Marketing Simulation Game Decision Making Experience And Its Impact On Indecisiveness Among Introductory Marketing Students

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ABSTRACT

The present study examines how the decision making experience gained by game participants during the play of a marketing simulation game impacts the traits of indecisiveness and competitiveness among marketing students. A pre-test/post-test experimental design was used to measure the change in participant decisiveness, competitiveness and attitude toward the simulation experience. The present study sought to determine whether the simulation experience reduced indecisiveness and increased competitiveness and whether well performing decision makers were less indecisive and more competitive than poorer performing game participants. The study findings, involving 348 students, showed a significant reduction in indecisiveness and a significant increase in attitude toward the simulation experience. There were no significant differences in pre-test indecisiveness and attitudes toward the simulation experience in relation to ending rank order performance but there was a significant difference in simulation performance for highly competitive students versus low competitive students. The post-test measures of indecisiveness, competitiveness and attitude toward the simulation experience showed a significant difference in relation to ending rank order performance. It was concluded that participation in a marketing simulation game produced a significant reduction in indecisiveness and that well performing students reported being less indecisive and more competitive than poorer performing students.

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INTRODUCTION

The use of business simulation games is generally intended to provide participants with decision making experience. It is also hoped that participation in business simulation games will help the participants to become better decision-makers. The issue of whether the simulation game experience makes participants better decision makers or not has not, however, been conclusively demonstrated. If simulation games are a meaningful educational experience, one would hope that decision making skills are improved as a result of the gaming experience. A major problem, of course, is that decision making skills are very hard to measure in an objective fashion.

Most often, when evaluating simulation game performance, good decision making is ascribed to superior performance. While most game administrators would agree that better performance results are due to better strategies and better decisions, this does not tell us whether game participants improved their decision-making skills through the simulation experience. One could certainly argue that the simulation game simply identified those participants who were the best decision-makers entering the competition.

A key requirement of most business decision makers is that they undertake decision making in a competitive environment. It is believed that good decision makers will develop and demonstrate the traits of decisiveness and competitiveness, among others, to cope with their business environments. If one is indecisive, the ability to make a decision at all is lacking, never mind the ability to make a good decision. If one is not competitive, then the ability to compete in a normal business environment is likely to be reduced. If, through the experience gained from participation in a business simulation exercise, participants became both more decisive and competitive, simulation games would clearly offer a meaningful experience.

Past research has examined the relationship between student performance in simulation competitions and a wide range of variables. Among the variables examined have been numerous personality characteristics, locus of team control, achievement motivation, previous academic performance, time pressure, ethnic origin of team members, gender, team size, previous business experience, team organizational structure, method of team formation, and grade weighting (see for example Anderson and Lawton 1992; Brenenstuhl and Badgett 1977; Butler and Parasuraman 1977; Chisholm, Krishnakuman and Clay 1980; Edge and Remus 1984; Faria 2001; Gentry 1980; Glomnes 2004; Gosenpud 1989; Gosenpud and Miesing 1992; Hergert and Hergert 1990; Hornaday 2001; Hsu 1984; Moorhead, Brenenstuhl and Catalanello 1980; Newgren, Stair and Kuehn 1980; Patz 1990; Roderick 1984; Walker 1979; Washbush 1992; Wheatley, Anthony and Maddox 1988; and Wolfe, Bowen and Roberts 1989). Summarizing much of the past research are major review articles by Greenlaw and Wyman (1973), Keys (1976), Wolfe (1985), Miles, Biggs and Shubert (1986), Wolfe and Keys (1990), Randel, Morris, Wetzel and Whitehall (1992), and Faria (2001). Two characteristics conspicuously lacking among past research studies are the traits of decisiveness and competitiveness.

The present study examines the traits of decisiveness and competitiveness and whether they are related to simulation game performance and whether they change over the course of participation in a marketing simulation game. Decisiveness has nothing to do with the quality of the decision but simply the willingness to make a decision. As such, this study will not be caught up with the problem of attempting to assess whether participant decision-making quality improved over the course of a competition but simply with the issue of the change in participant decisiveness over the course of the competition.

