

## **Developments in Business Simulation and Experiential Learning, Volume 26, 1999**

### **DEVELOPING A LEARNING CULTURE: ASSESSING CHANGES IN STUDENT PERFORMANCE AND PERCEPTION**

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#### **ABSTRACT**

This article discusses how a simulation-based, undergraduate management curriculum at Hartwick College precipitated a clear shift in "learning culture." Within two years, students grew to accept an active, experiential program where computer simulations, student teams, and instructor coaches are the primary instructional delivery system for all junior and senior courses, and electronic portfolios are a critical part of learning assessment. While some students initially objected to the higher workload, team-based grades, and the non-traditional organization of the program, faculty observed increases in student motivation, attendance, involvement and learning. By the end year two, analysis of students' end-of-course surveys indicated that the majority accepted the workload and concerns about grading decreased significantly. A year to year comparison of junior student "segments" indicated a 50% increase in enthusiasts, a 19% increase in acceptors, and a 23% decrease in a combined low-effort acceptor and resistor segment. Since the start of the new curriculum, the number of management majors has also increased 30% (119 to 156 majors), a rate of growth faster than the college overall.

#### **THE NEED FOR CHANGE**

In 1995, the faculty of Hartwick College's Department of Management and Accounting took a critical look at our undergraduate management curriculum. The program started in 1978, and most of the faculty taught since 1980. We had a traditional curriculum with a series of courses by function, and our primary pedagogy was lecture. Some faculty believed that we needed change. After an enrollment boom in the 1980s, the

numbers of management majors had not grown significantly. Courses and pedagogy were stale, marked by faculty and student boredom. Further, it was not clear that students were learning competencies essential for their future.

Business literature was rife with references to the non-traditional skills managers need to succeed. Future managers were encouraged to develop skills in teamwork and communication (Elliott, Goodwin & Goodwin, 1994; Nowak, Miller & Washburn, 1996; Paranto & Champagne, 1996; Rosenbloom, 1995; Smith & Demichiell, 1996; Stinson & Milter, 1996; Tompson & Tompson, 1995), problem analysis (Levenburg, 1996), critical/analytical thinking (Paranto & Champagne, 1996; Rosenbloom, 1995), computer use (Clinebell & Clinebell, 1995; Levenburg, 1996) and decision making (Levenburg, 1996). Businesses required "informed generalists" able to manage across functional lines (Elliott, Goodwin & Goodwin, 1994). We were concerned that our traditional, functionally segregated curriculum was not optimal preparation for our students.

A related concern was our pedagogy. Did our methods condition students to have the enthusiasm and responsibility so essential for lifelong learning? The literature appeared to support our concern. The effectiveness of traditional lectures was called to question since students were passive "spectators" in the learning process (Holter, 1994). Additionally, there was concern that lectures did not prepare students for learning situations encountered later in life (Butler, 1992). Students were more likely to internalize, comprehend and recall material learned through active engagement in the learning process (Bonwell & Sutherland, 1996). Recent

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constructivist theory contended that learning is most likely when students actively use and apply knowledge to solve meaningful problems that resemble the real world and when students solve these problems collaboratively (Glatthorn, 1994). This could maximize the students' abilities to both recall and apply concepts as they move into the world of work (Stinson & Milter, 1996).

### **THE NEW CURRICULUM**

In fall of 1996, faculty implemented an innovative curriculum to meet students' changing needs. We wanted students to become responsible for managing businesses and their own learning. The new curriculum was the vehicle through which we would achieve this active "learning culture." The curriculum was unique because it simultaneously combined five changes to achieve this vision.

**1. Students learn by doing.** Rather than progressing through a sequence of discrete, discipline-oriented courses, majors participated in a sequence of management simulations that each integrated functional disciplines and enabled students to "do" and learn from each experience. We chose simulations as the key delivery system because they have been shown to be effective to help undergraduates explore strategic alternatives and their consequences (Walters, Coalter & Rasheed, 1997), and it has been shown that skills can be improved during their use (Wolfe & Chanin, 1993). Students also reported higher interest, motivation, effort, and levels of learning from computer simulations than from other forms of group projects (Tompson & Tompson, 1995). Members of our department had consistent observations when they tested simulations on a smaller scale during 1995-1996.

The new curriculum is a sequence of eight courses that commence in a student's junior year after basic management, accounting and economics courses. The first seven courses are each approximately seven weeks long (two consecutive courses per semester), and each course is designed around an off-the-shelf, PC-based computer

simulation. Seniors take the last course concurrently with thesis projects in their final semester. The first five simulations are used as vehicles around and through which students learn, integrate and reinforce essential competencies from prerequisite courses and from across management disciplines. Seniors experience higher level simulations that expose them to multinational corporate finance, policy and strategy. While internships are not required, most students participate in at least one.

