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PERCEPTIONS OF LEARNING IN TE SIMULATIONS

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ABSTRACT

The purpose of this study was to explore the construct perceived learning and its relationship to objective indicators of learning and also to performance. In this study, perceptions of learning were divided into ten types for measurement purposes. The study was undertaken with seniors playing a total enterprise simulation. The results showed no relationship between perceptions and objective measures of learning. In other words, those who perceived that they learned a lot did not attain either high or low objective learning scores. On the other hand, there was a positive relationship between perception of learning and performance.

INTRODUCTION

In an extensive review of research on learning effectiveness, Anderson and Lawton (1997) clearly distinguished between perceived and objective effects. Perceived effects are from studies where participant perceptions are used as the dependent variable for a learning outcome, and objective effects are employed if a form of objective measure was used as the dependent variable for a learning outcome. Others, including Gentry et at. (1997), Lawton and Anderson (in press), Parasuraman (1980), and Parasuraman (1981), distinguished between perceived and objective measures of learning. These authors considered perceived learning to be less valid or suitable than objectively measured learning. For example, Lawton and Anderson (in press) stated that perceptions and attitudes have been overused because we know how to use them, and we will not succeed in assessing the educational merits of simulations until we develop better, more objective, dependent measures. Gentry et al. (1998) placed perceptions of learning into a 'feel good' category of measures. According to these authors positive perceptions of learning are a part of a halo effect that stems from that fact that students enjoy the experience. In summary, perceived learning has been judged inferior because it is subjective and because it is easier to measure.

However, we don't know very much about perceived learning. Also, we don't know if there is any relationship between perceived and other (more objective) measures of learning. This study focused on perceived learning. It dealt with the relationship between perceived learning and objective learning and also with the relationship between perceived learning and simulation performance. Specifically this study asked four questions:

1. What do students think they learn from a simulation?

2. Do those who learn the most, measured objectively, perceive that they learn a great deal?

3. What do those who score the highest on objective learning measures believe they learn?

4. Do those that perceive that they learn a tot also perform well?

METHOD

Subjects and Procedure

The subjects of this study were 136 students enrolled in four sections of the required un

dergraduate Administrative Policy course at the University of Wisconsin-Whitewater during the Fall 1997 and the Spring 1998. There were four industries with 40 three-member teams, 4 two-member teams, and 2 four-member teams. The simulation length varied between 12 and 16 quarters. The Simulation used was MICROMATIC (Scott et al., 1992).

Variables and Variable Measurement

Objectively Measured Learning. We assessed objectively measured learning with two forms of a multiple-choice and short-essay examination. These forms were made deliberately parallel in form and content. The examinations were constructed using questions and situations routinely confronted by companies competing in MICROMATIC. These include manipulating and analyzing the marketing-mix, making operating decisions, determining costs of goods sold, and understanding the consequences of doing or not doing ratio analysis or cash flows. Many of the questions require analysis, calculations, and the application of principles from MICROMATIC. For all industries, Form 1 was administered as a pretest at the beginning of the semester. Form 2 was administered at the end of the semester. Learning over the period of play was defined as the percentage score for Form 2 minus the percentage score for Form 1. The test developers used a common scoring key for all questions to ensure uniformity of measurement. Statistical reliability estimates for the instruments have ranged from .65 to .7.

Perceptions of Learning. Perceptions of learning were measured with a ten-item Likert style questionnaire, asking players to state their beliefs about the degree to which they learned each of the ten kinds of learning. The ten items represented the most frequently given answers to the question, "What have you learned while playing the game," which was given to simulation players in the Falls of 1995 (Gosen and Washbush, 1997) and 1996 (Gosen and Washbush, 1998). Students responded to the questionnaire during one of the last two quarters of simulation play. The ten items are stated in table 1 along with mean responses to the question, "To what degree did you learn (each of the perception items)."

Informally, the senior author categorized the items of the pre- and post-tests according to the ten perceptions of learning items and restated these ten as learning goals. For example the perception that one learned the cause and effect principles of the game was restated 'to learn the cause and effect principles of the game.' The result of this categorization was that of the 37 items of the pre-test and the 35 items of the post test, the majority tapped two goals: 'to learn the game's cause and effect principles' and 'to anticipate and plan for future events.'

Performance. Performance scores were generated by the game's scoring routine. They were based on Net Income (40%), Return on Sales (30%) and Return on Assets (30%). Game performance was worth 15% of the course grade, 5% of the course grade was based on peer ratings of team contribution, and 5% of the course grade reflected the score on the post test exam measuring learning in the simulation.