LITERATURE REVIEW

Several factors may explain good performance in a simulation competition. For example, it is possible that good students will consistently outperform poor students. To test this, a number of studies have examined the relationship between grade point average (GPA) and simulation performance. While some studies have reported a positive relationship to exist (Hsu 1989; Wolfe and Chanin 1993; and Wolfe and Keys 1990) many others have found no such relationship (Faria 1986; Glomnes 2004; Gosenpud 1987; Gosenpud and Washbush 1991; Norris and Niebuhr 1980; and Wellington and Faria 1994).

Learning is another obvious factor that might lead to good simulation performance. Learning is generally measured by performance on end of course examinations. While two studies have reported a relationship between simulation performance and performance on mathematical problems (Faria and Whiteley 1989; and Whiteley and Faria 1990), many other studies report no relationship between superior simulation game performance and performance on course final examinations (Anderson and Lawton 1992; Washbush and Gosenpud 1993; Wellington and Faria 1991; and Whiteley 1993).

A number of studies have examined the personality traits of successful simulation game players and successful business executives (Babb, Leslie and VanSlyke 1966; Gray 1972; McKinney and Dill 1966; Vance and Gray 1967; and VanSlyke 1964). These studies have generally shown that the characteristics of successful game players conform to those of successful business executives. Additional studies have examined the decision-making styles of successful simulation participants and successful business executives (Babb and Eisgruber 1966; and Wolfe 1976). These studies reported that the decision-making styles of successful executives and game players were similar.

Several longitudinal studies have been undertaken in which a student's business game performance is compared to some measure of subsequent business career success (e.g., number of promotions, job title, salary level, number of salary increases, management level in the company hierarchy, etc.). Good simulation performance might suggest something about an individual's managerial skills and, hence, serve as a predictor of later career success. One early longitudinal study (Norris and Snyder 1982) did not find a correlation between business game performance and later career success but two more comprehensive studies have reported such a correlation (Wolfe and Roberts 1986; and Wolfe and Roberts 1993).

Four studies have reported that successful business simulation game firms practice strategic management (Gosenpud, Miesing and Milton 1984; Gosenpud and Wolfe 1988; Miesing 1982; and Wolfe and Chanin 1993). In these studies, strategic management was considered to exist when the team developed clear goals, analyzed the external environment in which they were operating, understood their strengths and weaknesses, developed clear strategies as part of a formal plan, monitored their performance, and took corrective action when needed.

The research studies cited above have suggested that good simulation performance might be related to student grade point average, student learning in the simulation competition, the personality characteristics of the simulation participants, the decision-making style of the participants, or the degree of formal planning undertaken by superior performing teams. As well, several longitudinal studies have suggested that good simulation performers will be more successful in later business careers.

While we know something about the characteristics of successful simulation game performers, very little exists in the literature, simulation or otherwise, on decisiveness. It is not known if decisiveness is associated with good simulation game performance or if participation in a business simulation game has a measurable effect on decisiveness. The few articles on decisiveness have examined the process of decision making and utilized the same tautological reasoning to measure decision-making effectiveness: good decision making processes produce good results or, conversely, good results are evidence of good decision-making. The search for measures of decisiveness, further, revealed only a few studies which provided scales and those found actually measured “indecisiveness” as a trait (Salomone 1982; Heppner and Hendricks 1995; Germeijs and De Boeck 2002; and Bacanli 2006).

Two measurement scales, found during the literature review, were used in this study. Germeijs and DeBoeck (2002) developed a scale to measure indecisiveness in career decision-making while Mowen (2000) developed a competitiveness scale as part of a study on motivation and personality.

