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***Learning to Lead Organizational Change in Thailand:***

***Assessment of a Problem-based Approach***

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## Abstract

*This paper presents the design and evaluation of a problem-based learning project, Leading Organizational Change. The PBL module is organized around an interactive computer simulation, "Making Change Happen," which is used to help students learn how to implement complex innovations in organizations. The paper presents evaluation data focusing on the extent to which the simulation creates an active learning environment that encourages students to develop selected leadership competencies.*

## Introduction

*Education in the professions should prepare students for action.<sup>1</sup>*

Graduate programs in management have come under fire in recent years from a diverse group of influential scholars. Critics have noted several persisting weaknesses among MBA programs in particular.

- The curriculum is dominated by academic disciplines and disconnected from management practice.
- Learning is largely teacher-directed, resulting in weak retention and transfer of knowledge beyond the classroom.
- The management curriculum emphasizes analysis and calculation with limited attention to the development of affective and problem-solving skills necessary to gaining results with and through other people.<sup>2</sup>

These critiques take on even greater significance if we are concerned with developing the *leadership capacities* of students in graduate management programs. How can we prepare leaders to address the complex technical, conceptual-analytical and emotional tasks involved in leadership? In recent years, the demand for institutions to meet increasingly ambitious goals for graduate education in the professions has led to experimentation with the use of problem-based learning.<sup>3</sup>

As an approach to leadership education, problem-based learning incorporates several key dimensions:

- PBL presents a problem as *the initial stimulus for learning*; students always receive the problem scenario to be solved prior to encountering the relevant knowledge content to be learned.
- The PBL unit takes place in the form of a *project*; students work in *self-managing learning teams* that are accountable for solving the problem in a defined period of time.
- The learning team accesses a variety of *knowledge resources* in order to understand and develop solutions to the problem.
- To the greatest extent possible, the “solution” takes the form of a simulation or role-play that requires learners to demonstrate or *implement the solution*.<sup>4</sup>

Problem-based learning, first popularized in medical education, is an action-oriented approach that creates an experiential basis for learning. Researchers who have studied the use of PBL in medical education claim that it has the following positive outcomes when compared with programs using traditional methods of teaching and learning.

- While students studying in a PBL environment test as well as students in traditional programs on their understanding of basic content, the PBL students demonstrate stronger results on understanding underlying principles.
- Students in PBL programs learn in a more active and engaging learning environment which leads to greater interest and effort as well as faster and higher rates of program completion.

- PBL's focus on the application of knowledge creates desirable attitudes among students such as learning for meaning rather than for reproduction of knowledge.
- There is also some evidence to suggest that students in PBL programs also develop stronger problem-solving skills.<sup>5</sup>

These characteristics and findings concerning problem-based learning suggest its potential fit to the goals and needs of management education. Indeed, over the past decade, program designers have experimented with the use of PBL in graduate management programs in the United States, Europe, Australia, and Asia.<sup>6</sup> Although most extant reports on the use of problem-based *management education* are positive, there is relatively little empirical data to support these conclusions.<sup>7</sup>

This paper addresses the problem of developing the capacity of current and prospective managers to lead change effectively. We focus on the design and use of a problem-based computer simulation -- *Making Change Happen* – as a tool for leadership development in a Master of Management program in Thailand. We report data concerning the effectiveness of the simulation as a tool for learning to lead organizational change.

The paper is organized around three main questions:

- How does the design of the *Making Change Happen* simulation facilitate learning to lead change?
- How is the simulation used in the instructional setting?
- Is the simulation an effective means of learning to lead change?
- To what extent does the simulation achieve the stated goals of problem-based management education?