Table 1: The ten perception items and the average response to the "To what degree did you learn" question

	Fall 1997	Spring 1998
To correct or compensate for earlier made mistakes	**3.74**	**3.83**
The game's cause and effect principles	**3.46**	**3.54**
Forecasting skills	**3.56**	**3.46**
More about game playing, that is adapting to rules and competitor actions	**3.49**	**3.34**
That the game and business requires consideration of complex phenomenon	**3.79**	**3.51**
Financial statement analysis skills	**3.39**	**3.31**
To plan strategically	**3.66**	**3.66**
Ratio analysis skills		**3.12**
To anticipate and plan for future events	**3.81**	**3.69**
To balance numerous perspectives and priorities	**3.49**	**3.63**

RESULTS

The results yielding the average responses to the question, "To what degree did you learn each of the ten kinds of learning" is contained in table 1. In general students felt that they learned to correct and compensate for earlier mistakes, to plan strategically, to anticipate and plan for future events, and that the game and business requires the consideration of complex phenomena to a relatively great degree, and they learned financial and ratio analysis and about game playing (that is adapting to rules and competitor actions) to a relatively small degree. These results, which provide an answer to this study's first question, "What do students think they learn from a simulation" make some sense. Strategic analysis and the complexity of business decisions are new phenomena for most seniors, and it make sense that they learned them as the game presented them. In contrast, many seniors have been exposed to ratio and financial analysis in earlier courses, and it makes sense that fewer students felt that they were learning these to a great degree with a capstone simulation.

The correlational results of this study are contained in table 2. Of nineteen correlations between perception scores on one hand and scores on the objective measure of learning on the other, only one was positive and significant, and that correlation only explained about five percent of the potential variance between the two variables. Most of these correlations were close to zero. These results suggest little or no relationship between objective learning and perceptions of learning. Those who scored highest on the objective measure learning did not perceive that they learned any more or less than those who scored lower on the objective measure. Thus, the answer to this study's second question, "Do those who learn the most, measured objectively, perceive that they learn a great deal?" is 'no.'

Table 2: Correlations of the 10 kinds of perception scores with objective learning and performance scores

	Correlation with Objective Learning Score		Correlation with Performance	
	Fall 97	Spring 98	Fall 97	Spring 98
To correct or compensate for earlier made mistakes	.072	-.077	.140	.121
The game's cause and effect principles	.009	-.135	.156	.151
Forecasting skills	.243*	.058	.407*	.178
More about game playing, that is adapting to rules and competitor actions	.071	-.375*	.242*	*.354***
That the game and business requires consideration of complex phenomenon	-.033	-.026	.117	.286*
Financial statement analysis skills	.001	.107	.023	.306*
To plan strategically	.046	-.101	.131	.240*
Ratio analysis skills		.049		.461* *
To anticipate and plan for future events	.135	.000	.239*	.107
To balance numerous perspectives and priorities	.006	-.135	.234	. 285*

* p less than .05
** plessthan.01

This study's third question concerned the kind of perceptions of those who scored well on objective measures of learning. The results show that, in the Fall of 1997, there was a slight, significant relationship between the objective measure and the degree to which students perceived or thought that they learned forecasting. In the Spring of 1998, there was a significant negative correlation between the objective measure and the degree to which students thought they learned about game playing. So one might argue that those who scored the high on the objective measure think that they learn some about forecasting, and those that scored low on the objective measure think the learn about game playing but those relationships occurred only one of two semesters. And that was all. For the most part, the results of this study show no pattern of 'perceived learnings' for those who score high (or low) on this study's objective measure of learning.

This study's fourth question asked whether there was any relationship between perceptions of learning and performance in the simulation, and apparently the answer to question 4 is yes. Of the 19 correlations in table 1 between perceived learning and performance, all were positive and nine were significant. While these correlations were not extremely high, these results suggest that those that perform the best in the simulation also perceive that they learn the most.

DISCUSSION

These results shed some light on the concept, perceived learning, and this variable's relationship to objective measures of learning and

also to performance. From this study's results, perceived learning appears to be unrelated to objective indices of learning. This implies that self reports of what one learns and objective measures of what one learns somehow tap different things. Assuming that objective measures of learning are 'true' indicators of what one learns (a tentative assumption), then in general what one thinks he or she learns is not the same thing as what he or she actually learns. These result support the contentions of such authors as Lawton and Anderson (in press) and Gentry et al. (1998) who treat perceptions of learning and objective indices of learning as different phenomena.

An inspection of both the specific perceptions of learning recategorized as learning goals and the items of the pre- and post learning tests used in this study, further supports the notion that perceived and objective indices of learning are different from each other. As indicated in the method, of the ten specific perceptions of learning dimensions, the study's objective learning instrument tapped two to a greater degree than others. It tapped the individual's ability to learn the game's cause and effect principles and the individual's ability to anticipate and plan for future events. If perceptions of learning and objective indices were tapping the same dimensions, then correlations between the objective measure and those two perceptions of learning should be higher than correlations with the other perception items. As indicated in table 1, they were not. Correlations between the objective measure and the perception that individuals were mastering the game's cause and effect principles and anticipating and planning for future events were near zero, just as most of the other correlations between the objective measure and perceptions were near zero.

On the other hand, the results do show a positive relationship between the objective measure of learning and performance. To us, these indicate that those who were performing well thought that they were learning a lot. These results appear to confirm the notion of Gentry et al. (1998) that there is a halo effect that reveals itself in perceptions of great(er) amounts of learning. It appears that in this study the halo effect came from performing well in game competition.

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