

# THE APPLICATION OF MEANS-END THEORY TO UNDERSTANDING THE VALUE OF SIMULATION-BASED LEARNING

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## ABSTRACT

*A full-enterprise simulation was evaluated from the perspective of the means-end theory. The study is exploratory in that it examines the relationships among attributes of an educational service (a business simulation), the consequences of these attributes as experienced by customers (students), the goals that the customers want to achieve, and finally, the behavioral intentions of the customers after they experienced the service. The sample was composed of two groups, undergraduates and executives, all enrolled in for-credit educational programs. The findings suggest that undergraduate and executive students benefit in many ways from their participation in a simulation experience. However, what they take away from the learning experience is different and the differences may be due to the level of experience they have in the real world of business.*

## INTRODUCTION

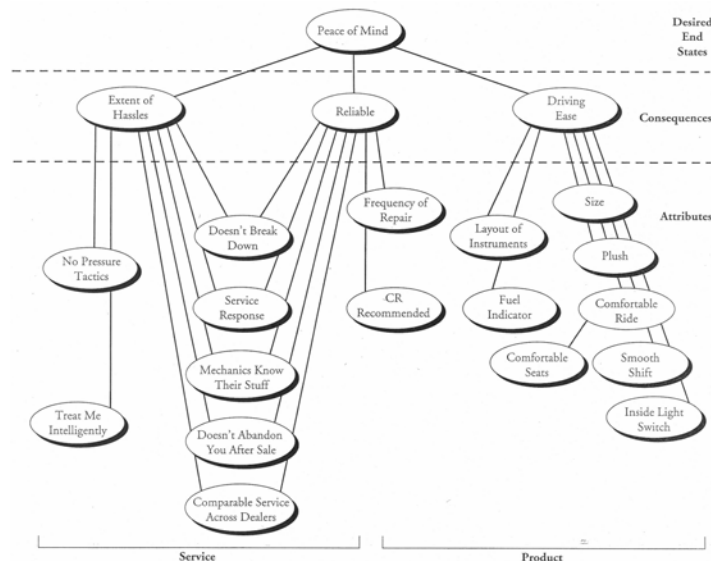
What is the value of simulation-based learning? Researchers have employed a variety of methodologies to try to answer this question. The focus of this paper is not to review these methodologies or to summarize their findings, but to introduce the means-end theory as a new way to think in making this evaluation.

The means-end theory is a highly regarded mental model for understanding consumer decision-making (Olson and Reynolds 1983). It is proposed that customers relate to products and services at three levels: attributes (components), consequences, and values (goals) (Figure 1).

Attributes are at the lowest level, and are often objectively expressed in terms of physical characteristics, features, or components. The attributes of a car are the suspension system, interior fabrics, horsepower, and so on. The attributes for a car maintenance service, on the other hand, are the service attendant's response, expertise of the mechanics, operation hours, waiting facilities, etc.

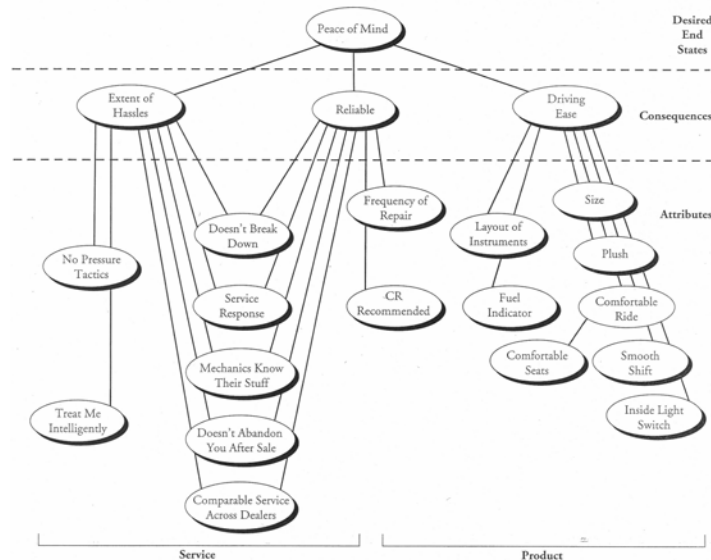
**Figure 2 Value Hierarchy for Auto Purchase Decision**

## Value Hierarchy for Auto Purchase Decision



**Figure 2 Value Hierarchy for Auto Purchase Decision**

## Value Hierarchy for Auto Purchase Decision



Source: Sarah E. Gardial and Robert B. Woodruff, "Understanding Customer Value," in *The Management of Strategy in The Marketplace*. Ernest r. Cadotte and Harry J. Bruce (eds) Southwestern Publisher Co., Cincinnati, Ohio (2003).

Each attribute or bundle of attributes has a consequence—either desired or avoided—for the user. In the car example, driving ease is a positive consequence of factors such as instrument layout, seat comfort, and shifting smoothness, among others. Feeling hassled with after-sale support is a negative consequence of slow repair service, pressure tactics to repair “discovered” problems, and being treated as an unintelligent person. Importantly, end users tend to care more about the consequences (the finish on a car holds its shine and does not show dings) than the attribute responsible (polymer rather than sheet metal was used on the side panels). Thus, products and services must be measured in terms of the consequences for the user.

The final element in the means-end hierarchy is values (or goals). Values are the ultimate ends that a customer wishes to achieve through the use or consumption of a particular product or service. They are the most basic or fundamental motivators for an individual, family or organization. Products and services are the means by which these ends are pursued (hence the term “means-end” hierarchy).

Consider the means-end hierarchy of a women searching for a new car (Figure 2). At the top of the hierarchy was her desire for piece of mind. By selecting a car that contained a specific configuration of attributes (both product and service) and that provided her with three key consequences (absence of hassles, security, and effortless driving), she attempted to enhance her overall peace of mind (Gardial and Woodruff 2003).