**2. Students learn from each other.** Throughout the curriculum, students experience teams of different sizes, roles, and structures. In the first week of each course, the class is divided into separate, competing company teams, within which students collaborate to make simulation decisions. Team decision making usually starts by the third class period, enabling students to complete at least two simulated years in each course. Teams usually make two decisions each week. Results are posted quickly so teams can prepare for their next set of decisions and see where they stand relative to their "competitors" on various performance dimensions.

**3. Our environment, technology and course materials enable students to be "successful" in their management roles.** For most courses, students report to the "office" twice a week for a three and a half-hour "work day" each session. The department has five dedicated workstations in separate student "offices" for team meetings and access to PC-equipped classrooms. Many students also bring their own college-issued laptops. During this time, teams make decisions and meet with faculty to discuss their performance.

Students use spreadsheets, presentation software, decision support systems, and word processing in every course. They also receive self-instruction and short readings called Competency Handouts ("CHOs") that help them learn supporting competencies and enable faculty to bridge the "inherent tension between covering content and using active learning strategies" (Meyers & Jones,

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1993). Students are told what competency areas they will learn in every course. CHOs are reviewed and expanded upon in class discussions led by the course instructor.

**4. Teachers are coaches.** The team concept also redefined faculty roles and the nature of teaching. Initially, two to four faculty collaborated to teach each course. Responsibilities included coaching, facilitating students' discovery, role-playing "top management" for formal meetings with student teams, writing CHOs, running simulations, assessing student work and meeting to coordinate the program. Currently, we no longer team teach courses, but we have continued to collaborate at the curricular level. Coaching has expanded to include student portfolios.

**5. Learning assessment is more than just an exam.** Each student's final course grade is a weighted average of exams, team and individual projects, presentations, and simulation results. Half of each final grade consists of individual performance, and half is based on team activities. For juniors, at least 20% of the course grade is based on self-assessment in the form of electronic portfolios which enable them to reflect about and "legitimize" their own learning (Burns & Gentry, 1998). During their senior year, students will use their junior course portfolios to develop comprehensive career portfolios.

### EVIDENCE OF CHANGE

When the new curriculum was first implemented in 1996-1997, faculty anticipated that the full benefit of the program would probably not be manifested in the first two years of implementation. In fact, we expected resistance from students who would be thrust into the challenging new format and from faculty elsewhere in the college who supported more traditional pedagogy. We also knew that change would require our long term commitment and longitudinal assessment. Given this, we tracked our progress in terms of four key result areas since the start of the program:

**1. Increased student motivation and learning.** In the first year, while students did complain about the increased workload, they rose to the challenge and demonstrated more learning, especially of non-traditional competencies (Kolenda, 1997). Higher student motivation was evidenced by high attendance and increased time on task. Important concepts and interrelationships were integrated and reinforced in every course. By being immersed into "jobs" during the first days of each class, students were highly motivated to learn and fare well among and against their peers. Later in each course, students became interested in applying their experience to broader contexts, enabling instructors to introduce case or other advanced application lessons. Positive results continued from year two to the present. Over time, students appeared to accept the program's workload and organization even more.

**2. Increased course value from a student perspective.** We hoped that students would accept the new culture of teams, experiential learning, and faculty as coaches, and we hoped to convince them that such changes were valuable for their future. Surveys of students' perceptions helped us assess these goals. We revised the 22 item Student Evaluation of Teaching (SET) survey used at the College for end of course evaluations. Our new instrument, the Student Evaluation of the Experience (SEE) consisted of all SET items plus 13 new items based on novel aspects of our program. In spring of 1997, we added 9 new student-generated items, bringing the SEE to a total of 44 items.

At the end of year 1, we compared our SEE results for *course value* against the college mean with the goal of at least meeting it. Our new cross-disciplinary, non-traditional courses were not directly comparable to previous management courses. We did not seek to exceed the college mean because we expected faculty learning and some student resistance during the transition to influence student ratings (Bonwell & Eison, 1991; Sutherland, 1996). Results appeared promising; student satisfaction with *course value* was above

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or not statistically different (at  $t_{.025}$ ) than the college mean of 81% for most courses. In year 2, student satisfaction with *course value* continued to be above or not statistically different than the college mean for most courses despite changes in faculty due to sabbaticals. While these results were encouraging, we believed we just scratched the surface of our understanding about our students' perceptions. Was *course value* really a dimension that students used to evaluate our courses? If so, how important was it relative to the other aspects students perceived about each course? Did perceptions about *course value* differ significantly among students or from year to year?

The next stage of our perception research consisted of two phases each year, using only the junior population to start. First, at the end of each fall semester, we used factor analysis to reduce the SEE survey items into the fewer dimensions that efficiently described how students perceived and evaluated their management courses that year. Second, we administered an *Overall Junior Experience Survey* to all juniors at the end of the last of four courses in their junior management sequence. Respondents identified which of the four junior management courses they took, specified the grade they earned in each course, ranked all four junior management courses from most to least preferred, and rated each course on each of the dimensions identified in phase one.