### Making Change Happen: A Problem-Based Simulation

Globalization is reshaping the lives of people in organizations throughout the world. In the space of little more than a decade, new technologies, new knowledge, a rapidly evolving global economy, as well as political and cultural changes have created a new context for organizations.<sup>8</sup> The unrelenting, increasingly rapid pace of global change has transformed change leadership into a critical competency for organizational leaders throughout the world.<sup>9</sup>

However, the organization's capacity to *make change happen* does not depend only on leaders at the apex of the hierarchy. The rapid pace of change in the 21<sup>st</sup> century makes it essential that the capacity to lead is distributed widely in the organization. Change leadership must, therefore, be developed among a broad base of people in a variety of staff, supervisory, and formal management roles.<sup>10</sup>

*Making Change Happen*<sup>11</sup> is a problem-based computer simulation designed to assist prospective and practicing managers and staff in learning to lead changes and innovations in their organizations. The computer simulation provides learners with a common high impact problem to solve: implementation of a new IT system in an organization. Although the focus of change is implementation of a new IT system, the simulation has been designed so that the lessons learned by students are broadly

applicable to many other types of organizational change efforts such as reengineering, TQM, reorganization, or mergers.

During the simulation students learn in teams consisting of three members. Each “project implementation team” is responsible for developing and applying a strategy for implementing the new IT system (named *IT 2020*) over a three-year period of time. The project team must develop a implementation goals and a strategy that will raise staff awareness of the change, create a broad base of interest, enable the staff to develop new IT skills, and generate commitment to use *IT 2020* in their daily work.

However, unlike in a case teaching environment, the problem-based simulation requires that the learners not only *plan* a change strategy, but also *implement* it. During the implementation process, the project team is confronted with widespread resistance to the mandated use of *IT 2020*. The nature, intensity and form of the resistance varies based upon a variety of personal factors including staff personalities, job positions, social networks, prior experience with IT, and personal and job priorities. The project team must also deal with obstacles arising from resource constraints, politics, organizational structure, communication networks, corporate culture, and even “acts of god.”

The team quickly finds out that they must revise their strategy to meet the needs of the real situation. Over the course of the three-year simulated implementation, the project team is able to “see” the results of their change strategy both in terms of staff usage of the new IT system and productivity gains arising from its use. The interactive nature of the simulation creates an active learning environment in which students learn to use change theories as tools for solving real problems. The learning sequence consists of team-based

use of the simulation, mini-lectures conducted by the instructor, instructor-led debriefings, and team-to-team knowledge sharing.

Playing the simulation. Students use the simulation as part of a six-week (18 contact hour) module on leading change. After being introduced to the problem and their role as project implementation teams, the learners begin to access other factual information concerning the change context. This information is presented via handouts as well as on the computer screen. It includes information about the 24 people (i.e., the staff members involved in the *IT 2020* implementation) and the 16 activities they can use to engage the staff in the change effort and prepare the organization to use *IT 2020*.

The game board (see Figure One), displays the organization's members on the left-hand side. Information on each staff member can be accessed by clicking on their icon. Change activities are listed on the right side of the screen, again with clickable buttons providing access to information about the activity and its cost in bits. Listed across the top of the board are five stages of the change process: *Information, Interest, Preparation, Early Use, and Routine Use*. These stages of use are derived from the *Concerns Based Adoption Model* of change.<sup>12</sup>

The game pieces representing the 24 staff members (see Figure 1) start “off the game board” because they have yet to begin the process of change. Few have much information about the change, except by rumor. As noted above, a key goal of the change

team is to move these staff members from a state of knowing nothing about *IT 2020* to a stage of mastery and routine use of the new IT system in their daily work. The other is to gain “Bennies” (productivity benefits) which will accrue as staff begin to do activities with *IT 2020* that increase efficiency and effectiveness.

The project team will work with 24 people in the organization. These staff members work in the two “pilot branches” as well as the regional and head offices. We emphasize at the outset of the module that successful implementation will depend upon the team’s effectiveness in understanding the perspectives of these staff members towards the change (i.e., *IT 2020*) and executing a strategy that addresses their concerns.

The descriptions of the staff members have been conceived taking into account a variety of factors including job position, social networks, organizational power and politics, personality type, and change adopter types. Relevant information about the 24 staff members is conveyed in an organizational chart, as well as through brief descriptions of the staff members accessible via the computer.

