothesis 8 proposed a causal relationship from the exogenous variable perceived learning outcomes to the endogenous satisfaction. The standardized path parameter was found to be 0.383, with a corresponding t-value of 8.579, indicating a highly significant statistical connection. These results provide evidence of a significant and meaningful relationship from perceived learning outcomes to satisfaction in this study. Consequently, null hypothesis 8 was rejected, and alternative hypothesis 8 was supported.

Alternative hypothesis 9 proposed a causal relationship from the exogenous variable teamwork to the endogenous variable satisfaction. The standardized path parameter was found to be 0.529, with a corresponding t-value of 11.624, indicating a highly significant statistical connection. These results provide evidence of a significant and meaningful relationship from teamwork to satisfaction in this study. Consequently, null hypothesis 9 was rejected, and alternative hypothesis 9 was supported.

Discussion

1.What is the significant effect on the students' experience generation using iBizSim in improving the students' conceptual understanding?

This study found that experience generation positively and significantly impacts conceptual understanding. According to the previous associated literatures, multiple researchers convinced that experience generation has a significant consequence on conceptual understanding for the learning associated with business simulation games (Gosen & Washbush, 2004: 270-293; Lovelace et al., 2016: 100-121; Mohsen et al., 2018; Ranchhod et al., 2014: 75-90.). Therefore, this research consequence was conformed with the antecedently connected academic achievements.

This suggests that students are more inclined to embrace the business simulation game, when they perceive it as a valuable tool that enhances their academic performance and overall satisfaction with the course. The main emphasis lies in the seamless integration of virtual simulation teaching with the traditional classroom's professional knowledge. This requires teachers to meticulously design the curriculum, ensuring a coherent connection between virtual simulation teaching and conventional knowledge explanation. By doing so, students are offered practical opportunities in the virtual environment to practice, apply, and improve their practical abilities. On the other hand, the classroom's professional knowledge explanation equips students with the theoretical foundation of the system, aiding their comprehension of the underlying logic and knowledge structure.

2.What is the significant effect on the students' experience generation using iBizSim in improving the students' skills development?

This study found that experience generation positively and significantly impacts skills development. According to the previous associated literatures, numerous simulation games investigators have conclusively demonstrated experience generation has an effective consequence on skills development into using simulation software (Gosen & Washbush, 2004: 270-293; Lovelace et al., 2016: 100-121; Mohsen et al., 2018; Ranchhod et al., 2014: 75-90.; Salas et al., 2009: 559-573). Therefore, this research consequence was conformed with the antecedently connected academic achievements.

3.What is the significant effect on the students' experience generation using iBizSim in improving the students' affective evaluation?

The study found that experience generation positively and significantly affects affective evaluation. According to the previous associated literatures, the majority of contemporary investigations had indicated that experience generation has an advantageous consequence on the participants' affective evaluation toward utilizing the technology (Kolb & Kolb, 2009: 297-327; Mohsen et al., 2018; Ranchhod et al., 2014: 75-90.; Salas et al., 2009: 559-573). Therefore, this research consequence was conformed with the antecedently connected academic achievements.

4.What is the significant influence of the students' conceptual understanding using iBizSim in improving the perceived learning outcomes?

The study revealed a positive and significant relationship between conceptual understanding and perceived learning outcomes. This indicates that students who developed a deeper conceptual understanding through the use of iBizSim were more likely to experience notable improvements in their perceived learning outcomes. Prior studies, such as those by Fuchs and Fuchs (2007: 14-19) and Ginsburg et al. (2014), have also confirmed the correlation between conceptual understanding and problem-solving skills, which are closely related to learning outcomes.

However, it is important to note that the existing research on the relationship between conceptual understanding and learning outcomes is still limited, and no specific hypotheses regarding these two latent variables were identified in the literature. As a result, this study contributes valuable insights to the field by establishing a significant link between students' conceptual understanding through iBizSim and their perceived learning outcomes.

5.What is the significant influence of the students' skills development using iBizSim in improving the perceived learning outcomes?

The study found that skills development using iBizSim did not have a significant impact on perceived learning outcomes. In other words, students' skills development through iBizSim

did not appear to result in significant changes in their perceived learning outcomes. Among the four observed variables in skills development, the scores were relatively low for the aspects where iBizSim enabled students to evaluate the success of adopted strategies and apply the learned skills in future jobs. This outcome might be attributed to several factors, such as the economic slowdown after COVID-19, uncertainty in the employment environment, and students' lack of clarity about their future career plans. As a result, they may have questioned whether the skills acquired in this class would be beneficial for their future employment. As educators, it is crucial to provide students with relevant knowledge about college students' career development and integrate learning planning with career planning during their college journey. In curriculum design, teachers should align with the employment goals outlined in the talent cultivation plan to better enhance students' professional skills within the curriculum.

Previous studies on the connection between skills development and perceived learning outcomes have provided limited findings. This reinforces the importance of the current study, as it contributes valuable insights to the existing literature by shedding light on the lack of a significant relationship between skills development using iBizSim and perceived learning outcomes. Further research in this area may help to better understand the factors influencing perceived learning outcomes and how different aspects of learning experiences interact to shape students' educational achievements.