In the fall of our first year, fall semester SEE items loaded into nine dimensions that explained 77.2% of total variance, with an eigen value = 0.965. In year 2, fall semester SEE items loaded into eight dimensions that explained 72.1% of total variance with an eigen value of 1.15. Comparing these results, we observed that *course value* stood out as a dimension in both years one and two. In fact, five of the eight dimensions from year one essentially repeated in year two: *course value*, *academic standards*, *fairness*, *workload*, and *content complexity*. While SEE items that loaded with each dimension changed somewhat, the dimensions appeared to remain fairly constant. We also observed that two of the dimensions from

year one—*learned from team* and *personalized attention*—were absorbed into the *course value* dimension in year two. We believed that this indicated that students in the second year of the new curriculum were more informed and expecting these attributes as part of the “value” of their major. We saw this as an important indication that our “learning culture” was changing.

In the second phase of our research each year, we administered the *Overall Junior Experience Survey* at the end of the fourth course. Surveys for students who took fewer than all four courses and/or omitted courses from their ranking process were removed from data sets each year. In year one, the population consisted of 14 students, and data were tabulated by student by course for a total of 56 cases. In year two, the population consisted of 32 students, and data were tabulated by student by course for a total of 118 cases.

To determine what dimensions were most important to each class on average, we regressed each year's data, with “rank” as the dependent variable and independent variables including grade and each dimension from that year's factor analysis. The models appeared to have good predictive power in both years 1 and 2, correctly predicting the most preferred course for 50% of the respondents ( $R^2 = 0.547$ ) and 39% of the respondents ( $R^2 = 0.357$ ), respectively (Urban & Hauser, 1980). In the first year, students appeared to place greatest importance on *course value* (0.28), *grade* (0.26), *content complexity* (0.23), *workload* (0.19), and *organization* (0.13). In year two, students continued to place the highest importance on *value* (0.25) and *complexity/difficulty* (0.18). Interestingly, while *learned a lot from company team* was a separate dimension in year one, it loaded with the *course value* dimension in year two, perhaps indicating that students were beginning to expect team learning as a valuable aspect of the management major. Further, *instructors* increased in importance (0.21) while *workload* (0.09) and *grade* (0.03) decreased significantly. We believed that this

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indicated that more students were expecting and more accepting of the *workload* and the team-based *grading* approach in year 2. Students also appeared to perceive greater variance in *instructors* between the four courses in year 2, and this may account for the increased importance of this dimension. *Standards* and *fairness* remained about the same importance as last year, but they did not appear to be key drivers.

**3. Students expecting and accepting the new curriculum approach.** We expected some student discomfort and resistance during the transition to our experiential format, but we also expected that eventually, the "culture" would shift to the point where students would expect and even take pride in their demanding major. While our analysis of student perceptions appeared to support this, we used cluster analysis to examine this more directly. Each year, we saved results of the fall semester factor analysis as variables, enabling us to cluster student populations according to their factor scores for each dimension. Student cases with similar factor scores were grouped into common clusters or "segments." By comparing segments each year, we could assess changes and trends in perception and hence "culture" each year.

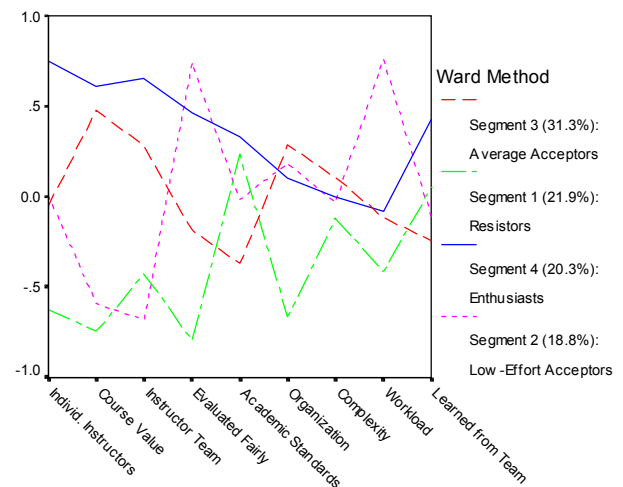
In year one, we used Ward's Method to cluster fall semester junior data into four segments that described all cases without missing values, 92.2% (59) of the student cases (see [Figure 1](#)).

Segments ranged from resistors to enthusiasts, with two segments between these extremes. **Resistors**, on average, responded negatively to most dimensions. Low scores for *evaluated fairly* and *course value*, *instructors*, *instructor team*, and *organization* revealed that this group did not accept—and perhaps even “resisted”—basic elements of the new curriculum. We were pleased that this group was not the majority, but our obvious objective was to decrease the size of this segment over time.