By viewing simulations as an educational service, the means-end theory can be employed in the evaluation

process. After all, simulations have attributes, consequences to the users and, hopefully, contribute to the end-states desired by the participants.

The purpose of this paper is to present an exploratory study regarding the value of simulations from the user’s perspective. The evaluation is undertaken at each level of the means-end hierarchy; attributes, consequences and end-states. The procedure that was employed to collect the data is described next. This is followed by a description of the methodology used to analyze the results. Next, the findings are presented. The paper is concluded with brief evaluation of both the methodology and results in terms of our assessment of the value of simulation-based learning.

## RESEARCH METHODOLOGY

The purpose of this section is to describe the methodology for collecting data relative to the quantitative application of the means-end hierarchy relative to the evaluation of simulation-based learning. Therefore, this study examines the relationships among attributes of an educational service (a business simulation), the consequences of these attributes as experienced by customers (students), goals that the customers want to achieve, and finally, the behavioral intentions of the customers after they experienced the service. A survey questionnaire was employed to gather the desired information. And, the sample was composed of two groups, undergraduates and executives, all enrolled in for-credit educational programs. It is reasonable to expect that applying the method to different samples with different

needs should yield results that are reflective of these differences. Clearly, the learning goals and consequences of these two groups should be different and thus the evaluation would be expected to be different.

### **SAMPLE AND RESEARCH SETTING**

The first group (undergraduate students studying business at a major university in the Southeast of the United States) was exposed to a comprehensive full-enterprise simulation (Cadotte 2005) during their junior or senior year in college. Prior to their participation, all students had received training in the business fundamentals of marketing, finance, accounting, operations, statistics, economics, distribution and human resources. Within this context, the simulation was designed to integrate the material from these foundation courses and provide a platform for additional courses in the student's major and collateral areas.

Respondents of the second group (executives) were enrolled in one of three Executive MBA programs located at three major universities located in the Southeast, Mid-Atlantic, and Midwest states. In two cases, the EMBA (Executive Masters of Business Administration) students were participating in the simulation as a capstone experience in their EMBA program. In one case, the simulation occurred at the start of the second year and was designed to reinforce and integrate the materials delivered during the first year, laying the foundation for the second year (similar to the undergraduates). Although it would be desirable to have all participants from the same university and EMBA program, the number of students in each program was insufficient to allow rigorous testing of the theoretical structure.

Both the undergraduate students and the executives were enrolled in a course designed to integrate the disciplinary content of all the functions of business. A full-enterprise simulation was employed as the main experiential learning tool for the course. It was accompanied by a series of lectures that were designed to lay the theoretical and managerial foundations for the decisions to be made during the exercise.

There was one important difference between the two courses offered to undergraduates and executives. That was, the undergraduate students worked on the simulation during a 15-week course. The executives, on the other hand, worked on the simulation within a five-day intensive seminar. Thus, the undergraduate students had more time to process the learning material and business decisions to be made than the executives. On the other hand, the executives had much more experience with making business decisions and interpreting relevant information and managerial practices. Thus, they were not likely to need as much time.

As the respondents needed to experience the service before they evaluated the value of the service, a random sampling approach could not be used. In this case, cluster sampling was more appropriate (Frankel 1983). Respondents were invited to give feedback about their experiences after they completed the simulation. A pretest

was done in order to test and refine items for the actual study. The main study test was then conducted.

### **SCALE DEVELOPMENT**

The attempt to quantitatively measure the elements and relationships within the means-end theory created a unique situation where there were no previously-developed measurement scales upon which to draw. Therefore, it was necessary to develop new scales for the attributes, consequences and values (goals) related to this educational service. Three sources were employed to identify relevant content, one for each stage in the hierarchy.

The first source tapped the experiences and objectives of the team that developed the simulation. This group helped to enumerate the attributes and features of the simulation which were purposely created to improve the learning environment. The attributes items fell into two distinct categories, labeled Simulation Design (Design in the SEM model) and Realism of Decision Environment (Reality in the SEM model). The first set was intended to capture the design characteristics of the simulation, including software interface, time to complete the exercise, and the organization of simulation. The second set of attributes was designed to capture the degree to which the simulation appeared to present decision situations that were realistic.

