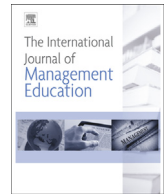


Contents lists available at [ScienceDirect](#)

The International Journal of Management Education

journal homepage: www.elsevier.com/locate/ijme

Using login data to monitor student involvement in a business simulation game



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ARTICLE INFO

Article history:

Received 2 September 2014

Received in revised form 25 January 2015

Accepted 23 February 2015

Available online 2 April 2015

Keywords:

Student involvement

Login

Business simulation games

ABSTRACT

While student involvement in business simulation games is critical to student learning and performance in the games, monitoring student involvement levels in the simulation activities remains a challenge for those who teach strategic management with the games. This study examined and tested whether student login frequency and consistency might serve as valid proxy measures of student involvement in the game activities, using data collected from 219 undergraduate business students who had participated in a business simulation game (Capstone). It was found that student login consistency had a stronger relationship with student involvement than student login frequency did, thereby representing a better measure of student involvement in the games. Research and pedagogical implications from these findings are discussed.

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1. Introduction

Today business simulation games have become a popular and effective tool to teach strategic management (Faria, Hutchinson, Wellington, & Gold, 2009). One large-scale survey of over 1000 business school professors in North America revealed that nearly half of them had used business simulation games (Faria & Wellington, 2004). Empirical findings based on student perceptions have consistently shown that students favor simulation over other instructional pedagogies such as cases and lectures (Anderson & Lawton, 2009; Jennings, 2002; Lu, Hallinger, & Showanasai, 2012). The widespread use of business simulation games is probably due to their unique education value. Research on the efficacy of business simulation games in teaching strategic management suggests that simulation experiences offer certain unique learning benefits that allow business students to develop critical strategic management knowledge and skills needed in the marketplace (Clarke, 2009; Kayes, 2002; Poisson-de Haro & Turgut, 2012; Seaton & Boyd, 2008; Zantow, Knowlton, & Sharp, 2005). Perhaps the most important unique benefit students obtain from participating in the simulation exercises is action or experiential learning where students practice developing, implementing and controlling competitive strategies as well as making complex and functionally integrated decisions in a competitive environment that reflects real life (Bell, Kanar, & Kozlowski, 2008; Kayes, 2002; Poisson-de Haro & Turgut, 2012; Tiwari, Nafees, & Krishnan, 2014). Such hands-on learning experience helps bridge the gap between classroom and real world work situations (Cadotte, 1995). Seaton and Boyd (2008) take note of two other unique learning opportunities from the simulation experience: equifinality in approach and autonomy in learning process. Instead of trying to find an optimal strategy or solution for a given situation, the simulation method allows for analyzing business

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situations from different perspectives and deriving alternative solutions to strategic problems (Lainema & Lainema, 2007). By giving students a high degree of control of the learning process, business simulation games enable students to master and internalize course materials and lessons learned through higher order thinking and reflection (Lu et al., 2012; Seaton & Boyd, 2008; Whetten, 2007). Another unique pedagogical benefit from simulation games is that they can be cost-effective and offer a fun learning environment (Lu et al., 2012).

In order for students to perform well and learn in business simulation games, they must be actively involved or engaged in the decision making activities of the simulation (Whetten, 2007; Wolfe & Luethge, 2003). Since students participate in the games with different interests, expectations, motivations, abilities and learning styles, it is necessary for instructors to monitor each student's involvement in the games effectively and efficiently so as to provide timely interventions needed. This is especially important as most of the games are played in teams due to the complexity of the decisions involved (Cadotte, 1995; Xu & Yang, 2010). While monitoring individual students' engagement in the simulation has traditionally posed a challenge for instructors (Wolfe & Luethge, 2003), today's business simulation games are often run online (Faria et al., 2009) and thus make it easier to track student activities in the games through automatic collection of data about how often a student logs into the game to make decisions. The research question this study sought to address is whether certain student login data represent valid proxy measures of student involvement in the simulation. Specifically, the study explored the potential relationships between two types of student login data (login frequency and login consistency) and student involvement levels in the simulation, using data collected from a sample of students participating in a web-based business simulation game (Capstone). Investigating these relationships may inform us about the potential pedagogical value of using student login data to track student engagement in the simulation activities and improve student performance and learning in the games. The use of these two easy-to-obtain proxy measures of student involvement may also facilitate research on the learning and performance effects of student involvement as well as its potential role in mediating the relationships between certain personal or external factors and student learning or performance.

2. Literature review and research hypotheses

2.1. Student involvement and student learning in business simulation games

Following the conventional wisdom that participation in educational games increases learning (Randel, Morris, Wetzel, & Whitehill, 1992; Wolfe & Luethge, 2003), student involvement in the decision making activities of business simulation games is presumed to influence student learning of strategic management knowledge and skills from the games. After all, it is hard to imagine a student would learn a lot about strategic management without some experience in contemplating and making strategic decisions. Yet, students come to business simulation games with different interests, attitudes, motives, expectations, skills and abilities, and learning styles (Coffey & Anderson, 2006). These individual differences may result in varying levels in individual students' efforts and learning outcomes even if students perform well in groups (Wolfe & Luethge, 2003). Indeed, the extant literature on the conditions for effective learning in business simulation games has shown that student learning at the individual level is subject to the influence of certain personal traits or characteristics (Adobor & Daneshfar, 2006; Coffey & Anderson, 2006; Faria, 2000; Towler, Lean, & Moizer, 2008). From a survey of 1967 students who had participated in a popular business simulation game (Capstone), Coffey and Anderson (2006) found a positive relationship between achievement motivation and perceived learning from the simulation experience. In a recent survey of 143 business students from India, Tiwari et al. (2014) also found that students with higher motivation to learn developed better analytical skills and market knowledge. In their study of factors affecting the effective use of another popular business simulation game (Business Strategy Game), Adobor and Daneshfar (2006) reported that students who perceived the simulation as reflective of real life situations obtained higher levels of learning of key strategic management skills. Towler et al. (2008) even found student age and gender accounting for some variances in the learning outcomes from playing the same game.

External factors such as team size, team dynamics and instructor support have also been shown to have a bearing on student learning in business simulation games (Adobor & Daneshfar, 2006; Anderson, 2005; Coffey & Anderson, 2006; Snow, Gehlen, & Green, 2002; Tiwari et al., 2014; Washbush & Gosen, 2001; Wolfe & Chacko, 1983; Xu & Yang, 2010). In one of the earliest investigations of team size effects on learning, Wolfe and Chacko (1983) found the students playing in teams of three to four members had increased their knowledge of strategic management concepts and facts more than those working in teams of smaller sizes. As most of business simulation games are played in teams, the influence of different aspects of team dynamics on simulation learning and performance has received considerable attention in the literature. Adobor and Daneshfar (2006) reported that task conflict in the team (i.e., the degree of idea exchanges) increased learning of individual team members while emotional conflict in the team reduced individual learning. A recent study by Tiwari et al. (2014) also found a positive effect of team cohesiveness on perceived student learning. Another recent research by Xu and Yang (2010) revealed that social interaction and a psychologically safe team environment were conducive to the development of synergistic knowledge which in turn enriched students' mental models in the simulation exercise.

Besides team size and dynamics, Coffey and Anderson (2006) observed in a study that students felt more positive about the learning value of the simulation if the instructor was more helpful and knowledgeable. Tiwari et al. (2014) also studied the instructor's role in the business simulation game and found the instructor's ability to give students a feel of a real life CEO had

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