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AN EXAMINATION OF THE EFFECT OF TEAM COHESION, PLAYER ATTITUDE, AND PERFORMANCE EXPECTATIONS ON SIMULATION PERFORMANCE RESULTS

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ABSTRACT

The present study examines the relationship between team cohesion, participant attitudes, and performance expectations with actual performance in a simulation competition. Importantly, these measures were not only taken at the beginning and end of the competition, but during each decision-making period. The rigorously controlled experiment involving 389 students found a strong relationship between beginning team cohesion and performance expectations and final game performance but little relationship between beginning participant attitudes and game performance. Further, while student attitudes and performance expectations changed over time in relation to game performance, team cohesion did not.

INTRODUCTION

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 achievement, time pressure, ethnic origin of team members, males versus females, team size, previous business experience, team organizational structure, method of team formation, and grade weighting (see for example Brenenstuhl and Badgett 1977; Butler and Parasuraman 1977; Chisholm, Krishnakuman and Clay 1980; Edge and Remus 1984; Faria 1986; Gentry 1980; Gosenpud 1989; Hergert and Hergert 1990; Hsu 1984; Moorhead, Brenenstuhl and Catalanello 1980; Newgren, Stair and Kuehn 1980; Patz 1990; Roderick 1984; Walker 1979; Wheatley, Anthony and Maddox 1988; Wolfe, Bowen and Roberts 1989; and Wolfe and Chacko 1982). Summarizing much of the past research have been major review articles by Greenlaw and Wyman (1973), Keys (1976), Wolfe (1985), and Miles, Biggs and Shubert (1986).

The present study examines perceived team cohesion, student attitudes toward the simulation competition, and performance expectations as they are related to actual performance in the simulation competition. While team cohesion and participant attitudes have been reported on in the past, this study takes a slightly different perspective. The examination of performance expectations represents a totally unexplored area.

LITERATURE REVIEW

Team Cohesion

Team cohesion, generally viewed as the degree to which team members hold an attraction for each other and a desire to remain intact as a team (Wolfe 1988), has been the focus of a number of studies. While two early studies (McKenney and Dill 1966 and Deep, Bass and Vaughan 1967) found no relationship between team cohesion and team performance,

all recent studies show such a relationship to exist (Gentry 1980; Gosenpud, Milton and Larson 1985; Hsu 1984; Miesing and Preble 1985; Norris and Niebuhr 1980; and Wolfe and Box 1988). The relationships reported, of course, are positive. That is, high team cohesion is associated with better simulation game performance.

All past research has examined either the relationship between beginning team cohesion (measured via questionnaire) and final simulation performance or ending team cohesion and ending simulation performance. The present study differs in that a measure of team cohesion was taken during each decision period and related to both performance during that period of competition and, ultimately, to final simulation performance. As such, this is the first study to report on changing team cohesion over the course of the simulation competition as it relates to ongoing performance.

Participant Attitude

As is true of team cohesion, relatively all past research has reported a positive relationship between student attitudes toward the simulation competition (generally measured via questionnaire) and simulation performance (Faria 1986; Hemmasi, Graf and Kellogg 1989; Hergert and Hergert 1990; McLaughlin and Bryant 1987; Waggner 1979; Washburn and Gosenpud 1991; Williams, McCandless, Robb and Williams 1986; and Wolfe 1985). Also as is true of research on team cohesion, past studies have reported on a measure taken at only one point in time. Typically, student attitudes were measured at the end of the simulation competition, a point in time when they knew their final performance standing and simulation grade. As such, it would be very reasonable to expect participant attitudes to reflect game performance, exactly what past research has shown. Once again, the present study differs in that a measure of student attitude was taken before the competition began as well as during each decision-making period of the simulation competition.

Performance Expectations

No previous research has reported on the relationship between performance expectations and actual performance results. In the present study, students were asked in each decision-making period to indicate where they expected to finish in the simulation competition. As there were six companies in each industry in the competition, students could indicate anything from first to sixth place as their expected simulation competition final ranking. Performance expectation measures were taken prior to the first decision in the competition and, subsequently, in each decision-making period through to the end of the competition. As such, an ongoing review of expectations and actual performance results was collected.

