Using expectation confirmation theory to understand the learning outcomes of online business simulations

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The purpose of this paper is to contrast learners' expectations of the knowledge and skills developed by an online business simulation at the start of the semester with their perceptions of how well the simulation performed in meeting these expectations at the end of the semester. The study draws on expectation confirmation theory to measure the expectations and perceived performance of two business simulations. Data were collected from 225 students studying at two Australian universities. The findings indicate that both online business simulations performed strongly in terms of helping learners understand strategy, real world problems and the importance of interaction and cooperation between different business departments. Both simulations also performed well in developing skills across all five levels of Bloom's taxonomy. There were some notable differences between expectations and performance between the two cohorts and the implications of these differences for business simulation choice and design is discussed.

Keywords: business, simulation, pedagogy, assessment, learning outcomes.

Introduction

It has been suggested that the growing emphasis on skills and graduate capabilities in business education requires a reframing and rethinking of pedagogy to support the development of desired learning outcomes (Biggs, 1999). In this context, innovations in technology enhanced learning have created new opportunities for business educators to create student-centred learning environments that foster the development of graduate capabilities. In particular, the use of simulations, 'serious games' and challenge-based learning has received recent attention in a number of fields. Simulations provide experiential learning environments that replicate workplace tasks or processes to allow students to apply knowledge and skills. Simulations are especially useful as a learning tool because they model aspects of reality in a safe environment, allowing learners to engage and make decisions in a risk-free environment (Kriz, 2010).

Literature Review

Thavikulwat (2004) defines a simulation as "an exercise involving reality of function in an artificial environment, a case study, but with the participants inside" (p. 243). Essentially, simulations provide a simplification of reality that facilitates participant's exploration of different scenarios and outcomes (Hill, 2001). The focus of this paper is on online business simulations. Business simulations are typically experiential exercises wherein participants are "learning how to learn" (Penger, Znidarsic & Dimovski, 2011; Ncube, 2010; Akilli, 2007). Many business schools have adopted simulations as learning tools because they offer insights into the operational and strategic issues managers face (Adobor & Daneshfar, 2006; Tichon, 2012).

The literature has increasingly focused on understanding what participants learn from simulations. Simulations provide more realistic scenarios than case studies often provide students with simultaneous objective feedback (Palmunen, 2013; Tompson & Dass, 2000). Simulations can be 'fun', providing participants with enthusiasm and motivation to actively learn. Simulations have been found to be effective in developing a range of employability skills including teamwork, communication and negotiation (Tichon, 2012; Gopinath & Sawyer, 1999), conflict-resolution (Seaton & Boyd, 2009) and interpersonal skills (Penger, Znidarsic & Dimovski, 2011). Business simulations can provide participants with a better understanding of financial reports, improve their computing skills and knowledge of programs such as Microsoft Excel, and enhance their quantitative analysis skills. This is because simulations often require working with numeric data, calculating outputs and understanding

the relationship between decisions and financial results (Fawcett, 2002).

The focus of this paper is on contrasting the knowledge and skills learners expect to develop prior to participating in an online business simulation with their perceptions of how well simulations have performed at the end of the semester. The research draws on expectation confirmation theory (ECT) to provide a conceptual foundation. ECT was originally developed in the marketing field, but has subsequently been applied in psychology, consumer research and information systems research (Bhattacherjee, 2001; Oliver, 1980). ECT posits that satisfaction is influenced by the extent to which the performance of a product or service meets the expectations of the user. In a technology context, Bhattacherjee (2001) found that a user's intention to continue using an information system is determined by their satisfaction, which in turn is influenced by the confirmation (or disconfirmation) of the users expectations based on performance. An understanding of learner expectations about online business simulations is important because ECT predicts that learners will be more satisfied when performance meets or exceeds expectations. As a consequence, learners who are satisfied with their simulation learning experience are likely to be more engaged and motivated to continue using the simulation throughout the semester. An understanding of expectations can also help inform the design of simulation-based pedagogy and assessment to ensure that performance meets expectations. Conversely, an understanding of initial learner expectations can help educators to identify and manage unrealistic expectations. The purpose of this paper is therefore to contrast the knowledge and skills learners expect to develop prior to participating in an online business simulation with their perceptions of how well simulations have performed at the end of the semester.