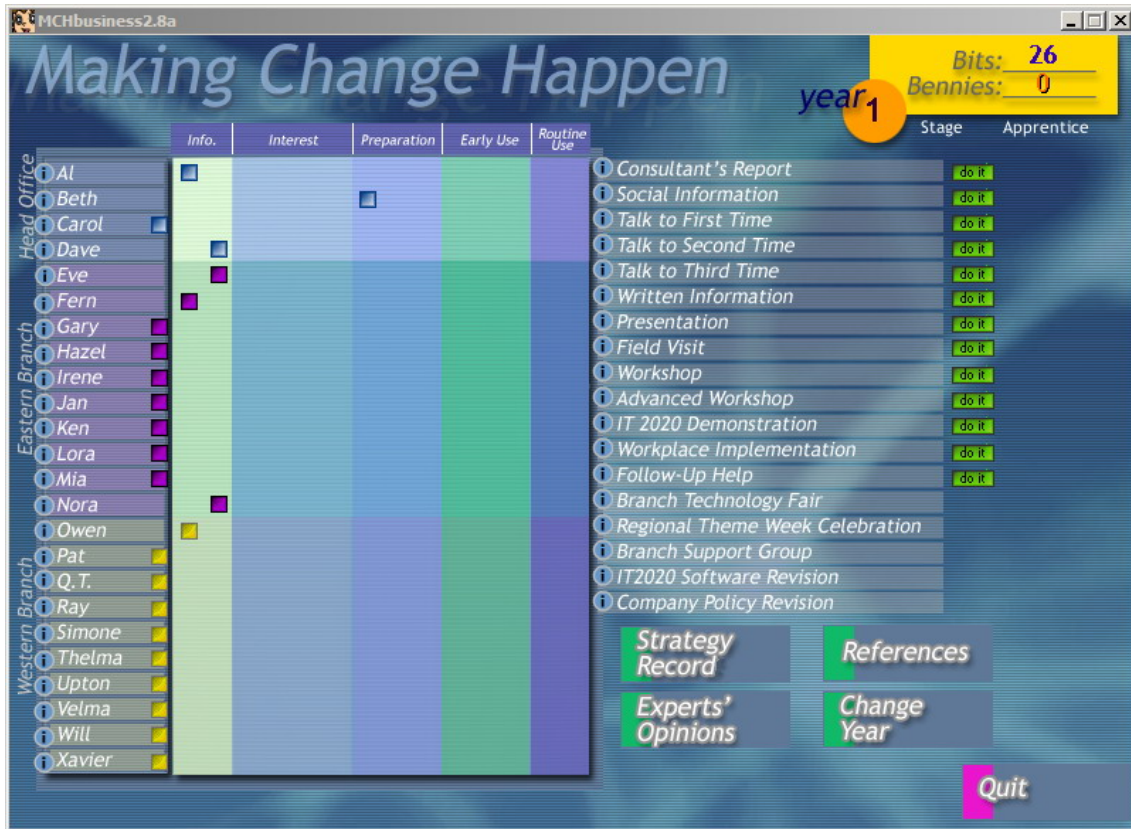


Figure 1: Making Change Game Board

There are 16 activities from which the learners can choose in order to create their implementation strategy (see Figure 1). These are typical activities that a change implementation team might undertake: gathering more information, talking with people, distributing written information, conducting a presentation for staff about IT 2020, holding a demonstration of the software, visiting another organization that is using the software successfully already, holding a skill development workshop, using the IT in the

workplace, providing follow-up help to support implementation, holding an advanced workshop for experienced users, creating a branch support group, revising the software, policy revision.

As noted in the problem section, the project team has an annual budget to spend on these activities. Each activity has a different price in bits. The cost of the activity is deducted automatically when the activity is implemented by the team. The teams will spend their budgets on a combination of these activities until they run out of time or budget for a given year of implementation.

A great advantage of the computer technology used with this simulation is that it allows seamless interactivity between the learner and the change context. The project team will “play” the simulation by considering first its strategy and then by selecting an activity to conduct with the staff members.

Each time that learners “do” an activity in the simulation, several things happen:

- The cost of the activity is deducted from their budget.
- The game pieces representing staff members involved in the activity move.
- Bennies, if any are accrued from the activity, are recorded on the screen.
- A Feedback Card pops up describing what happened.