PURPOSE AND HYPOTHESES

The purpose of the present study is to determine whether the experience of participating in a marketing simulation game will have an effect on the decisiveness, competitiveness and attitude of the game participants. Based on past research findings, and some amount of logic, the following six hypotheses will be tested:

H1: As a result of game play, students will become less indecisive by the conclusion of the simulation competition than they were at the beginning.

H2: As a result of game play, students will become more competitive by the conclusion of the simulation competition than they were at the beginning.

H3: As a result of game play, students will become more positive towards the simulation by the conclusion of the competition than they were at the beginning.

H4: Well performing students will be less indecisive at the conclusion of the simulation competition than less well performing students.

H5: Well performing students will be more competitive at the conclusion of the simulation competition than less well performing students.

H6: Well performing students will have a more positive attitude towards the simulation competition than less well performing students.

METHODOLOGY

The subjects for the research to be reported here were 632 students who completed a Principles of Marketing course from the same instructor in three different semesters in which *Merlin: A Marketing Simulation* (Anderson, Beveridge, Lawton and Scott 2004) was used. The *Merlin* participants played as single member companies divided into industries of seven companies each and participated in an eight period competition.

The students were asked to complete a self-report questionnaire at the beginning and end of the simulation exercise which contained measures of their indecisiveness, competitiveness and attitude towards the simulation competition. The indecisiveness measure was drawn from a study by Germeijs and De Boeck (2002) and is a 22 item scale with a reported alpha reliability of .91. The items were measured using a Likert style seven point Strongly Agree to Strongly Disagree scale with lower numbers meaning less indecision. The competitiveness measure was a four item scale with a reported alpha reliability of .92 and was developed by Mowen (2000). These items were also measured using a seven point Strongly Agree to Strongly Disagree scale with lower numbers meaning more competitiveness. The participants' attitudes toward the simulation competition were measured using a four item Strongly Agree to Strongly Disagree scale developed by the authors. Students were told that the nature of their responses would not affect their grading in the course. Only students who returned both the pre-competition and post-competition questionnaires were included in the data analysis. This resulted in a sample of 459 students. A further elimination of incomplete questionnaires and questionnaires containing highly inconsistent responses reduced the sample size to 348 students or 55.1 percent of the students participating in the simulation exercise.

The questionnaire items were factor analyzed using the principal axis factoring technique and a varimax rotated solution to establish discriminant validity among the constructs. In undertaking the factor analysis, it was found that the competitiveness measures and attitude toward the simulation competition measures loaded very heavily on separate factors but that the indecisiveness measures seemed to load on four different factors instead of one single factor as expected. In undertaking the factor analysis it was also found that one of the 22 items on the indecisiveness scale was loading as a single unique factor and not loading with any other items on the scale. As such, this item was removed from further analysis. Given the quandary of whether to examine multi-dimensions of indecisiveness or to utilize the established scale as presented by Germeijs and DeBoeck (2002), it was decided to use the established scale. The resultant scale reliabilities for both the pre-test and post-test questionnaire results are reported in Table 1. The average value of the scale items were used for hypothesis testing.

In the *Merlin* competition, performance is measured using a ranking based on an index of company sales, earnings, return on sales and forecast accuracy. These indexes were weighted 5%, 85%, 5% and 5%, respectively, resulting in each participant/company being ranked from first place to last place within their industries (e.g., from first to seventh position).

H1, H2 and H3 were tested using a paired t-test procedure to compare the indecisiveness, competitiveness and simulation competition attitude scale ratings for the whole group at the beginning of the simulation and at the end of the simulation competition.

H4, H5 and H6 were tested using ANOVA. It must be acknowledged that the performance data were ordinal and involved high and low dependent variables for indecisiveness, competitiveness and attitude versus the independent variables of game rank order performance, expected rank order performance, and course grades. As such, it can be argued that it would be most appropriate to use a non-parametric procedure such as the Kruskal-Wallis One-Way Analysis of Variance by Ranks test for the rank order data. However, when samples are large as is the case with this study (348 students and at least 39 individuals in each ranking group), "parametric tests are robust to deviations from Gaussian distributions. . . . Unless the population distribution is really weird, you are probably safe choosing a parametric test when there are at least two dozen data points in each group" (Motulsky 1995). Consequently, the parametric ANOVA procedure was used to compare indecisiveness, competitiveness and attitude toward the competition versus *Merlin* rank order performance as a factor variable.