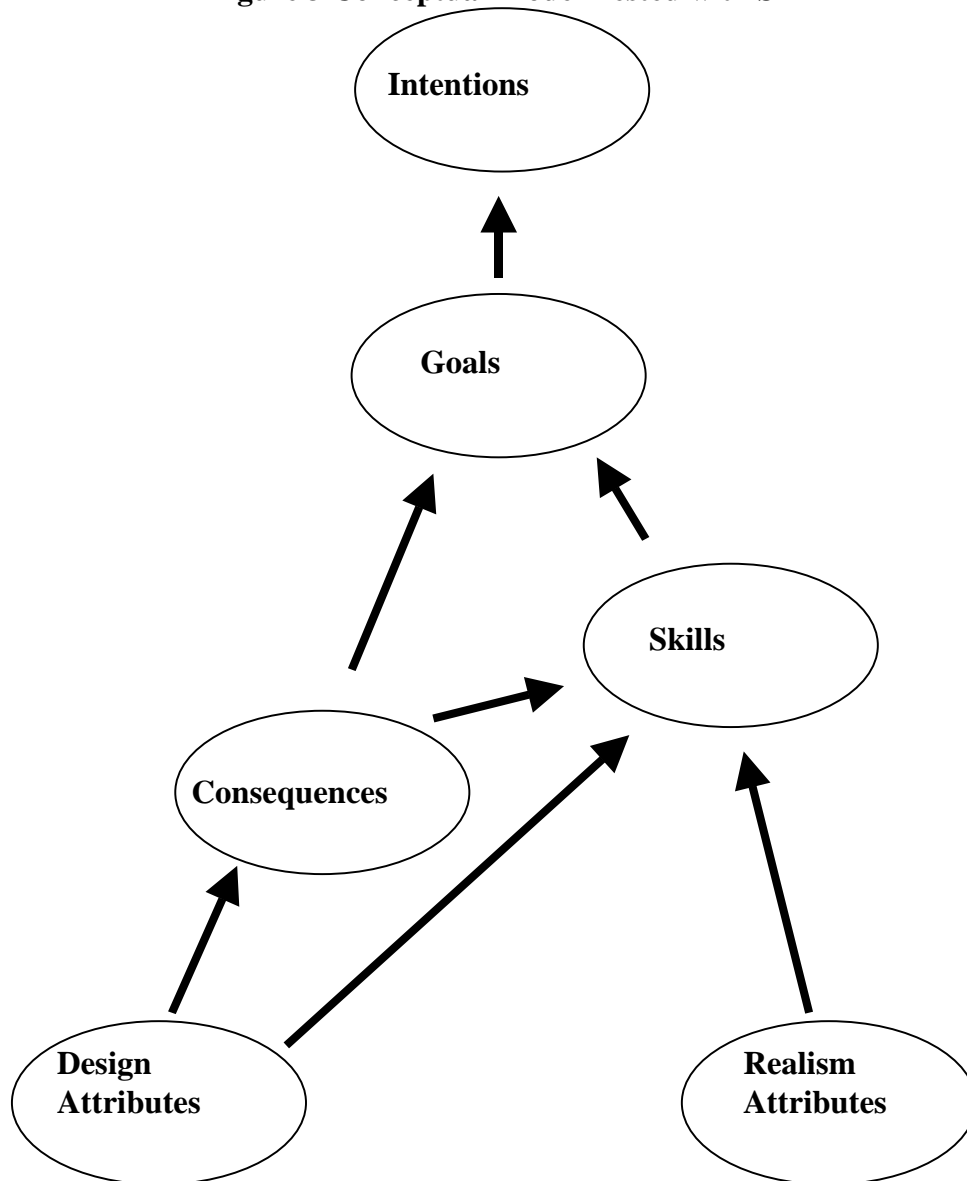
During the pre-test phase of the study, it was realized that the simulation alone did not determine the total value of the exercise. The instructors that were managing the learning process also contributed to the whole experience. Thus, a third set of items were added that focused on the instructors' role in the simulation. These items were added within the simulation design construct.

The learning objectives of the instructors who taught the courses represented the second source of items. These learning objectives were very similar to the consequences that a student might realize by participating in the simulation. Thus, the learning objectives were used to develop items for the consequences section of the questionnaire. These items fell into three categories, Accomplishments, Lessons Learned, and Skill Development.

The last source was the theoretical literature on value types. This literature was useful in enumerating possible values or goals that a student might achieve after participating in a comprehensive learning experience. Holbrook's work on value types (1999, 1994) was especially instrumental in the development of a comprehensive set of goal items. He provided a typology of the many types of goals that a person could pursue in a consumption experience. By developing scale items that corresponded to this comprehensive set of goals, it allowed a systematic sampling from the domain of value types.

Redundancy was purposefully introduced to tap each dimension of customer value and cover the whole domain of the value hierarchy; it also prevented block-outs. (Churchill 1979). Use of multiple items also let the data reveal the

**Figure 3 Conceptual Model Tested with SEM**



dominant paths, rather than incorporate pre-imposed type of goals. (For a detailed list of items, see Anitsal 2007).

In addition to these elements of the means-end hierarchy, it was also desired to develop items that measured the behavioral intentions of the participants given their evaluation of the learning experience. . The intention scale was developed based on experiences of instructors and informal discussions with students. The items included positive word-of-mouth communication, future use of material in the students' careers, and the use of simulation as a yardstick to measure other courses. An average intention scale was calculated and used as a criterion variable.

Each of the scales was evaluated in a pre-test survey for the computer-based simulation. The pre-test questionnaire was composed of 78 items of 5-point Likert and rating-type scales. Based on the results of the pre-test, a number of

attribute items were re-written for greater clarity and a few new items were added. The final questionnaire included 82-items.

#### **SURVEY IMPLEMENTATION**

The items were physically placed in a questionnaire in the order of 1) attributes, 2) consequences, 3) goals and 4) future intentions. This schema was selected because it follows the means-end theory on how the constructs relate one to the other. Also the order of items is important as service meaning structures are stored in memory that consists of a chain of hierarchically related elements (Botschen, Thelen, and Pieters 1999).

A web survey was used to administer the questionnaire. An email invitation (introduction letter) containing a link to the survey site was sent to the undergraduate students' ( $n_c=957$ ) and executives' ( $n_e=294$ ) at the end of simulation.

Once they read the consent form, they could proceed to the next step and respond to questions in the survey. The web survey was designed such that respondents could not enter more than one answer to each close-ended question. At the end of each page respondents were automatically warned if they omitted an answer.

Among undergraduate students, 631 decided to take the survey (66% response rate) and among executives, 197 responded (67% response rate). Out of a total of 828 returned responses, 790 were filled out completely and were used for further analysis. Unfinished responses were examined for non-response bias later. Completed responses were stored in a spreadsheet file and participants were assigned a respondent number to assure anonymity before any analysis was conducted. Pre-codes provided tracking of open and close-ended questions.