Method

Learner expectations were measured using a self-administered questionnaire completed in class by 107 business students at University A and 118 students at University B. Ninety per cent of students were final year undergraduate business students. University A had an even gender balance while University B had twice as many female students compared to male students. University A had an even split of domestic to international students compared to University B with 19 per cent domestic and 81 per cent international students. The students at University A were enrolled in an interdisciplinary final year capstone unit, which was designed to integrate disciplinary knowledge and responsible decision making through the application of ethical, socially responsible, and sustainable practice. The unit is based on a series of lectures and an action based learning project. In the action learning project learners form multidisciplinary teams and run a simulated business for a period of several weeks. Key performance areas include profit, quality, productivity, environmental impact, sustainability, social innovation and ethical performance. Team members compete as they make business performance decisions in the areas of operations, quality, marketing, HR, finance, production, corporate responsibility and sustainability. The total enterprise simulation was created by the university to address the lack of simulations dealing with responsible decision making. Students at University B were enrolled in a capstone hospitality management unit focussed on helping learners to integrate and apply knowledge from prior learning to solve management problems in a team environment. The learning experience is built around a simulation where learners develop strategies and implement decisions in 'real time' in order to develop a profitable hotel. The inputs into the simulation include strategic and tactical decisions on quality, refurbishment and extra facilities, room rates and discounting strategies, channel management, food and beverage options, marketing and advertising, environmental management, and human resources. Learners evaluate financial performance, seasonal trends, guest feedback, and staff satisfaction and alter their decisions accordingly.

Students were surveyed about the knowledge and skills they expected to develop prior to participating in the simulation. The same students were then asked to complete a post-simulation survey at the end of the semester to measure the perceived performance of simulations in terms of knowledge and skills development. Student expectations and perceived performance were measured using a set of seven-point Likert scales (1 = Strongly Disagree … 7 = Strongly Agree) developed from the literature, student focus groups and trial surveys. The paper also draws on Bloom's taxonomy to evaluate student expectations of skills (Bloom, Englehart, Furst, Hill, & Krathwohl, 1959). There are five levels in the taxonomy, moving through lowest order processes such as understanding and applying to higher order processes such as analysing, evaluating and creating.

Findings and Discussion

The data analysis focuses on three areas: (1) overall patterns in the data, (2) differences between the two cohorts, and (3) differences between the expectations and performance of simulations regarding knowledge and skills development. The mean expectation and perceived performance ratings for both cohorts are presented in Figure 1. Means testing was conducted using the t-test statistic to identify whether differences between the two cohorts and between expectations and performance were significant. Significant differences ($p < 0.05$) are shown on the figures using arrows. Several observations are evident from the figure:

1. Learners had high expectations about the ability of simulations to develop further knowledge in all areas except financial knowledge (M=5.35). Furthermore, there were no significant differences between the two cohorts (t=-0.633; p=0.527).

2. Learners had high expectations about the ability of simulations to develop skills across all five levels of Bloom's taxonomy with means ranging from 5.51 to 5.84. There were no significant differences in the expectation levels of the two cohorts.

3. Generally both simulations performed strongly in terms of helping learners understand strategy (M=5.63), developing an understanding of real world problems (M=5.60) and helping students to appreciate the need for interaction and cooperation between different business departments (M=5.81). Both simulations also performed well in terms of developing skills across all five levels of Bloom's taxonomy.

4. There were some significant differences between expectations and performance across the two cohorts. The findings indicate that the performance of the University B simulation exceeded student expectations in the area of financial knowledge ($M_E = 5.40$; $M_P = 5.68$; t=-2.063, p=0.041). On the other hand, the performance of the University A simulation did not meet expectations in the areas of financial knowledge ($M_E = 5.29$; $M_P = 4.90$; t=2.339, p=0.021) and marketing ($M_E = 5.35$; $M_P = 4.97$; t=2.358, p=0.020).

