Using Simulation Games and Case Studies in Teaching Performance Measurement and Management

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Simulation games and case studies are used extensively in teaching in business administration. However, few studies investigate the relationship between using simulation games in tandem with case studies and student learning. This study showed only a positive direct relationship between the benefits gained from case studies and student learning. There was no apparent direct relationship between the benefits gained from simulation and student learning. The study also showed a relationship between benefits gained from simulation games and benefits gained from case studies. It can be concluded that simulation games affect student learning only when accompanied by case studies[1].

INTRODUCTION

Performance measurement and management (PMM) is on most business agendas, as it helps managers know the outcome of the decisions that have been made and also guides them in the formulation of the most appropriate strategies in today's rapidly changing business environment. PMM is also useful for the translation of strategy into action. Measurements of the success of a strategy helps a manager become aware of the importance of strategy and enables good alignment of all actions with the objectives of the organization.

Given the importance of PMM, many organizations have begun to train their people to understand this concept more. Many institutes of higher education provide courses relating to PMM to enable students to better understand the concept and henceforth use this knowledge to help the organization they are connected with.

As lecturers help students understand the concept of PMM, they add to the traditional lectures using slides and handouts by offering the students the opportunity for hands-on experience in PMM. This can be done by asking real organizations to allow students to work in real situations. However this option is limited as an organization may find it too risky to let students engage in this since they have no way of knowing whether or not a particular student is ready. This brings up other options – the use of simulation games and case studies. Simulation games allow students to make decisions under various constraints in simulated situations, while case studies allow students to make decisions based on information from real stories from organizations. Discussion of the case studies in a classroom situation also encourages students to exchange ideas and opinions.

Although simulation games and case studies seem to be an effective tool for student learning, in many cases they are not as effective as desired. Students sometimes complain that though simulation games and case studies are interesting, they gain little new knowledge. Although there are some studies attempting to prove the effectiveness of these two tools [see for example; Anderson (2005); Fowler (2006) for the

effectiveness of simulation games and Dittenhofer (1992); Finney and Pyke (2008) for effectiveness of case studies], there are few studies that investigate the effect of these two tools used concurrently. The contribution of this study is therefore to provide the empirical evidence of the relationship between the usefulness of simulation games and case studies and student learning in a PMM course. If a linkage is found, then the results can be generalized to other subjects. On the other hand, if there is discovered to be no linkage between the use of case studies and simulation with student learning, lecturers will have to explore other ways to make this transfer of knowledge take place or even develop new teaching strategies to help their students learn more effectively.

USING SIMULATION GAMES AND CASE STUDIES IN BUSINESS COURSES

Simulation games are a very popular tool in teaching business courses (Anderson, 2005). Based on the result of a study, 30.6% of professors in business schools use simulation games in teaching (Faria and Wellington, 2004). The objective of a simulation game is to encourage students to apply knowledge obtained from study materials in a simulated situation (Walters et al 1997), and thereby help them understand the content, increase their experience, and even increase their software skills (Leger, 2006). The study shows that factors that lead to student satisfaction in a simulation game is the level of control in the game, the student's need for achievement, and the student's risk propensity (Walters et al 1997). It has also been found that simulation game performance was influenced by team heterogeneity, opportunistic practices, and hypothesis-driven thinking of players (Anderson, 2005).

Although simulation games are used extensively in business school courses, some argue that it is not a very effective tool if used improperly and there are still doubts as to its effect on student learning (Neuhauser, 1976; Klein, 1984; Fowler, 2006)

The case study is another tool used in teaching business for more than 70 years since its beginnings at Harvard Business School (Dittenhofer, 1992). It has gained in popularity and is used extensively in many business-related subjects including accounting, finance, marketing, and human resource management among others (Swiercz and Ross, 2003). Case studies help students learn in a real setting and encourage students to think critically and search for the truth by themselves. They are intellectually stimulating and tend to involve the concept of adventure and exploration (Christensen, 1987). The objective of the case study is therefore the facilitation of student learning of subject content (Shapiro, 1984).

Although case studies are normally used for subjects that need discussion and can have more than one solution, more recently it has been applied in quantitative analysis study (Pillay and Dugar, 2009). This recent development is called "Live Case Method", where students go into an organization and propose a solution to a real problem that is currently unsolved in that organization (Roth and Smith, 2009).

Although case studies are used extensively in business studies, they do not always lead to successful learning. Numerous factors that lead to successful case discussion have been identified: 1) student preparation; 2) multiple and diverse perspectives considered; 3) quality, depth, and repetition versus quantity of coverage; 4) energy, collaboration, and community in the classroom; 5) maximum engagement of students; 6) appropriate cases discussed; 7) the student discovers a need for and finds value in the learning experience; 8) environment of respect and support versus fear and intimidation; 9) learning – deep, life-long, applied, retained, and personal; 10) emphasis on application, decision making, and development of an action plan; 11) graphic presentation and use of technology; and 12) overcoming challenges of case discussion leadership (Smith, 2010). It has also been found that there is a relationship between student perception of case relevance and student motivation (Finney and Pyke, 2008).