### RELIABILITY AND VALIDITY

Multiple tests were undertaken to assess the reliability and validity of the measures and model. In particular, coefficient alpha and item to total analysis were used to evaluate the homogeneity of the scales and to identify items that were not consistent with the other items in a scale. Furthermore, confirmatory factor analysis was used to evaluate the convergent and discriminate validity of the data. Finally, structural equation modeling was used to test the overall fit and nomological validity of the model.

As a result of these analyses, 3 items were dropped (items Q5, Q74 and Q75). The confirmatory factor analysis also revealed that a six-factor model fit the data best. Thus, a set of items that related to the realism of the simulation were separated out from the original set of design items resulting in two distinct sets of attributes. Furthermore, the skill development items appeared to be distinct from the balance of the consequence items. According to the SEM analysis, skill development seemed to have more in common with goals than consequences. Thus, they were treated as high level consequences or low level goals (Figure 3).

With these adjustments, the SEM analysis supported the overall theoretical structure of the means-end hierarchy. As hypothesized, attributes had their greatest impact on consequences which had their greatest impact on goals which in turn had their greatest impact on behavioral intentions. (Chi-Square= 7998.5, d.f.=2942, Chi-Square Ratio=2.719, CFI= 0.916, RMSEA= 0.047) (Anitsal 2007).

### DEVELOPMENT OF MEANS-END HIERARCHIES

Theory testing with structural equation modeling yielded distinct categories of attributes, consequences, goals and behavioral intentions. Thus, the overall theoretical framework was supported. The focus of the current research was on parsing out the specific attributes, consequences, and goals that make up the dominant paths of the means-end hierarchies for each sample of participants. This research is considered exploratory because no prior studies have

attempted to use quantitative tools to develop these hierarchies.

Similar to the qualitative laddering approach that has been used to develop means-end hierarchies in the past (Bagozzi and Dabholkar 1994; Grunert and Grunert 1995; Gutman 1997; Pieters, Baumgartner, and Allen 1995; Reynolds and Gutman 1988; Valette-Florence 1998), the goal of the quantitative method is to identify and interconnect all important and meaningful chains in a map using statistical methods. One way of investigating mathematical relationships between a dependent variable and other predictor variables is to use multiple linear regression analysis where a correlation coefficient ( $R^2$ ) gives the strength of linear relationship among the variables. For example, a series of multiple linear regressions could be utilized that start with the average intentions scale as a dependent variable, and individual goal items as the highest level predictors in a means-end chain. Once the most important goals are identified, then each goal item could be used as a dependent or criterion variable and the various consequences could be used as predictors. This step would conceptually identify the specific consequences which were influential in predicting each specific higher level goal. The last set of regression analysis would identify specific attributes as predictors of each important consequence item.

The common method of investigating the relative importance of the predictors in all of these equations is to examine the regression coefficients and/or the zero-order correlations with the criterion. When predictor variables do not correlate among each other, the zero-order correlations with the criterion variable and standardized regression coefficients are equivalent.  $R^2$  is the sum of these coefficients.

However, if the predictor variables correlate among each other, the interpretation of important predictors, as well as the criterion variable, becomes difficult and often misleading. Due to the nature of means-end hierarchy research, correlations among variables were expected to be high and significant. In the presence of very high correlations, the common methods for measuring importance become unusable. The size of the beta weights depend on the other predictors included in the model. If a predictor has a positive zero-order correlation but a negative beta, the interpretation of beta becomes impossible.

To solve this problem regarding the relative importance of predictors in the presence of high multicollinearity, Budescu (1993) introduced dominance analysis as a technique to determine (1) the rank of predictor variables in terms of importance, and (2) a quantitative measure of importance. Dominance analysis is the comparison of the average increase in  $R^2$  obtained by adding a predictor variable ( $x_i$ ) to each possible subset models. In other words, "for any two predictor variables,  $x_i$  and  $x_j$ , let  $x_h$  stand for any subset of remaining  $p-2$  predictors in the set, Variable  $x_i$  dominates  $x_j$  if, and only if:

$$R^2_{y, x_i x_h} > R^2_{y, x_j x_h}$$

for all possible choices of  $x_i$  (Johnson, LeBreton 2004 p. 246). If adding  $x_i$  to all possible subset models will always generate a greater increase in  $R^2$  than adding  $x_j$  to all possible subset models, then it is safe to conclude that  $x_i$  dominates  $x_j$ .

Once the analysis is completed for each variable, it is possible to come up with an order that reflects the importance of predictor variables. Sometimes the predictive ability of one variable does not exceed that of another in all subset regressions. Then a dominance relationship cannot be established between these two variables. If these two variables dominate all the other variables in all subset regressions, both can be considered as equally important and dominating the rest of the variables.

The major drawback of dominance analysis is its computational complexity. The number of separate analyses increases exponentially as the number of variables increase. This problem can be overcome by using Johnson's relative weights method (Johnson 2000). This method uses orthogonally transformed variables that are highly related to the original set of variables. These transformed variables do not correlate with each other. When the original variables are regressed on the orthogonal ones, regression coefficients are assigned to uncorrelated variables, and these coefficients provide a measure of relative importance (Importance analysis). Even though this method produces very similar relative weights to those obtained by the dominance analysis, they do not give the complete dominance that is important for identifying the dominant paths suggested in the means-end theory,

In order to utilize the strengths of dominance analysis and importance analysis, the predictor variables were pre-