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PURPOSE AND HYPOTHESES

The findings from previous research would suggest that high team cohesiveness and a positive attitude toward the simulation competition are associated with superior simulation game performance. While these findings are certainly intuitively appealing, all previous results reported have used a one time measure only, taken either at the start or at the conclusion of the competition. The purpose of the present study is to examine how team cohesion and participant attitudes toward the simulation competition change over the course of the competition in relation to changing performance. As well, for the first time, participant performance expectations are examined to determine if there is a relationship between this variable and simulation game performance.

Based on the findings from previous research and, where previous research is lacking, based on what would seem to be intuitively logical, the following hypotheses have been formulated for testing purposes.

- H1: Teams exhibiting higher cohesion at the start of the simulation competition will outperform teams exhibiting lower cohesion at the start of the competition.
- H2: Over the course of the simulation competition, team cohesion will increase with good game performance and decline with poor game performance.
- H3: Teams ranking high in the simulation competition will exhibit greater cohesion at the conclusion of the competition than teams ranking low in the competition.
- H4: Students beginning with a more positive attitude toward the simulation competition will be associated with teams that will outperform students with a less positive attitude at the start of the competition.
- H5: Over the course of the simulation competition, participant attitudes toward the simulation will increase with good game performance and decline with poor game performance.
- H6: Participants on teams ranking high in the competition will exhibit more positive attitudes toward the simulation competition at its conclusion than participants on teams ranking low in the competition.
- H7: Students with high performance expectations at the start of the competition will be associated with teams that will outperform students with low performance expectations.
- H8: Over the course of the simulation competition, participant performance expectations will increase with good game performance and decline with poor game performance.
- H9: At the conclusion of the simulation competition, participant performance expectations will reflect their most recent performance results.

While past research has not reported on changing team cohesion and participant attitudes over the course of a simulation competition, the first six hypotheses are generally based on previous research findings. The final three

hypotheses naturally follow from the first six.

METHODOLOGY

The subjects for the research to be reported here were 389 students in two sections of a principles of marketing course. Both sections were taught by the same instructor, used the same textbook, viewed the same videos, and took common multiple choice midterm and final exams. The simulation game used was LAPTOP: A Marketing Simulation (Faria and Dickinson 1987), a simulation game specifically developed for use in introductory marketing courses. Students were divided into teams of three or four players. In total, 108 simulation teams were formed and divided into 18 industries of six teams each.

One critical issue in all simulation research that involves performance measures is the selection of the unit of analysis. Should the unit of analysis be teams or the individual participants who compose the teams? Clearly, the homogeneity and consistency of a team unit of analysis could very well change from decision to decision. Furthermore, it is hard to know whether items measured on an individual basis and then combined to give a team measure are comparable from period to period. On the other hand, although teams are composed of individuals who have relatively enduring characteristics from decision to decision, the degree to which each individual contributes to the team can be expected to vary over time. This unit of analysis issue is a constant concern for all simulation researchers and was recognized in the present research. On balance, the decision was made to use individuals as the unit of analysis because of the repeated measures design used.

In both sections of the course, six decisions were made in the simulation competition and the simulation game counted towards 15 percent of the students' final grade in the course. In addition to making decisions in the simulation competition, the students were required to complete a self-report attitude survey to be submitted along with each simulation decision. Among other things, the survey measured time spent making each decision; expected team ranking at the end of the competition; team cohesiveness (4 item scale, mean alpha reliability = .9270); simulation enjoyment (3 item scale, mean alpha reliability = .8109); simulation experience relative to lectures, cases, and readings (3 item scale, mean alpha reliability = .8691); perceived appropriateness of the simulation evaluation method being used; the degree to which the students felt that their simulation performance reflected their managerial abilities; perception of the benefits of group work; a rating of each group member's contribution to the simulation; and team organization. Each student's overall grade point average was also obtained from university records. Finally, simulation performance was measured in four ways: final team ranking within the industry, cumulative earnings per share, a relative earnings measure termed the EPS gap, and a computerized simulation performance grade based on the previous three measures.

