

SUCCESS FACTORS FOR LEARNING WITH BUSINESS SIMULATION GAMES– A LITERATURE REVIEW

Carina Aichinger, Mathew Docherty, David Kronawettleitner, Sandra Mühlböck

University of Applied Sciences Upper Austria (AUSTRIA)

Abstract

This literature review is aimed at giving an overview of success factors in business simulation games (BSG). BSG are widely used in educational institutes like schools and universities as well as in professional training. While a large proportion of the research in this field is focused on learning success, an overview is difficult to gain due to the vast variety of different approaches, methods and focuses. Moreover, latest trends in digitalization have reshaped as well as diversified the industry. In order to get a deeper insight into the current findings in BSG research on learning success, an extensive literature research was conducted, including both quantitative and qualitative research. The result is an integrative literature review summarizing and categorizing the current state of the art regarding success factors in BSG, using the Kirkpatrick model of success ([1]) as a theoretical background. The goal is to provide a summary of the current research on success in BSG, as well as to facilitate successful development and implementation of BSG. The findings show several key factors important for promoting learning success with BSG.

Keywords: business simulation games, serious games, learning success, adult education, simulation-based learning.

1 INTRODUCTION

Business simulation games (BSG) are a popular learning tool ([2]) to teach business-related subjects in a lively, realistic manner. Because BSG mimic the “real” world, are engaging and can allow students to gain valuable competences for today’s business world ([3]), educators like using them in class or for training sessions.

BSG come in many different forms: “Classical” types like role plays, board games, card games are complemented by digital computer simulations where learners can enter digital “worlds” and work on their own or in teams ([4]). Despite their different forms and shapes, most BSG have several aspects in common, like target orientation and focus on problem solving and decision making ([5]). BSG give students the opportunity to try things out and gain valuable experience, but without the risks they would encounter in the “real” business world ([5]).

Despite the popularity of BSG and the high number of research publications, there does not seem to be a common agreement of what promotes learning success in BSG. This may be partly due to the vast variety of target groups, research designs, learning focuses and BSG types. Moreover, a large number of computer-supported BSG have been developed in the last decades, bringing the BSG market into the digital era. With this transformation come many new possibilities to teach business-related subjects via simulations. The aim of this integrative, qualitative literature review is therefore to summarize and classify the latest research articles relating to success factors in BSG in order to get an overview of the current state of the art in this field.

2 KIRKPATRICK’S TRAINING EVALUATION MODEL

The Kirkpatrick’s model of evaluation ([1]) was chosen as a theoretical basis for this literature review. The model is widely recognized and the levels are suitable for the classification of a broad range of studies on BSG. The Kirkpatrick model of success ([1]) consists of four main levels:

2.1 Level 1 - Reaction

The first level of evaluation focuses on learners’ opinions and feelings about the learning experience. Measuring this level is relatively simple and can be achieved via surveys or interviews (individual, focus groups etc.). Typical questions asked on this level would be how participants liked the learning

experience, how motivated they felt, how useful and engaging they found the BSG and which difficulties they encountered. Although this level does not measure actual increase in knowledge or competences, it can give insight into peoples' experiences, motivations and perceived learning success.

2.2 Level 2 - Learning

The second level goes beyond learners' opinions and perceptions and measures learning in terms of increased knowledge, skills or change in attitude. Often, students' performance is measured before and after the training. Common performance indicators are grades, quiz answers, assessment results etc.

2.3 Level 3 - Behavior

Level three measures learning outcomes in terms of actual behavioral changes due to the learning solution. It focuses on the application of theoretical knowledge acquired during training. Level three also takes the environment (e.g. organization) into account where the learning is applied. This is especially important because not all learning results in actual behavioral changes, for example if obstacles exist (e.g. insecurity to try out knowledge in practice or a working environment that inhibits innovations). Possible research methods for level three would be field observations or experiments.

2.4 Level 4 - Results

On this level, the final objective(s) of the training are evaluated. These could be business goals like an increase in sales, fewer customer complaints or business indices like ROI and are often the reason why a certain training was initiated in the first place. Evaluation on this level often takes longer than on the other levels, as the result are often not visible immediately.

3 METHODOLOGY

An extensive literature research was conducted in order to find the most relevant recent papers on success factors in BSG. Keyword combinations like "business simulation success factors" or "business simulation games success" were used in different variations. With "success" being a broad term, also key words with similar meanings like "accomplishment", "achievement", "benefit" were used. In addition to Google Scholar, the following databases were searched: Emerald Insight, Taylor & Francis Online, SpringerLink, Scopus, ScienceDirect.