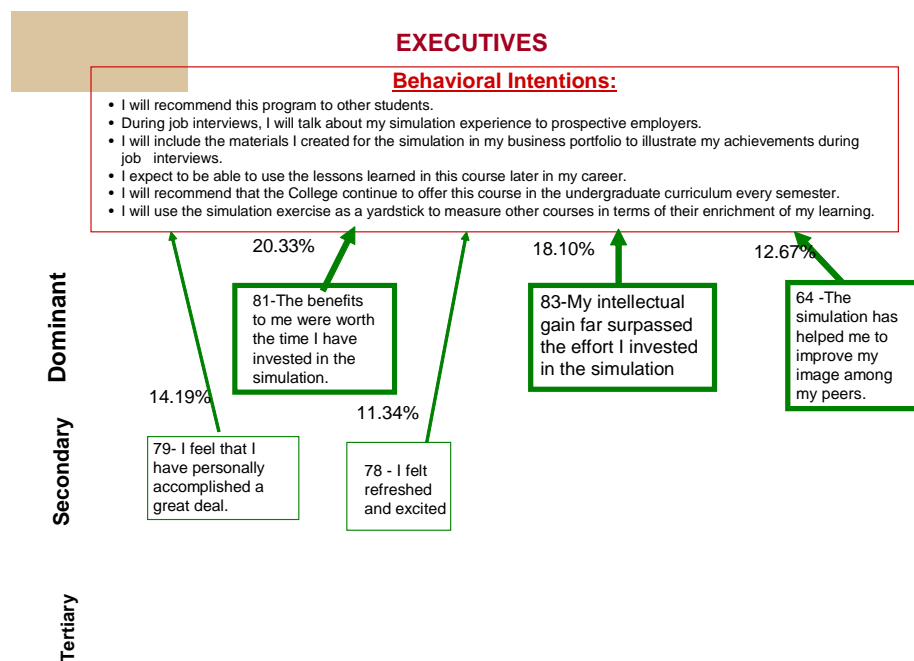
screened through the importance analysis to eliminate the noise at each series of the regression analysis. Then, the most important predictors (up to 15 variables) were subjected to dominance analysis to identify the dominating variables at each step. This procedure was repeated for the executive sample as well as undergraduate sample. Results of these series of analysis are presented in the next section.

## RESULTS

The dominance and importance analyses resulted in separate hierarchical maps for undergraduate students and executive students. The executives had a shorter, to-the-point map compared to undergraduate students. To facilitate the review of the findings, the discussion of the hierarchical maps will begin with the executives followed by the undergraduates.

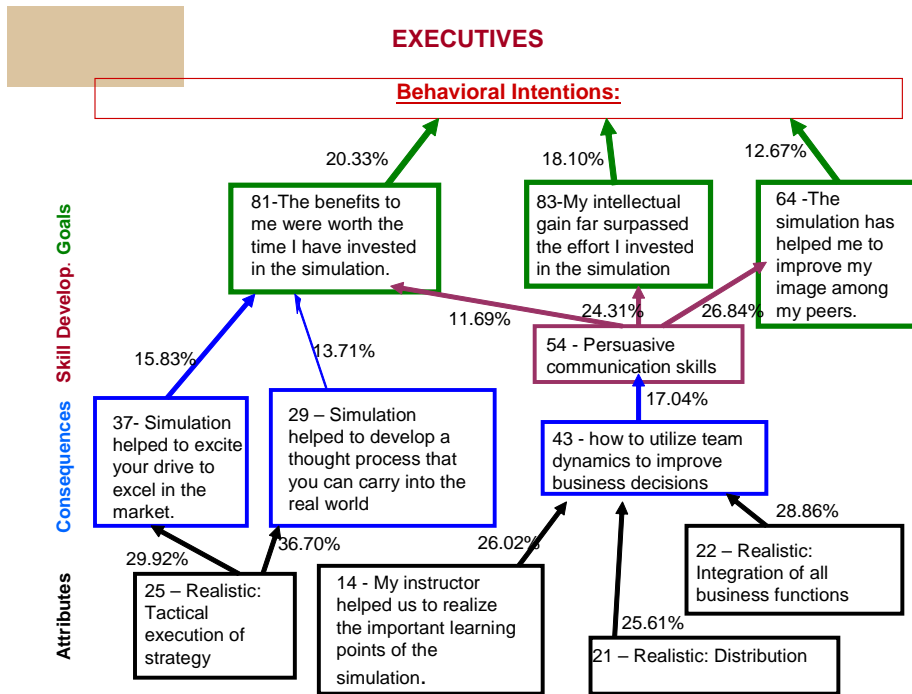
*Goals of Executives.* Five goals emerged as important in the regression model. Three goals dominated all others. These three can be considered equally important for executives. The first two reflect the time and effort elements of the extrinsic value dimension (Holbrook 1999). Executives believe that the benefits they received from the simulation experience were worth the time they invested in the simulation (Q81) and their intellectual gain far surpassed the effort they invested (Q83). The third dominant goal belongs to the status aspect of the others-oriented dimension of the value typology. Executives thought that the simulation has helped them to improve their image among their peers (Q64). This goal did not emerge as an important goal for undergraduates.

