THE IMPACT OF SIMULATION ON STUDENTS' LEARNING & PERFORMANCE IN BLENDED FORMAT, A COMPARISON BETWEEN BUSINESS AND ENGINEERING STUDENTS

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Abstract

The aim of this research is to measure the impact of simulation on students learning and performance in Business and Engineering classes. Furthermore, we are also investigating what factors may influence simulation's effectiveness and how these factors relate to the learning performance.   In order to offer quality higher education to the students through simulation and to increase interests of other professors in simulation method of teaching in their classes. The research will be tested by conducting questionnaire survey to 100 students from Engineering School and Business School in Fall 2014.   Through dada analysis we want to confirm the students' general preference and attitudes, satisfaction toward simulation, feedback, instruction quality, group size and content in the simulation are positively or negatively related to the simulation effectiveness. We would also investigate the Impact of simulation on better interpersonal skills, teamwork, communication skills, tactic knowledge sharing and student grades. The result may show the performance difference between Business students and Engineering students.

1.   Introduction

A persistent concern in teaching is the aim to achieve a better outcome and to reduce the number of students dropping out from the course, and it is recognized that achieving these goals might require a change in the teaching methods employed (López-Pérez et al, 2010). Traditionally, teachers use face-to-face method. But with the development of high technology, such as internet, video and voice technology, virtual teaching method is becoming increasingly popular. As of September 2007, 42 states sponsored "significant supplemental online learning programs, significant full-time programs, or both" (Watson & Ryan, 2007; Roblyer et al, 2009). In comparison with face-to-face teaching, virtual teaching method can increase students' cognitive-affective engagement (PytlikZillig et al, 2011), create an environment that cultivates better achievement and attitudes (Bernard, 2004), give students more time to prepare and put forward their ideas (Sotillo, 2000; Yamat, 2013), and offer flexibility to those distance learners who may not have opportunity to meet or to interact with their learning counterparts (King, 2001; Yamat, 2013). But face-to-face teaching method also has its advantages. It guarantees prompt reply to students, increases decision making process in discussion and increases interactivity and dynamic in the class (Yamat, 2013). Therefore, many universities adopted blended teaching (or learning) method, which combined virtual teaching method and face-to-face teaching method.

Blended learning is normally defined as the integration of traditional classroom method with online activities (Garrison & Kanuka, 2004; Graham, 2006; Macdonald, 2008; López-Pérez et al, 2010). From the brief comparison between traditional face-to-face teaching method and virtual teaching method above, blended class, which is a combination of those two methods, has the advantages of these two methods. Thus, blended class should have a big impact on students learning performance. Blended learning includes many formats, such as face-to-face lecture, simulation, video communication, and so on. Any integration of these formats becomes blended class. In this paper, we mainly explore the impact of simulation on students' learning behavior, because simulation plays an increasingly important role in education and training. Simulation improves performance of students and employees, helps students apply knowledge to practice and facilitates employees to acquire new skills more efficiently.

From O'Connor's case research (O'Connor et al, 2011), students from different major may react differently toward the simulation. Students from different major receive different kinds of education contents, thus their reaction toward simulation may be different. And according to Stitt-Gohdes (2001), business major students prefer an Iconic instruction mode which uses non-word materials when addressing the subject matter during class, such as slide shows, charts, and videos. Also, these business major students want to have a personal relationship with their teachers and prefer teamwork assignments with their classmates (Stitt-Gohdes, 2001). However, researchers found that engineering students' learning level and sense of satisfaction will be higher if the instructor implements some of new teaching methodologies that are not within the traditional teaching contexts, such as blended class learning and collaborative spaces. (Ana-b et al, 2013). But because only a few literatures discussed this topic, we will compare business students' reaction and engineering students' reaction with the same simulation model to check whether the learning performance of students from different major will be different under the same simulation.

Many previous literatures mainly focus on simulation' effectiveness on learning achievement, but seldom have literature focused on what factors in simulation relate to learning performance and what kind of learning performance can be influenced, which is an important topic to decide what kind of simulation should we offer to people and what changes should we make toward the existing simulation to provide a more effective learning method. Moreover, in Business Schools, seldom have teachers adopted simulation as an educational tool, because they don't see how the simulation affects the students learning performance. Through this research, we want to invoke their interests in simulation by demonstrating that simulation does have a positive relationship with learning performance; and to tell them how to provide more effective simulation by demonstrating what factors in simulation influence the learning performance.

Therefore, through this research, we are investigating the impact of simulation on students learning and performance in Business and Engineering classes. Furthermore, we are also investigating what factors may influence simulation's effectiveness and how these factors relate to the learning performance.

3. Methodology

□□Participants

Participants of this research are undergraduate students who take blended classes that contain simulation in both Business School and Engineering School in University of Illinois at Urbana-Champaign in the 2014 Fall semester. The total number of these students is 100, 50 of whom come from Business School and the other 50 come from Engineering School.

□□Instrument

In the research, we would like to measure students' thoughts and feelings toward the simulation (such as general preference and attitudes, satisfaction) and also measure the facts about the impacts of simulation on learning performance (such as the four main factors and the improvement in learning performance through simulation), and a questionnaire measure separate variables including preferences and facts (Adèr&Mellenbergh, 2008), we decided to use questionnaire to select the data. In the questionnaire, we categorized the hypothesis into 4 groups. The first group is General Attitudes and Preference, which tests the hypothesis 2. The second group is the 4 Main Factors that will affect simulations' effectiveness, which tests hypothesis 3, 4, 5, 6, 7 and 8. And the third group is Satisfaction, which tests the hypothesis 9. Moreover, in order to evaluate the relationship between students' learning outcomes and factors that will influence the simulation effectiveness; we will select data on students' feedback of the simulation, which is categorized as the fourth group in the survey. However, students' feedback is the subjective evaluation of the learning performance. We also need to evaluate objective data. Therefore, we will also collect data on students' simulation grades and final grades. The dependent variable is learning performance, including both subjective and objective data. The independent variables are general attitudes and preference, group size, feedback, instructor, instruction and satisfaction. After selecting these data, we will conduct regression analysis. The result of the analysis will show what factors in simulation will affect students' learning performance what aspects of the learning performance would be influenced. The regression analysis will be conducted separately for students from Business School and Engineering School. The result of these two analyses can test the hypothesis 1.

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