TABLE 1
PRE-TEST AND POST-TEST MEASUREMENT SCALE RELIABILITIES

Scale	N	Number of Items	Alpha Reliability
Pre-test Indecisiveness	348	21	.709
Post-test Indecisiveness	348	21	.687
Pre-test Indecisiveness	348	4	.766
Post-test Indecisiveness	348	4	.764
Pre-test Indecisiveness	348	4	.761
Post-test Indecisiveness	348	4	.795

TABLE 2
PAIRED COMPARISON T-TEST FOR H1, H2 AND H3

		Pre-test		Post-test	
Comparison of Changes T-Test	N	Mean	Mean	t-score	Sig.
H1: Pre-test vs Post-test Indecisiveness	348	3.900	3.704	5.654	.000**
H2: Pre-test vs Post-test Competitiveness	348	2.903	2.842	0.994	.321
H3: Pre-test vs Post-test Attitude	348	3.794	3.637	1.937	.054*

Note: Measurement scales were 1-7 point, with lower numbers meaning less indecisive, more competitive and more positive attitude towards the simulation competition.

In addition, the impact of the simulation experience on competitiveness, indecisiveness and attitudes towards the simulation was examined using a partial least square structural equation modelling program, PLS Graph® 3.0, a component based software package developed by Chin (Chin, 2001). This program assesses data in relation to conceptual models using multiple regression and confirmatory factor analysis techniques. The Partial Least Squares (PLS) statistical analysis method was developed by Wold (1982) for the latent variable conceptual models with multiple constructs and indicators. An advantage of PLS programs is their ability to accommodate a complex model in exploratory studies.

FINDINGS

The overall findings with respect to H1 through H3, which were tested using a paired t-test, are reported on in Table 2. These findings support the acceptance of H1 and H3 but do not support H2.

To test H1, the average indecisiveness scale rating from the student responses to the indecisiveness scale measures on the pre-test questionnaire were compared to the average of the responses on the post-test questionnaire to determine if there was a change. As shown in Table 2, the average level of indecisiveness decreased and the difference was highly significant. These results provide overwhelming support for the acceptance of H1.

H2 was tested in the same fashion, comparing the average response on the competitiveness scale for the pre-test and post-test results of the simulation experience. Although the average level of competitiveness increased from the beginning to the end of the simulation competition as hypothesized, this change was not statistically significant and H2 is not accepted.

H3 examines whether students became more positive toward the simulation competition by virtue of their gaming experience. The findings reported in Table 2 indicated that the average attitude towards the simulation competition became more positive from start to finish and this difference was marginally significant at the .10 level. As such, H3 is cautiously accepted.

The overall findings from the ANOVA procedure are reported on in Tables 3 and 4. The findings support the acceptance of H4 through H6.

The overall findings from the partial least squares (PLS) path analysis of the constructs indecisiveness, competitiveness and attitude are reported in Figure 1 and Table 5. The findings are consistent with the acceptance of H4 through H6. In all post game survey results (R2) the game performance appears to have had a mediating effect on indecisiveness, competitiveness and attitude toward the simulation experience.

The results of the analysis of impact of the gaming experience on indecisiveness, competitiveness and attitude towards the simulation are illustrated by the effect size (f^2) of the PLS paths from Figure 1 which are presented in Table 5. These findings indicate that the game performance had a major effect on attitude toward the game. However, the game performance only had a small to medium effect on the indecisiveness of individuals and a small to medium effect on competitiveness. The effect size (f^2) analysis indicates that the individual's pre-existing competitiveness and indecisiveness were greater predictors of attitudes toward the simulation experience and that the simulation game only mediated the outcome.