**Figure 4 Dominant Goals for Executives**

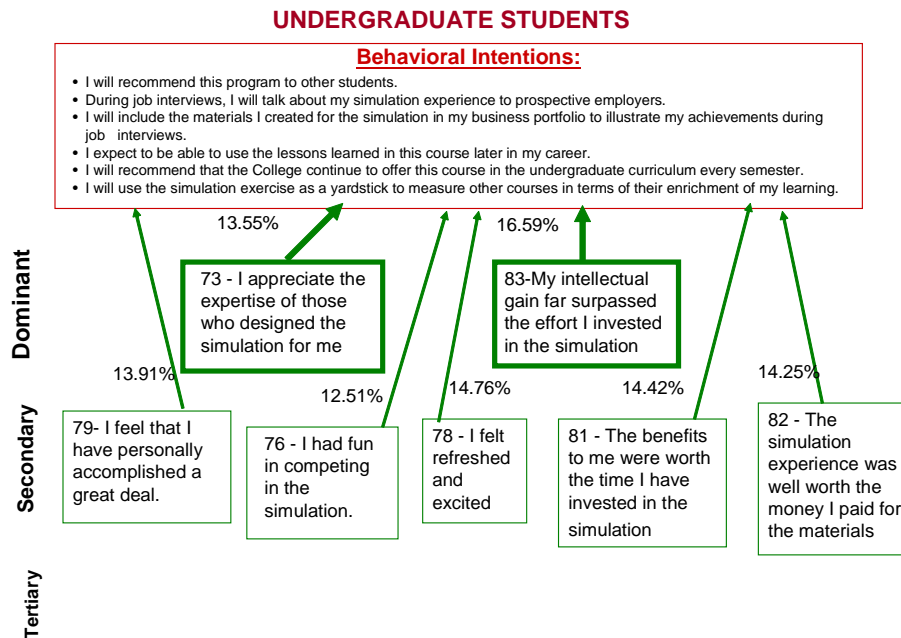


R square=0.695 The number on the arrow shows % Relative importance

**Figure 5 Means-End Hierarchy Map for Executive Sample – Dominant Path**



**Figure 6 Dominant Goals for Undergraduate Students**

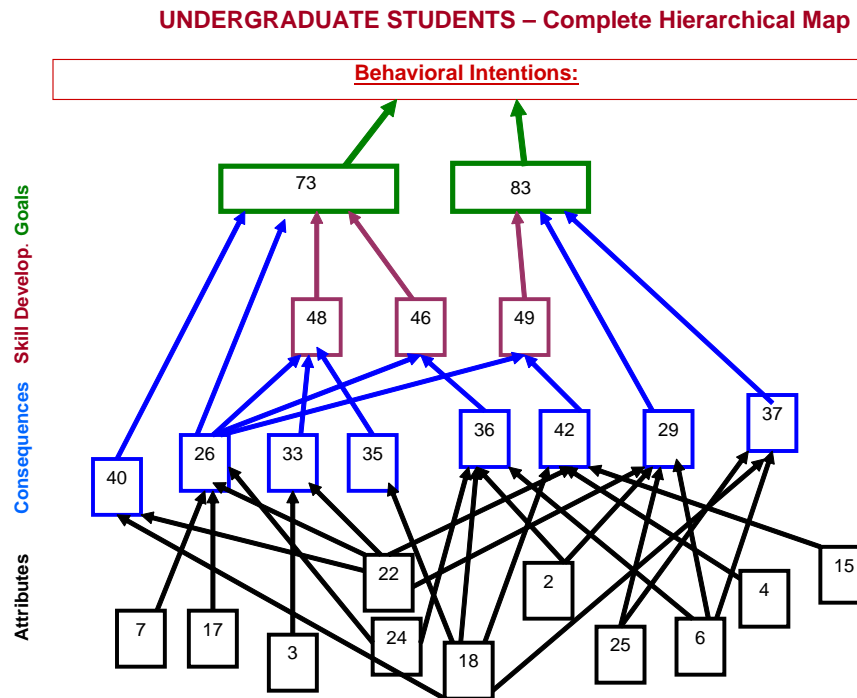


R square=0.756 The number on the arrow shows % Relative importance

The secondary goals are also important. Two secondary goals dominated the rest of the goal items in all possible subsets. In one, the executives felt they had accomplished a great deal (Q79), which is related to the

control aspect of the active value dimensions. The last important secondary goal belongs to intrinsic value dimension – fun and play. Executives felt refreshed and

**Figure 7 Means-End Hierarchy Map for Undergraduate Sample – Dominant Path**



excited at the end of the simulation experience (Q78) (Figure 4).

*Skills that Executives Developed.* One skill dominated the three models for predicting the three most important goals, persuasive communication. Apparently, it is extremely important to develop this skill in terms of its contribution to improving an executive's image among his/her peers. The development of persuasive communication skills also was important relative to the realization of the intellectual gain for the time and effort invested. The dominant paths are shown in Figure 5.

*Consequences that Executives Experienced.* Among all the consequences, three consequences stand out for the executives. Development of a thought process that the executives can carry into the real world (Q29) and exciting their drive to excel in the market (Q37) emerged as the two dominant consequences that impacted on the goal of benefits vs. the time invested (Q81). The third dominant consequence is the fact that executives learned how to utilize team dynamics to improve business decisions (Q43). This consequence had a direct impact on the development of their persuasive communication skills (Q54).

*Attributes That Led to Dominant Consequences for Executives.* The realism in the tactical execution of strategy (Q25) was extremely important to help executives to develop a thought process that they can carry into the real world (Q29). This attribute was also essential in exciting the executives' drive to excel in the market (Q37). The realism of the integration of all business functions (Q22), on the other hand, was a critical attribute for executives to learn how to utilize team dynamics to improve business decisions (Q43). Another equally important attribute for that

consequence was the realism of the distribution function (Q21). Finally, executives appreciated their instructors' help to realize the important learning points of the simulation (Q14). The involvement of the instructor as a course design attribute contributed to the experience of learning how to utilize team dynamics to improve business decisions (Q43).