**Low-effort acceptors**, on average, had highly positive scores for *workload* and *evaluated fairly*

and strongly negative scores for the *instructor team* and *course value*. While these students did not appear to react as negatively to the new curriculum as the resistors, they did seem to feel the workload was very high. We wanted to reduce the size of this group over time, and we believed this would occur as students self-selected to accept and even take pride in the workload associated with the major.

**FIGURE 1**  
**YEAR 1 CLUSTER OUTPUT**

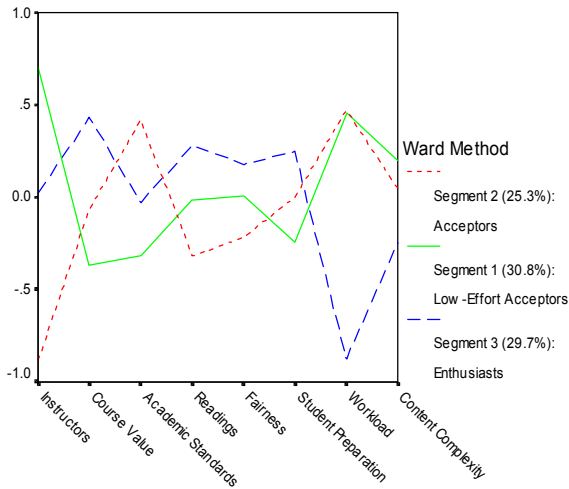


**Average acceptors** had positive scores for *course value*, the *instructor team*, *organization*, and *learned from team*, signs that they “accepted” the new curriculum, on average. Negative scores for *academic standards* and *evaluated me fairly* and a positive loading for *content complexity*, however, clearly separated this segment from enthusiasts. Average acceptors appeared to consider the new program very rigorous, perhaps unfairly so. **Enthusiasts**, on average, appeared extremely supportive and “enthusiastic” about the new curriculum, with high positive scores for most dimensions. Only content complexity and workload received average ratings, indicating that these students are either used to working hard or perhaps could have been stretched further. Our objective is to increase the size of this segment.

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In year two, we clustered fall data into three segments that described all cases without missing values (78), roughly 86% (see [Figure 2](#)).

**FIGURE 2**  
**YEAR 2 CLUSTER OUTPUT**



While each segment changed somewhat, their basic composition appeared reasonably consistent with year 1 results. Given its low, negative score for *value*, segment one appeared to be a combination of the **resistors and low-effort acceptors** from year 1. A positive trend was that *value* was not as negative as it was for either segment during the first year. Interestingly, these students appeared to rate instructors favorably on average, which may indicate that they were not adverse to the active learning format. Low negative score for *preparation* and high scores for *workload* and *content complexity*, however, may indicate that they were not gaining as much from student teams. This segment's size decreased from year 1, and we want to reduce it further in year 3.

An average score for *value* appears to indicate that **acceptors** accepted the curriculum on average, though less strongly than in year 1. They continue to consider the curriculum rigorous, possibly because of the *instructors* and the *readings* they assign. Given this, it is possible that while these students accepted the value of the new curriculum, they did not fully embrace active learning concept. This is an improvement opportunity for year 3.

As in year 1, **enthusiasts** appeared to *value* the new curriculum most highly. In year 2, however, they appeared less accepting of the *workload* and *content complexity*; in year 1, these dimensions scored about average, but in year 2, those scores were negative. This may indicate that enthusiasts continued to desire challenge. Given the drop in scores for *instructors* and *academic standards*, it appeared that enthusiasts attributed the *workload* and *content complexity* to *instructors* with lower *academic standards* than they expected or desired.

Overall, changes in population segment sizes from year 1 to year 2 clearly indicated a positive trend. Enthusiasts increased by 50% and acceptors also increased by 19%. Combined, the low-effort and resistor segment decreased by 23%. A clear challenge for faculty in year 3 will be to meet the needs and expectations of groups with such different scores for *workload*, *academic standards*, and *preparation*.

**4. Increased enrollment in the program.** We expected that our number of majors would increase if students accepted the value of our new program. By the end of our first year, we experienced a 15% increase in management majors (from 119 to 137), a rate of growth faster than the college overall. By the fall of 1998, we had 156 management majors, an increase of 30% since the start of the new curriculum in fall 1996.

## CONCLUSIONS

We are pleased with the progress our department has made toward a "learning culture." We have made a change from passive to active learning, and we increased motivation, morale, standards, and acceptance of challenge among our students. While we may never enroll 100% enthusiasts, it is our goal to increase acceptors and enthusiasts to maximum levels. Systematic assessment of both performance and perceptions will enable us to monitor such change, supporting us in our mission to challenge and raise the performance of all students as we move into the 21<sup>st</sup> century.

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