Only relevant papers in English that were not older than January 2014 (publishing date) and were published in journals ranking in the first or second quartiles (Q1 or Q1) on SCImago (<https://www.scimagojr.com>) were included. These criteria were chosen to include only relatively recent literature, as well as high-quality content. Moreover, we only included studies that focused on adult education in order to maintain a certain homogeneity and thus a better comparability.

4 SUMMARY OF FINDINGS CLASSIFIED BY KIRKPATRICK'S STEPS

In total, from over 300 preselected articles, 14 papers which met all formal criteria and were relevant on the content level were included in the review. All studies were empirical and conducted in the following countries: Taiwan, UK (3x), Spain (4x), India, Switzerland, and Finland. One study was international with students participating in a web-based simulation inside and outside of the USA and two articles did not explicitly state a country in which their studies were conducted. All studies took place in a tertiary educational institution.

Regarding the research methods, most of the studies (12) chose a quantitative approach, with sample sizes between 54 and 362. Four studies used quantitative as well as qualitative measures (mixed method approach). This literature review includes no study with a qualitative-only approach.

In terms of types of BSG used for the studies, almost all worked with a computer-based, usually online BSG. Only in one ([6]), a board game was used and one study ([7]) did not specify the nature of their BSG.

Despite the diversity of approaches, focuses and research methods used in the papers, some recurring areas of interest could be identified. The following section summarizes and classifies the relevant findings according to Kirkpatrick's levels of evaluation ([1]):

4.1 Level 1

Motivation: Unsurprisingly, motivation plays an important role as a success factor in learning with BSG. Buil, Catalán & Martínez ([8]) found out that satisfaction of needs for competence (students feel they have the skills to play the BSG) and autonomy (students experience freedom in the BSG) improved intrinsic motivation to play. Intrinsic motivation, subsequently, had a positive impact on perceived skill development and perceived learning. Gatti et al. ([6]) found out that students' motivation affected cognitive and affective learning outcomes. Students with high motivation showed a higher self-reported understanding, perceived importance and usefulness of the learning topic taught in a BSG than a low-motivation group.

Flow: According to a study [9], in which groups of marketing students competed in a BSG, flow experience (components being absorption, enjoyment and intrinsic motivation) seems to have a positive influence on the development of perceived generic skills development and perceived learning, as well as satisfaction with the activity. Killi, Lainema, Freitas & Arnab ([10]) found that the ability to influence game events (make decisions, number of changes teams made) contributed to flow.

Engagement: The role of engagement is also mentioned in several studies. Buil et al. ([11]) found that satisfaction of need for autonomy and need for relatedness had a positive impact on cognitive, emotional and behavioral engagement. Cognitive engagement was associated with perceived skills development and perceived learning. Emotional engagement in the BSG also positively influenced skills development and perceived learning. Bell & Loon ([12]) found out that engagement had the biggest influence on intended learning outcomes, supported by cognitive maturity (awareness of problem complexity, openness towards other viewpoints, awareness of predispositions and biases as well as the ability to reflect those factors before making decisions). Moreover, Buil et al. ([8], [11]) found that engagement had a positive influence on perceived skill development and perceived learning.

Team work/collaboration was the study focus of several articles analyzed as well. Gresch & Rawls ([13]) studied learners' perceptions in a BSG and identified seven interpersonal skills helpful when working in a team in a simulation game that were named by the students in a questionnaire: organizational skills, oral communication, problem solving, team skills, leadership, cooperation and coordination. Buil et al. [8] recommend that teams should work together towards a shared goal to foster a feeling of relatedness with the teammates and "friendly competition" is recommended for a sense of belonging. Moreover, Mohsen et al. ([3]) found that competition can be helpful for engagement and motivation. Chaurasia ([7]) explored factors that influence students' perceived learning and found that a) collective learning (indicators are statements like "simulation helped in developing team working skills" or "simulation augmented negotiation within/across team"), b) collaborative communication (indicators are e.g. "teacher satisfactorily answered to questions raised by students" or "simulation motivated for cultural/demographic empathy"), c) satisfaction and d) fun had a significant positive influence on perceived learning.