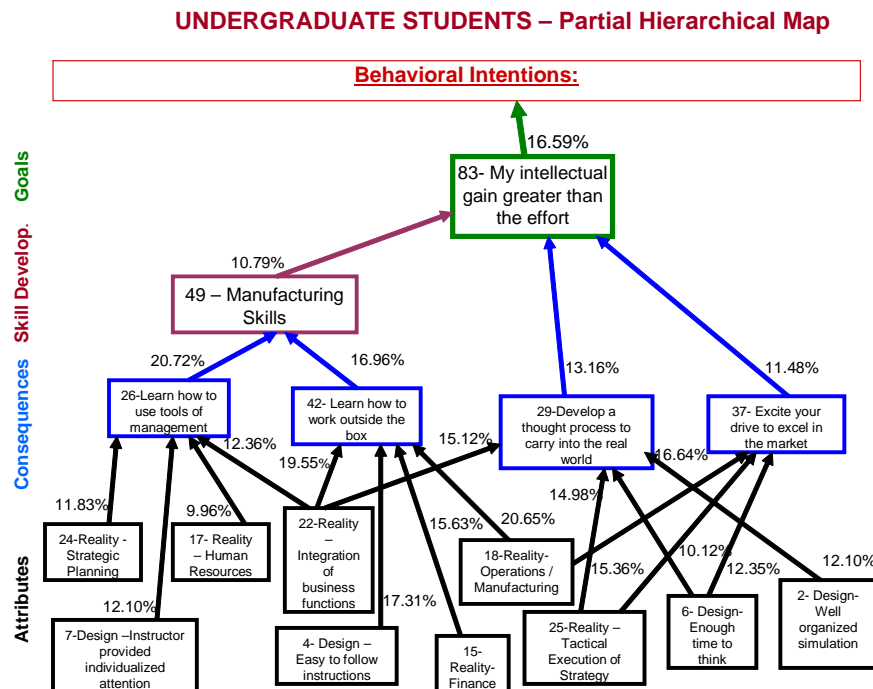
*Goals of Undergraduate Students.* The regression analyses revealed that there were seven important goals for undergraduates ( $R^2 = 0.756$ ). However, 2 goals dominated the rest of the goals. They contribute 87.6% to the  $R^2$ . Undergraduate students, similar to executives, believed that their intellectual gain far surpassed the effort they invested in simulation (Q83) (Extrinsic dimension – input/output aspect). Unlike executives, the second dominant goal belonged to the reactive value dimension. Undergraduates appreciated the expertise of those who designed the simulation exercise for them (Q73) (Figure 6).

Other important goals belong to extrinsic, intrinsic, and active dimensions. Undergraduate students thought that simulation experience was worth the time they invested (Q81) and the money they spent (Q82). They also had fun in competing in the simulation (Q76), and they felt refreshed and excited (Q78). Finally, they felt they had accomplished a great deal (Q79).

The next linear regression series used each goal item as the criterion variable and skill development and consequences items as predictor variables. As the number of criterion variables increase, the number of linear regressions increases exponentially. In order to keep the model understandable and simple, only the dominant variables are discussed in detail here.



**Figure 8 Dominant Paths Leading to Q83 for Undergraduate Sample**



The complete map of the dominant paths is shown in Figure 7. This figure is quite complex and will be explained in two parts that lead to the two dominant goals. That is, the discussion will first focus on which variables were important to the students' conclusion that their intellectual gain far surpassed the effort they invested in the simulation (Q83). The discussion will then shift to the variables that were important to their appreciation of the expertise of those who designed the simulation exercise for them (Q73).

*Dominant Paths Leading to the Goal of Intellectual Gain versus Effort Spent (Q83) for Undergraduates.* While executives had more goals and only one skill item in the dominant path of their hierarchical map, undergraduates had three dominant skill development areas. The dominant skills include leadership (Q46), marketing (Q48), and manufacturing (Q49). The dominant paths leading to the goal of obtaining intellectual gain versus the effort invested in the simulation is in Figure 8. Reaching towards this goal, the dominant skill development happened in the area of manufacturing and operations for undergraduate students (Q49).

In addition to this skill, two consequences had a direct impact on their higher level of intellectual gain. The first was the development of a thought process that the students can carry into the real world (Q29) and the second was the excitement of their drive to excel in the market (Q37).

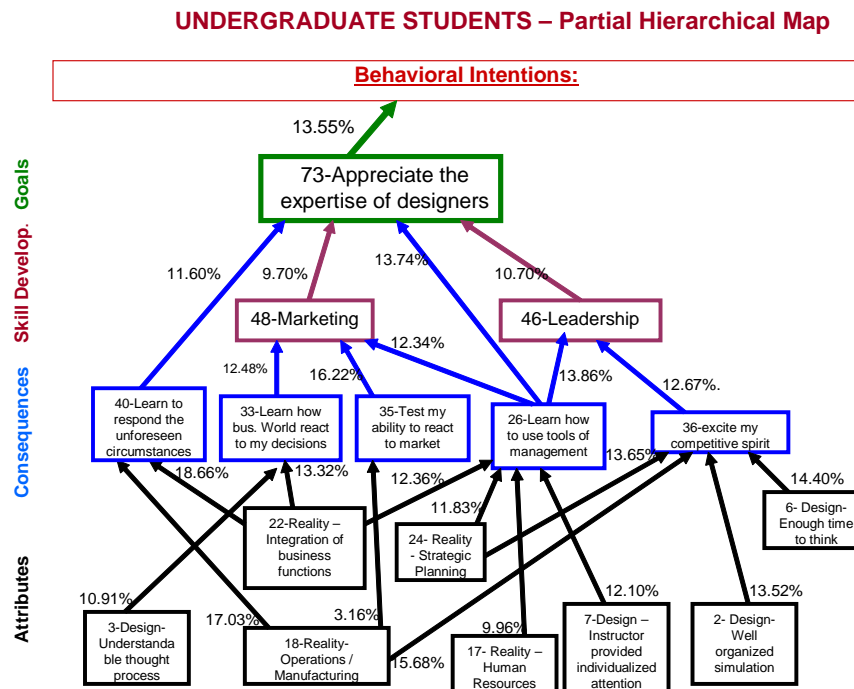
In the development of students' manufacturing skills two consequences were influential. One was learning how to use tools of management (Q26). The other consequence was learning how to work outside of the box or outside of their comfort zone (Q42).