TABLE 3

PRE-TEST ANOVA ANALYSIS OF HIGH AND LOW INDECISIVENESS, COMPETITIVENESS AND SIMULATION ATTITUDE VERSUS PERFORMANCE RANK, EXPECTED RANK, DECISION TIME AND COURSE GRADE

	Pre-test Indecisiveness			Pre-test Competitiveness			Pre-test Simulation Attitude		
	Less	More	Sig.	High	Low	Sig.	Pos.	Neg.	Sig.
N Value	180	168		183	165		174	174	
Performance Rank	3.28	3.26	.906	3.08	3.48	.027*	3.15	3.40	.175
Expected Rank	2.11	2.43	.027*	1.95	2.61	.000*	1.90	2.63	.000*
Course Grade	70.88	73.14	.036*	73.14	70.69	.023*	71.76	72.19	.688

TABLE 4

POST-TEST ANOVA OF HIGH AND LOW INDECISIVENESS, COMPETITIVENESS AND SIMULATION ATTITUDE VERSUS PERFORMANCE RANK, EXPECTED RANK, DECISION TIME AND COURSE GRADE

	Post-test Indecisiveness			Post-test Competitiveness			Post-test Simulation Attitude		
	Less	More	Sig.	High	Low	Sig.	Pos.	Neg.	Sig.
N Value	175	173		162	186		168	180	
Performance Rank	2.91	3.64	.000*	2.75	3.73	.000*	2.46	4.03	.000*
Expected Rank	2.45	3.06	.000*	2.20	3.24	.000*	2.06	3.40	.000*
Course Grade	73.75	70.18	.001*	74.14	70.09	.000*	73.09	70.92	.044*

DISCUSSION AND CONCLUSIONS

The research reported here sought to examine whether students became less indecisive, more competitive and more positive towards a simulation competition as a result of participating in a marketing simulation game. The findings indicate that there is very strong evidence that students became both less indecisive and more positive towards the simulation as a result of their experience. There did not appear to be a significant change in overall participant competitiveness, however. The fact that there was a reduction in indecisiveness across all students, independent of performance, is very encouraging. This means that the simulation gaming experience was generally helpful in making all of the students more willing to make a decision regardless of their performance, a very significant game benefit.

The findings also indicate that individually, students that performed well in the game were also less indecisive, more competitive and had a more positive attitude toward the game. This suggests that individual students may be positively reinforced by performing well in a simulation game. Weissman (1976) indicated that individuals that experience success also experience “a sense of competence, decisiveness” (p.411). Conversely, individuals that did not perform as well did not like the game as much, were less competitive and were more indecisive (less competent).

The fact that better performing students were more competitive at the beginning of the simulation and at the conclusion of the simulation provides evidence to validate the use of performance outcomes as measures of decision making quality. One would expect more highly competitive individuals to perform well. This appears to support the conclusions drawn by Brown and Peterson (2007) that “Competitiveness was positively and directly related to performance” (p.78). One would also have expected that less indecisive individuals might be expected to perform better from the outset of the simulation but this did not prove to be the case. However, as stated, decisiveness refers to the willingness to make a decision, not to the quality of the decision.

One might expect that attitude toward the simulation competition at the outset would affect simulation game performance but this was not the case. However, as in sports, a positive attitude is not a guarantee of top performance.

Although significant differences were found, the PLS results indicate that the level of impact of the simulation experience on altering the traits of indecisiveness and competitiveness of individuals was modest. In contrast, as might be expected, the impact on the attitudes towards the experience was major. These findings indicate that simulation experiences will lead to change but these changes are not transformational or highly dramatic. Rather, they represent one other unique instructional tool that offers an alternative approach to instruction and provides some unique learning benefits other instructional tools may not provide.