The reviews of literature above show that there is no definitive study showing that simulation games and case studies are effective tools that help students learn better. There are also few studies (if any) that investigate the effectiveness of these tools when they are used at the same time. To help fill this gap, this study aims to answer this question.

RESEARCH METHODOLOGY

In this study, data was collected from 204 MBA students enrolled in BA701, Performance Management and Value Creation, l at Thammasat Business School. The researcher is the primary lecturer for this course, and the students are given the opportunity to use both simulation games and case studies.

The simulation game used in this course is called "Managing Through Measures" (MTM). The objective of the game is to provide students an opportunity to wisely use a limited amount of resources based on information from various performance measures. This game also provides the student the opportunity to analyze and interpret the results obtained from the performance measures and decide what should be done to increase organizational performance in the next period.

To play this simulation game, students divide into groups of 4-5 students, with a maximum of 10 groups. Each team takes on the role of CEO of one service company that provides information to top executives. The team has to decide what project they want to invest in and how much to invest (that will not exceed the limit specified). The objective of this investment is to improve the company's performance, which is presented though 13 performance measures for each quarter (in this simulation game one week is equivalent to one quarter in the game). Once the team has made their decision, these performance measures will be shown to every team and the team will use these to support their decisions in the next quarter. The game lasts 12 quarters. At the end, the performance of each team will be judged based on profit accumulated.

In addition to submitting the group's investment decision every quarter, students in each team are required to present the company's performance at the end of the first year (4th quarter), second year (8th quarter) and third year (12th quarter). This presentation is to include the summary of the company performance against the plan and the future plan for the next year.
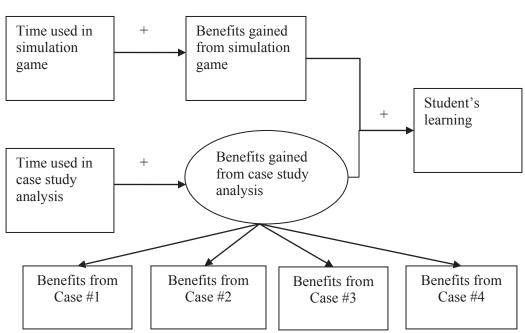
As for their case studies, the students are required to read and analyze four Harvard Business Cases: (1) Nordstrom: Dissension in the Ranks? (2) Playgrounds and Performance: Results Management at KaBOOM! (3) Store24 and (4) Citibank: Performance Evaluation. Each case is discussed in a one-hour period. Students need to read the material and answer the case questions before the class discussion begins. During the discussion period, the lecturer will encourage each student to take part in the class discussion and at the end of the class, the lecturer will summarize the highlights of the points to learn from the case.

In this study, student opinions were obtained by use of a questionnaire. Students were asked to evaluate the time and benefits gained from the simulation game and case studies at the end of the term. Each student's level of learning was measured by his final examination score. The score of the final examination is used as an indicator because it tests the understanding of the student and is written to cover everything the students should have learned during the term.

Once the evaluation from the student was received, analysis was performed to investigate the relationship between (1) time used and benefits gained from the simulation game, (2) time used and benefits gained from case study analysis, and (3) the benefits from both the simulation game and the case studies and the amount the student learned.

Figure 1 illustrates the research model for this study. Please note that Case #1 refers to Nordstrom: Dissension in the Ranks?, Case #2 refers to Playgrounds and Performance: Results Management at KaBOOM!, Case #3 refers to Store24 and Case #4 refers to Citibank: Performance Evaluation.

FIGURE 1
RESEARCH MODEL

Data was collected for one academic year, which consists of three terms: term 1/2009, 2/1009, and 3/2009. The structural equation modeling (SEM) technique is used to test the validity of the model (above).

RESULTS

Of 204 respondents (part-time MBA students), most (62.6%) are female, 32.5% have a background in accounting and business studies. Most are working full time in: the service industry (26.6%), the financial industry (17.2%), or the industrial products industry (15.8%). Table 1 illustrates the work place industry and Table 2 shows the educational background of the respondents.