*Attributes That Led to Dominant Consequences for Undergraduates.* There were multiple attributes that helped the students to experience the four dominant consequences. Realism of the integration of the business functions (Q22) and Realism of operations / manufacturing module (Q18) were important for multiple consequences. Realism of strategic planning (Q24) and human resources module (Q17) were important for learning how to use tools of management (Q26) as well as the fact that instructor provided individualized attention (Q7).

Realism of the finance module (Q15) and easy to follow instructions (Q4) helped students to work outside the box (Q42). The realism of the tactical execution of strategy had impact on two consequences, namely developing a thought process to carry into the real world (Q29) and exciting their drive to excel in the market (Q37). Having enough time to think through the problems presented in the simulation (Q6) had impact on these two consequences as well. Finally, a well organized simulation (Q2) helped students to develop a thought process to carry into the real world (Q29).

*Dominant Paths Leading to the Goal of Appreciation (Q73) for Undergraduates.* The dominant paths leading to the goal of appreciation of the expertise of the designers of the simulation is presented in Figure 9. Developing Marketing (Q48) and Leadership (Q46) skills were the lower level goals leading to this higher level goal. Two consequences were also important. They were 1) learning a great deal about responding to unforeseen circumstances in a business environment (Q40) and 2) learning how to use the tools of management in managing the firm (Q26). The

**Figure 9 Dominant Paths Leading to Q73 for Undergraduate Sample**



later consequence was also important in the development of both marketing and leadership skills.

Exciting students' competitive spirit (Q36) was another important consequence that led to the development of leadership skills. There were two more important consequences that were influential in the development of marketing skills. They were experiencing how the business world might react to the students' decisions and the decisions of their competitors (Q33) and testing their ability to react to market feedback in an environment where a misstep could result in lost market share and/or profits (Q35).

*Attributes That Led to Dominant Consequences for Undergraduates.* Multiple attributes were important to the students being able to experience the five above mentioned consequences. Two attributes are worth mentioning before the others. First, the realism of the integration of the business functions (Q22) impacted 1) learning of how to respond unforeseen circumstances (Q40), 2) learning how the business world might react to decisions (Q33) and 3) learning how to use tools of management (Q26). Next, the realism of the operations and manufacturing (Q18) module influenced 1) the students' learning how to respond unforeseen circumstances (Q40), testing their ability to react to the market feedback (Q35) and exciting their competitive spirit (Q36).

The realism of the strategic planning module (Q24) influenced both learning how to use tools of management (Q26) and exciting their competitive spirit (Q36). The realism of the human resources (Q17) module influenced learning how to use tools of management (Q26) as well.

Among the attributes related to the design of the simulation course, time-to-think (Q6) and a well organized simulation (Q2) had impact on exciting the students' competitive spirit (Q36). The instructor providing individualized attention (Q7) helped learning how to use tools of management (Q26). Finally, an understandable thought process (Q3) helped students learn how the business world might react to their decisions (Q33).

## CONCLUSION

This study was designed to evaluate a full-enterprise simulation from the perspective of the means-end theory. It was exploratory in the sense that it brought a completely new approach to understanding what students experience within a simulated business environment.

This exploratory analysis provided considerable insight into what is important to both undergraduates and executives. In one form or another, the participants found that the benefits from the experience surpassed the time, cost and/or effort invested in it. Although there is no data to compare simulations with other pedagogical tools, this conclusion is striking.

There were other benefits to the simulation. For executives, they found that it enhanced their image among their peers and their communication skills. They also thought it helped to excite their competitive spirit, develop a thought process they could carry into the real world, and use team dynamics to improve business decisions.

From the undergraduate point of view, there were many more takeaways from the experience. In addition to the value of the exercise compared to their investment of time,

effort and money, the undergraduates also appreciated the expertise of the simulation designers. They felt they had personally accomplished a lot, felt refreshed and had fun competing in the simulation.

In terms of skills, the manufacturing, marketing, and leadership aspects of the experience were the most important. In terms of specific benefits (consequences), they felt that they had learned to use the tools of management and work outside of the box. They also felt they had developed a thought process they could take into the real world and were excited to compete in the marketplace.

The realization of these goals, skills and benefits suggest that the simulation was a powerful learning tool. Of course, there were a variety of simulation attributes that contributed towards their attainment. Many of these were related to the design and realism of the simulation, while others could be attributed to the way the instructors conducted the course.

One of the most striking aspects of the research findings related to the differences between undergraduates and executives. It is clear that undergraduates had a more complex hierarchical map than executives. Undergraduates realized more goals, had more skills developed, and had more consequential learning experiences than the executives.

There is a considerable body of knowledge regarding the differences between experts and novices regarding information processing, quality of knowledge acquired and decision making (Wu and Lin, 2006). Experts are more capable of prioritizing and focusing on the core of the problem as they are more capable of correctly categorizing new problems and retrieving relevant information faster than novices do to solve new problems (Day and Lord, 1992).

The undergraduates (novices), on the other hand, had to learn multiple aspects of the business decision making with the help of their instructors and features of the simulation to achieve higher intellectual gains. This result supports Holbrook's idea of reactive value which is appreciation or admiration of an object (simulation). The undergraduates responded to it as it acted upon their person, and moved them to a new dimension (Holbrook 1994). The simulation was valuable to novices, since it changed them and made them better business decision makers. Therefore, they appreciated the expertise of those who designed the simulation.

In conclusion, this study suggests that undergraduate and executive students benefit in many ways from their participation in a simulation experience. It is clear that what they take away from the learning experience is different and the differences may be due to the level of experience they have in the real world of business.

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