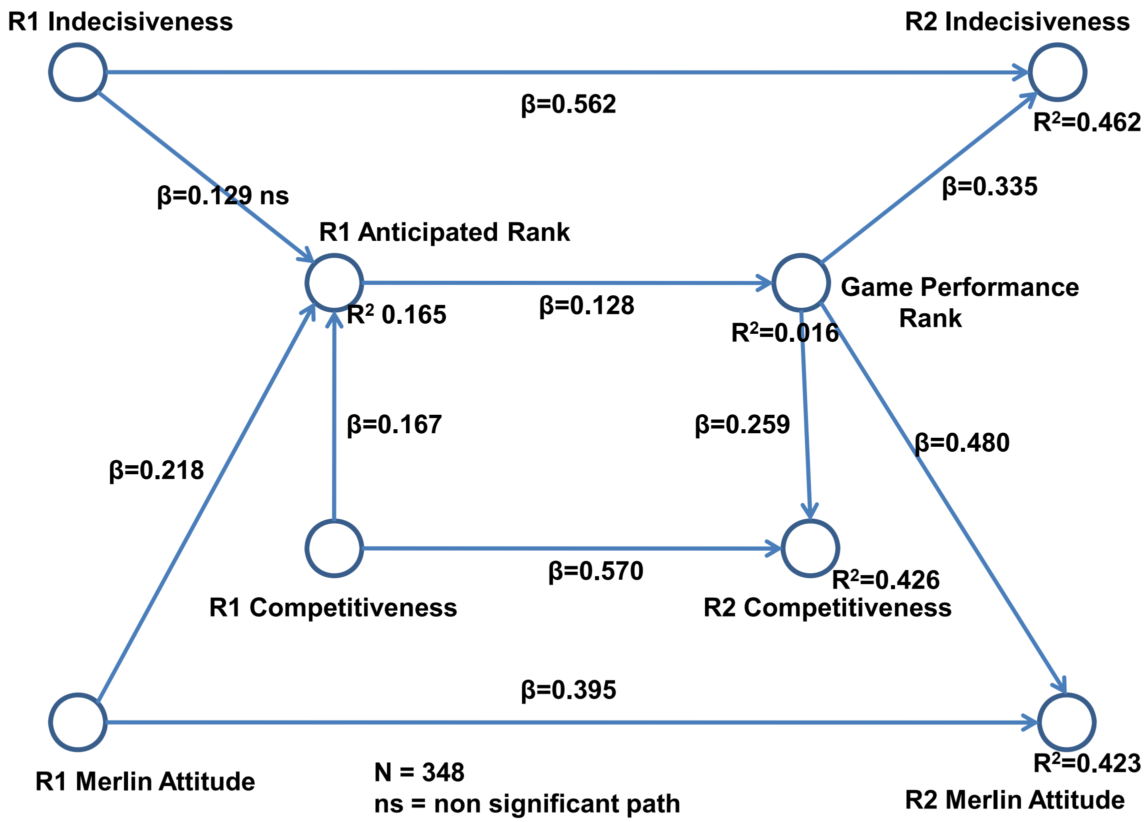

Figure 1 – PLS Path Analysis of Indecisiveness, Competitiveness, Simulation Attitude

TABLE 5

Effect of the Independent Latent Variables (LV) on Dependent LV's

Construct	Paths Remaining	Latent Variable R^2	Path as Predictor* of Dependent LV
Indecisiveness	Indecisiveness R1 to R2 (Path 1)	0.408	Large Effect Size of Path 1; Small to Medium Effect size of Path 2
	Full Model	0.462	
Competitiveness	R1 Competitiveness to R2 Competitiveness (Path 1)	0.359	Large Effect Size of Path 1; Small to Medium Effect Size of Path 2
	Full Model	0.426	
Attitude toward Merlin	R1 Merlin to R2 Merlin (Path 1)	0.194	Large Effect Size of both Paths 1 & 2
	Full Model	0.423	

*Cohen (1988) Effect Size f^2 = .02 small; .15 medium; .35 large effect size
Effect Size (Chin 1998): $f^2 = R^2$ *included* - R^2 *excluded* / (1-R^2 *included*)

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