TABLE 1
WORK PLACE INDUSTRY FOR RESPONDENTS

Industry	Percentage
Service	26.6
Financial	17.2
Industrial product	15.8
Technology	12.3
Consumer product	8.9
Resource	6.4
Agriculture	6.4
Unemployed	3.4
Real Estate	2.5
Non-Profit	0.5
Total	**100**

TABLE 2
EDUCATIONAL BACKGROUND OF RESPONDENTS

Educational background	Percentage
Accounting/Business Studies	32.5
Engineering/Architecture	24.6
Science	8.9
Economics	8.4
Agriculture	6.4
Medicine/Pharmacy	4.4
Political Science	4.4
Arts	3.9
Humanities	3.4
Communication	1.5
Law	1.0
Education	0.5
Total	**100**

On average, respondents value the usefulness of the Case 3, Store 24, the highest (81.6 out of 100) and see simulation as having the lowest usefulness value (71.4 out of 100). Students spent 4.4 hours per week on case study analysis and 2.7 hours per week on simulation game analysis. The average final examination score is 31.5 out of the maximum score of 35. Table 3 shows the descriptive statistics of variables of interest.
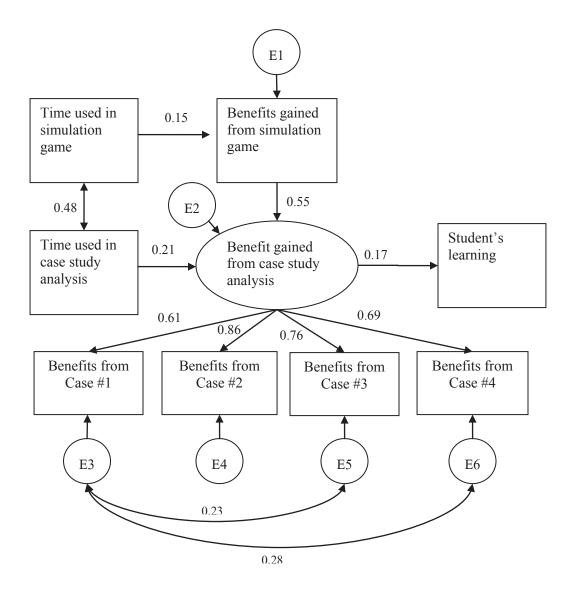
TABLE 3
DESCRIPTIVE STATISTICS OF VARIABLES IN THIS STUDY

Variables in the study	N	Minimum	Maximum	Mean	Standard Deviation
Usefulness of case - Store24	204	0	100	81.6	26.7
Usefulness of case - Nordstorm	204	0	100	79.4	27.3
Usefulness of case - KaBoom	204	0	100	75.9	30.9
Usefulness of case - Citibank	204	0	100	75.6	34.2
Usefulness of simulation game	204	0	100	71.4	30.2
Final exam score	204	11	31.5	23.9	3.6
Time spent for case analysis	204	0	24	4.4	2.9
Time spent for simulation game analysis	204	0	24	2.7	3.6

By using SEM technique and the statistical software, AMOS, it was found that the research model as presented in Figure 1 did not fit with the data from the sample. The researcher then modified the model as shown in Figure 2. This model passed the model fit test (Chi-Square = 24.739, degree of freedom (df) = 17, p-value = 0.101 Chi-Square/df = 1.455 GFI = 0.972 NFI = 0.950 RMSEA = 0.047 (with p-value = 0.503) and Hoelter = 227. Every value indicates that the model fits with the data). Please note that the number shown in the model in Figure 2 represents the standardized relationship between each variable and E_i refers to error of measurement for each variable.

FIGURE 2
MODIFIED RESEARCH MODEL

   Based on the modified research model, there were found to be positive relationships between time used and benefits gained for both the simulation game and case study analysis. In the case study analysis, Case #2 (Playgrounds and Performance: Results Management at KaBOOM!) has a strong relationship with the total benefit gained from case studies compared to the other three cases. It was also found that there is a positive relationship between the benefits gained from case study analysis and student learning as measured by the final examination score.

   However, it is interesting to see that that is no direct relationship between benefits gained from the simulation game and student learning. It was, however, found that there is a positive relationship between the benefits gained from the simulation game and benefits gained from case study analysis. This implies that the simulation game does not have a direct effect on student learning but that it does, however, have an indirect effect via benefits gained from case studies, i.e. the simulation game helps students understand more when undertaking case study analysis, which in the end leads to higher student learning.

The results also show that there is a positive relationship between time used in the simulation game and time used in case study analysis. This can be seen as suggesting that students who spent more time in simulation game analysis tend to spend more time in case study analysis as well.

CONCLUSION

The results of this study indicate that the more time students spend in analysis of the simulation game and case studies, the greater the benefits gained. The benefits gained from case study analysis will in the end raise the student's learning as measured by the final examination score.

Although there is no evidence of a direct relationship between benefits gained from the simulation game and student learning, the benefits gained from simulation game are shown to have a direct effect on case study analysis, leading to a higher level of student learning.

Based on this study, it can be suggested that using simulation games alone will not help students understand PMM content and that learning will be enhanced only when both tools (simulation game and case study) are used concurrently. At the same time, the scope of this study is only to test the relationship between simulation games and case studies and student learning; it does not attempt to explain the variability of student learning, hence the other variables that might affect student learning are not included in this study.

Results from this research can be used to develop teaching methods for PMM, and can also be generalized to other business subjects, as by nature business courses have many similarities. It is also hoped that this finding can stimulate greater creativity in teaching business studies in the future.

NOTE

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