6.What is the significant influence of the students’ affective evaluation using iBizSim in improving the perceived learning outcomes?

The study revealed a significant and positive relationship between affective evaluation and perceived learning outcomes. This indicates that students' emotional and affective experiences with iBizSim positively impacted their perceived learning outcomes. Students reported that the iBizSim experience was conducive to effective learning, leading to positive perceived learning outcomes.

Prior research has provided limited evidence regarding the relationship between affective evaluation and perceived learning outcomes. Hence, this study adds valuable insights to the literature by highlighting the significance of affective evaluation in shaping students' perceived learning outcomes when utilizing iBizSim. Understanding the emotional aspect of the learning experience and its impact on learning outcomes can be essential for designing effective educational interventions and improving overall learning experiences for students. Further investigation in this area could contribute to a more comprehensive understanding of how affective factors influence the learning process and educational outcomes.

7.What is the significant influence of the students’ teamwork using iBizSim to the students’ perceived learning outcomes?

The findings of the study indicate a positive and significant relationship between teamwork and perceived learning outcomes. In simpler terms, students who engaged in teamwork were more likely to achieve positive perceived learning outcomes. This correlation between teamwork and perceived learning outcomes aligns with the findings of previous studies conducted by Baber (2020: 285-292.) and Lohmann et al. (2019: 455-472).

The study's results emphasize the importance of teamwork in enhancing students' learning experiences and outcomes when using iBizSim. Collaborative learning experiences can foster knowledge sharing, critical thinking, and problem-solving skills, leading to improved perceived learning outcomes for students. By recognizing the positive impact of teamwork on perceived learning outcomes, educators and institutions can implement strategies

to promote and facilitate collaborative learning opportunities using tools like iBizSim. Such approaches can contribute to a more enriched and effective learning environment for students.

8.What is the significant influence of the students' perceived learning outcomes using iBizSim to the students' satisfaction?

The study's findings reveal a positive and significant relationship between perceived learning outcomes and students' satisfaction. In other words, students who perceive positive learning outcomes with iBizSim are more likely to be satisfied with the course. This correlation between perceived learning outcomes and satisfaction aligns with numerous prior studies that have supported this relationship (Baber, 2020: 285-292.; Ikhsan et al., 2019: 68-73; Lohmann et al., 2019: 455-472).

It can be inferred that the reason many students embraced the simulation instructional pattern was because of the positive and active learning outcomes they experienced. To enhance subsequent instructional practices, teaching units should focus on effectively expanding students' knowledge beyond what they would typically gain in a traditional classroom setting. Optimizing the program design for simulation learning courses, providing corresponding tutorial documents and assistance files, and clearly outlining various studying operations, such as learning tasks, data review, assignments submission, virtual system operation, score inquiry, and instructional quality evaluation, can make the learning process more accessible and convenient compared to traditional classroom education. These measures are likely to foster a positive psychological response among students in terms of their perceived learning outcomes.

9.What is the significant influence of the students' teamwork using iBizSim to the students' satisfaction?

The study's findings indicate a positive and significant relationship between teamwork and students' satisfaction. In other words, students who engage in teamwork while using iBizSim are more likely to be satisfied with the course. This correlation between teamwork and satisfaction aligns with prior research studies that have supported this relationship (Ikhsan et al., 2019: 68-73; Johnson et al., 1998: 26-35; Lohmann et al., 2019: 455-472).

The utilization of business simulations created a realistic team-based learning environment, which positively influenced student satisfaction by facilitating the achievement of management-related learning outcomes through social construction of meaning. Collaborative learning not only enhances knowledge sharing and problem-solving skills but also contributes to a sense of belonging and engagement, leading to higher levels of student satisfaction. Hence, when designing courses, it is crucial to incorporate teamwork as a positive and dynamic teaching instrument, encouraging group discussions, and assigning group projects to enhance the educational experience. Emphasizing teamwork within the simulation-based approach can motivate more students to embrace and accept this advanced instructional pattern, ultimately leading to improved learning outcomes and higher levels of satisfaction.

Recommendation

The study focused on identifying key factors—experience generation (EG), conceptual understanding (CU), skills development (SD), affective evaluation (AE), teamwork (TW), and perceived learning outcomes (LO)—that influence the utilization of the simulation game in a private university in Guangdong, China. It is recommended that these pivotal factors be enhanced and emphasized to encourage the adoption of simulations in higher education, with the exception of trust, which demonstrated insignificant influence.

Moreover, the research was centered exclusively around iBizSim as a type of business simulation game. To obtain a more comprehensive insight into the effects of simulations on learning outcomes, future investigations should encompass diverse types of simulations utilized across various courses, such as virtual laboratories or other educational tools.

In forthcoming studies, it is suggested to explore additional variables related to the intrinsic features of virtual simulation software. This could involve examining the benefits of integrating virtual simulation software in teaching, such as its potential to enhance students' creativity and facilitate improved communication between educators and learners.

Furthermore, to deepen the understanding of students' behaviors and experiences with virtual simulations, qualitative research could be integrated. This qualitative approach would provide valuable context and insights to complement the quantitative findings, offering a more holistic perspective on the subject.

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