Game design: An intuitive and simple interface is recommended ([7]), so that learners can concentrate on the game and not lose time trying to understand the interface. Related to this, perceived ease of use of a BSG can have a positive effect on intention to use ([5]). Also, perceived realism and computer efficacy (level of being comfortable working with computers) can lead to positive learning reflections¹ in BSG ([17]). Adequate levels of challenge also seem important: Buil et al. ([9]) found that if students felt they had adequate skills to meet a challenge, their flow experience increased.

Feedback: The role of feedback was mentioned in two papers. Feedback, from a person or the game, can foster students' flow experience and engagement ([9]). Furthermore, Loon, Evans & Kerridge ([14]) found that real-time feedback from a BSG can help maintain learners' interest.

4.2 Level 2

A surprising result of the literature analysis was that only two of the papers measured learning outcomes on level 2.

Lin, Yen, & Wang ([15]) measured the performance of students in a BSG in two different learning modes: working collaboratively in a group or working individually. They found that the group of students working

¹ Learning reflection is measured as „students' process of internalizing the knowledge of business process analysis and accounting cycle mapping that they acquire from market simulations“ ([17]). p.214

on their own performed better and showed higher commitment and involvement in the tasks than the collaborative group. Explanations were that students working on their own could focus more on the tasks themselves, whereas students working collaboratively had to perform extra tasks like making compromises, discussing and explaining, which could have led to cognitive overload. Although, looking at the collaborative groups isolated, those with high learning motivation showed higher performance. In general, however, the individual group was performing better, even those with low motivation.

Kiili et al. ([10]) created a flow framework with the aim to facilitate the analysis of educational games and conducted a case study in which students played a collaborative BSG. They evaluated their flow experience in a questionnaire and found a clear relationship between flow and game performance (performance indicators like turnover, profit or average production costs).

4.3 Levels 1, 2 and 3

One study included in this literature review measured levels 1-3:

Hinck & Ahmed ([16]) analyzed the impact of anticipatory emotions (feelings directed toward a performance goal) on learners' performance and motivation in a BSG, especially how positive and negative anticipatory emotions related to volitions, how volitions related to goal-directed behavior, how goal-directed behavior related to goal attainment, and how goal attainment is related to outcome emotions.

In the study, university students played a marketing BSG. Teams of four to six students competed against students from other universities and colleges. At the end, outcome emotions (level 1), degree of goal attainment (level 2) and actual goal-directed behaviors (level 3) were measured.

The study found that volitions were strongly associated with actual goal-directed behavior, which had itself a positive influence to actual goal attainment. Goal attainment was positively related to positive outcome emotions and negatively to negative outcome emotions.

5 DISCUSSION & CONCLUSIONS

An interesting outcome of this literature review with regards to Kirkpatrick's levels ([1]) was that the majority of papers measured learning on level 1 only. A likely explanation for this could be that among the most common empirical research methods in education are surveys, focus groups, interviews and similar methods, which measure people's opinions, attitudes and feelings, but not actual increased knowledge or competences. The absence of studies on level 4 could be related to the circumstance that all studies selected for this article took place in educational institutions. Level 4 evaluations (e.g. increased turnover) are usually not relevant for educational institutions and harder to evaluate than in a business environment.

Another finding was that in the articles selected for this review it seems that "human" aspects like motivation, flow or engagement seem to play an important role as success factors. The studies focused less on factors related to game design, game mechanics or didactics. A possible reason could be that in most of the articles, off-the-shelf BSG were used in which neither the game mechanics nor the game interface could be manipulated.

On the basis of the findings, it can be recommended that more studies evaluate success factors in BSG on levels 2-4 in the future. This could be achieved for example by measuring increased knowledge or competencies and observing learners' behaviors after playing BSG. Also, more research focusing on level 4 evaluations could be conducted in business settings.

Although "human" factors are important in learning success, it would be desirable to find more studies on how game design, interfaces, didactic designs etc. influence learning outcomes. Especially in digital simulation games, these aspects play an important role.

Limitations of this literature review exist due to the qualitative nature of this article, as the findings cannot be generalized. A more structured, systematic literature review on learning success factors with bigger sample sizes could be done in the future in order to address this limitation.

Another potential limitation is the vague concept of "success". It is possible that relevant studies have been overlooked because their articles did not include any of the keywords searched or were ranked very low in the databases and Google Scholar. Moreover, not all articles were accessible from the university's databases, which could have further limited the output of this review.

In summary, however, this literature review could help to gain an insight into the research approaches and outcomes of recent studies on success factors in BSG and show potential for future research in this area.

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