5. The University B cohort generally rated the performance of their simulation more positively than students using the University A simulation for both knowledge and skills. Significant differences were evident between the two cohorts when students were asked to evaluate their understanding of finance ($M_A = 4.90$; $M_B = 5.68$; t=-4.321, p=0.000), marketing ($M_A = 4.97$; $M_B = 5.64$; t=-3.491, p=0.001) and operations ($M_A = 5.46$; $M_B = 5.79$; t=-1.997, p=0.047) at the end of the semester. Similarly, significant differences were also evident in the skills area, with University B students being significantly more likely than University A students to agree that the simulation had enhanced their ability to analyse data ($M_A = 5.50$; $M_B = 5.87$; t=-2.320, p=0.021), evaluate problems and make decisions ($M_A = 5.61$; $M_B = 5.93$; t=-2.143, p=0.033).
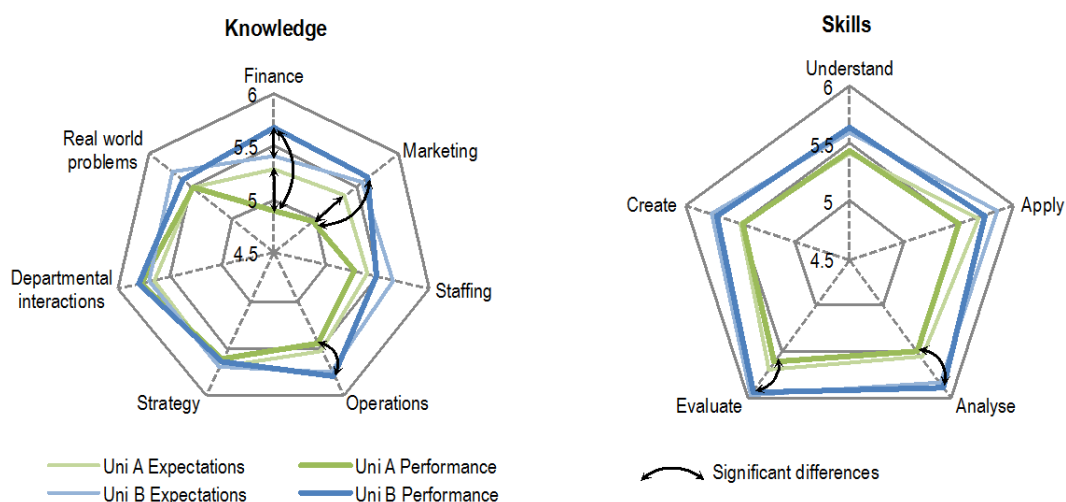

Figure 1: Mean ratings for knowledge and skill
Mean based on 1 = Strongly Disagree … 7 = Strongly Agree; Significant differences ($p < 0.05$)

The findings generally support other studies that have found that business simulations are effective at

developing a range of knowledge and skill areas. This study differs from previous work by also identifying student expectations and by contrasting expectations and performance across two different simulations. This analysis identifies that both simulations are effective at providing an authentic context for the development of business knowledge and basic skills such as understanding and application as well as advanced skills such as analysis, evaluation and creation. Business educators often struggle to develop and assess these skills using more traditional pedagogies and assessment. The originality of this paper therefore resides in the implications for simulation design in the future. The expectations and perceptions of two student cohorts provide insight into how closely learning outcomes need to be matched with the selection and design of the simulation.

Some of the differences that have been observed warrant further discussion. The University B students clearly underestimated the extent to which their simulation would develop their understanding of finance. These students generally major in tourism, hospitality and events management and are unlikely to have completed a substantial number of advanced accounting and finance units in their program. The University A cohort on the other hand included both business and commerce students and being in their final year, the business and commerce students are likely to have had an advanced understanding of finance concepts. It is therefore not surprising that these students did not learn a great deal more about finance and marketing from their simulation. This example highlights that one simulation is not necessarily better than another, but that the prior knowledge and skills of each cohort need to be considered when using a simulation to ensure that opportunities do exist for further advancement of knowledge and skills.

The perceived performance of the University A simulation was also not rated as highly as the University B simulation in the areas of marketing and operations. These differences may be the result of differences between the learning objectives of the two simulators. The University B simulation is an operational and strategic planning simulation and has complex modules in the areas of operations, revenue management and marketing. On the other hand, the University A simulation was purpose built to develop student capacity in the areas of ethics, social responsibility and professional practice – all areas that were not measured by this study. Differences in the student perceptions of the skills developed by the two simulations may come down to differences in the complexity of the two simulations.

Conclusion

This paper has contrasted the knowledge and skills learners expect from participating in an online business simulation by comparing two different University simulations. Student learning expectations from both cohorts were high as were their perceived learning from the simulation. While both student cohorts varied in composition and business knowledge, each experienced a high level of engagement, learning interdependencies, strategy, real world knowledge and the development of skills across all levels of Bloom's taxonomy. Differences arose with the influence of discipline upon the perceived performance of the two simulations, highlighting the importance of aligning the choice and/or design of simulation with the learning objectives.

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