Hi, H3, H4, H6 and H7 were tested with ANOVA using team cohesion, student attitude, and performance expectations for the first, last, and intermediate decision periods in relation to final team standings as appropriate to each hypothesis. H2, H5 and H8 were tested using repeated measures MANOVA analysis with final team ranking as a between subjects factor variable and time as a within subjects factor

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variable. Finally, H9 was tested using simple bivariate correlation between the period five actual team ranking versus period six performance expectations as well as with ANOVA analysis using final team ranking as the factor variable versus final performance expectations.

FINDINGS

The overall findings from the ANOVA and MANOVA analyses are reported in Table 1. The findings would support the acceptance of H1, H3, H5, H6, H7, H8 and H9 but would not support H2 or H4.

To test H_i, the simulation teams were divided into high, medium and low cohesiveness groups based on the questionnaire responses from the student teams. The questionnaires were submitted at the same time as simulation decision one. Beginning team cohesion was analyzed in relation to final simulation competition ranking. The significant ANOVA results reported in Table 1 would lend support to H_i. Teams that were more cohesive at the start of the simulation competition outperformed teams that were less cohesive.

H2 examined changes in team cohesion over the course of the simulation game. The findings from the MANOVA

analysis indicate that cohesiveness over time is related to the between subjects factor of rank order finishing position. However, when time was considered as a within subjects factor, the result was not significant. The interaction between cohesiveness and rank order finish as a within subjects factor was significant. These findings indicate that cohesiveness was related to rank order finish but that teams did not become more or less cohesive over the simulation. As such, H2 is rejected, team cohesiveness did not change with team performance.

H3 examined final reported team cohesion in relation to final simulation performance ranking. As shown in Table 1, there is a significant relationship between final ranking and reported team cohesion. Better performing teams reported greater cohesion at the conclusion of the competition. Thus, H3 is supported.

Three attitude measures, as reported in the student questionnaire, were examined and are included in Table 1. H4 (a) is a measure of enjoyment of the competition, H4(b) is a comparison of simulation gaming to other teaching methods, while H4(c) is a student report measure of whether the simulation game is an adequate indication of the student's managerial abilities. H4 represents an examination of beginning measures on these factors in relation

TABLE 1
RESULTS OF ANOVA/MANOVA TESTS OF HYPOTHESES

	N	Sum of Squares	DF	Square	Mean F-Value	Significance
H1	380	26.042	2	13.021	4.675	.010*
H2(Rank)	306	39.180	5	7.840	2.350	.041*
H2(Time)		2.640	5	.530	1.450	.204
H2(Time/Rank)		39.940	25	1.400	3.840	.000*
H3	357	36.034	5	7.207	6.482	.000*
H4(a)	380	.186	2	.043	.033	.968
H4(b)	380	9.515	2	4.758	1.682	.187
H4(c)	374	7.757	2	3.878	1.381	.253
H5(Enjoyment):						
H5(Rank)	306	178.450	5	35.690	6.780	.000*
H5(Time)		21.600	5	4.320	8.360	.000*
H5(Time/Rank)		36.650	25	1.470	2.840	.000*
H5(Comparison):						
H5(Rank)	306	200.220	5	40.040	7.350	.000*
H5(Time)		17.920	5	3.580	5.450	.000*
H5(Time/Rank)		53.840	25	2.150	3.270	.000*
H5(Ability):						
H5(Rank)	299	125.960	5	25.190	3.630	.003*
H5(Time)		26.810	5	5.360	5.020	.000*
H5(Time/Rank)		114.320	25	4.570	4.280	.000*
H6(a)	357	78.956	5	15.791	9.842	.000*
H6(b)	357	98.135	5	19.627	10.138	.000*
H6(c)	356	119.016	5	23.803	10.354	.000*
H7	368	10.188	1	10.188	3.622	.058**
H8(Rank)	260	427.010	5	85.400	32.740	.000*
H8(Time)		185.100	5	37.020	73.620	.000*
H8(Time/Rank)		219.56	25	8.780	17.460	.000*
H9	348	423.829	5	84.766	76.392	.000*

* = p < .05
** = p < .10

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to final simulation performance. As can be seen from Table 1, while the relationships are in the directions hypothesized, none are significant. Thus, beginning student attitudes were not found to be statistically related to final game performance and H4 is not accepted.

H5 examines changes in attitudes over time relative to performance. The results reported in Table 1 are highly significant. The finding is that poor performing teams experienced changes in attitude in that they enjoyed the simulation less, felt that it did not compare as well to other instructional methods, and felt that it did not reflect their managerial ability. Conversely, the attitudes of the members of the top ranked teams became more positive with respect to each of these issues. Therefore, H5 is accepted.

H6 examines final participant attitudes toward the simulation competition in relation to final game ranking. As can be seen in Table 1, the results are highly significant. That is, participants on teams performing well in the competition reported greater enjoyment, gave simulations a higher rating in comparison to other teaching methods, and were more apt to report that simulations are a true reflection of their managerial abilities. Thus, H6 is accepted.

To test H7, the simulation participants were divided into two groups, those who anticipated finishing first in their industry in the competition and those who did not. H7 examined beginning performance expectations in relation to final game ranking. As can be seen from Table i, the results are significant and H7 is accepted. Participants with higher beginning performance expectations did outperform participants with lower initial performance expectations.

H8 suggests that performance expectations will change over time to reflect actual simulation competition results. The findings reported in Table 1 indicate that this did occur and H8 is accepted.

H9 essentially hypothesized that performance expectations, by the end of the simulation competition, would reflect current performance levels. That is, by the final decision-making period, students would report performance expectations that coincided with their current position in the competition. Examining final reported performance expectations in relation to current simulation ranking shows this to be true (see Table i). Furthermore, the correlation between actual results in period five and period six expectations was .7100 with a significance of $p < .000$ ($N = 348$). As such, H9 is accepted.

DISCUSSION AND CONCLUSIONS

The research reported here sought to examine how team cohesiveness, participant attitudes toward the competition, and performance expectations would reflect, and possibly respond to, actual simulation performance. The findings indicate that self-reported beginning team cohesion and final reported team cohesion were related to final simulation game ranking. This supports the findings from previous research. However, team cohesion did not change over time to reflect changes in team performance. The implication of this finding is that beginning team performance is an important determinant of ending team performance. Team cohesion, as such, is a predictor of performance but does not

respond to performance.

Unlike team cohesion, beginning participant attitudes did not reflect final team ranking but did change in relation to ongoing simulation performance. Ending simulation enjoyment, regard for simulations in relation to other teaching methods, and simulations as a reflection of perceived managerial abilities were directly related to final simulation performance, as past research has reported, and changed over time to reflect ongoing performance.

As with team cohesion, beginning performance expectations were found to be related to final team ranking. Participants who expected to perform better did outperform participants with lower expectations. Interestingly, fully one-third of the participants in this simulation competition did not expect to perform well. These low initial expectations did lead to poorer performance.

While the high expectation participants did outperform their lower expectation counterparts, not all high expectation participants could come in first place in their industry. The findings from this research showed that performance expectations did change to reflect actual performance. As participants received each period's results, subsequent measures of performance expectations showed that participants did adjust their expectations to reflect their most recent results.

As high expectation groups did outperform lower expectation groups, an examination was undertaken to see if the high expectation groups differed on any significant characteristics. For example, performance expectations might reflect past academic achievement. As such, a T-test of all variables gathered in the self-report questionnaire, along with GPA, was undertaken. Surprisingly, there was no significant difference in the GPA between high and low expectations groups. The only significant difference found was between performance expectations and team cohesion. High performance expectation groups were also more cohesive.

In conclusion, this study has found, as has been reported by past research, that beginning team cohesion and ending participant attitudes are related to final simulation game ranking. Interestingly, team cohesion did not change over time to reflect ongoing performance. The present study, further, found that participant attitudes did change over time to reflect changing team performance. This finding would seem to be intuitively logical in relation to past findings on ending attitudes and performance.

This study examined, for the first time, participant expectations in relation to simulation performance. Beginning performance expectations were found to be related to ending team performance. Further, performance expectations did change over the course of the simulation competition to reflect ongoing team ranking.

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