After an activity has been implemented, the team will receive immediate feedback on what happened and why. Thus, the first time they “Talk to” Al, the team receives the following feedback:

Al is very busy. He is involved in other projects to improve the region’s productivity and doesn’t have much time to talk with you today. He suggests that you coordinate with MIS staff at the Head Office. On your way out he says, “I don’t know they are always thinking up these new things for us to do.” Al moves one space.

The first time that they “Talk to” Irene, she responds as follows.

I just don’t like computers. They’re so impersonal. How can this new system help me anyway? And what will I do when the system breaks down and I have to get the credit reports out on time? Will I be blamed for the late report? Irene doesn’t move at all.

Thus, the team proceeds through a process of planning their strategy, implementing it, getting feedback, reflecting on the results, and adjusting their strategy. Through the simulation, the team is able to see the *evolving results* of their strategy as the staff members begin to move through the stages of change.

#### Development of Strategic Thinking about Leading Change

As suggested above, the instructional model incorporated into the problem-based learning process allows relevant conceptual frameworks to emerge out of the learners’ experience as they play the simulation. The introduction of change theory during the process of active problem-solving enables the students to view theory as a practical tool.

At this point we would like to reemphasize our goal of developing students’ ability to think strategically and flexibly. To us this means that students will be able to understand and apply the key factors that form the context for change in an organization and use that understanding to formulate effective change leadership strategies. Indeed, we stress three related points throughout the module:

- Every context is different and there is no single sequence of steps that will bring about effective change in all situations. Therefore, memorizing or even seeking to identify one best sequence is useless.

- There are many possible strategies (i.e., sequences of activities) that will yield excellent results in bringing about the change in any single context. Begin by seeking to understand the underlying needs of people as well as the resources and constraints of the situation.
- The goal of learning through the PBL simulation is to understand how to apply the analytical principles that underlie effective change strategies.

With this point in mind, we would note that a central feature of the simulation is the *interdependence* of the activities that comprise a team's strategy. Interdependence means that the success of certain activities in the simulation depends upon the completion of other prior activities. Again, as with the adopter type information, the decision rules are only discovered through the "experience" of playing the simulation. The interdependence of the activities requires the project team to develop a strategic *sequence of activities* that create a context that supports change in the organization. It causes the team to develop a dynamic view of the change process in which the context is constantly evolving over time. This facet of the simulation is supported both by practical experience as well as by change theories.<sup>13</sup>

The interdependency among the change activities incorporated into the hidden decision rules is central to the design of the simulation. Over 300 interdependencies are built into the simulation as well as some randomly generated responses. These factors increase the life-like nature of the simulation and cause students to view the change process as *systemic* rather than menu-driven.

Another way in which the module fosters the capacity for strategic thinking is by asking students to engage in goal-setting and strategy formulation at the outset of each year of the simulation. Each year the students must set goals that specify both the desired rate of progress of staff through the stages of the change process as well as the number of

Bennies (i.e., productivity increases) they seek to achieve by the end of that year. This creates greater focus as well as reflection among students as they refine their strategies and reduces the “computer game” mentality of clicking away without thinking about cause and effect relationships.

At the beginning the students tend to think in terms of *activities* rather than *strategies*. However, when they are asked to formulate goals and ways of achieving them, the change models becomes more relevant. For example, a team might draw on Kotter’s<sup>14</sup> 8-stage model of change to inform the development of their strategic objectives in the first year:

- Raise awareness among staff in the pilot branches and create a sense of urgency towards the IT 2020 implementation effort;
- Create a guiding team possessing position power, influence and expertise;
- Engage the guiding team in developing a vision for the change and becoming models who can support others as the change moves forward.

With these strategic objectives in mind, the project team could begin to effectively consider the suitable sequence of *activities*. At the end of the year, the team would reflect on their results in light of their goals (i.e., staff progress and Bennies) and their strategy. By playing the simulation multiple times, the learners can test out different strategies.

It is through this iterative sequence of planning which activities to choose, implementing them, seeing the results, revising the strategy, and seeing the results that learners begin to see the patterns in the change process. These patterns gradually cohere

into identification of underlying *principles* that we would like them to learn from their “experience” of the simulation.<sup>15</sup>

As a final note about the simulation, we must mention that this simulation was originally designed based upon research on organizational change conducted in largely in North America. Using a process of research and development, we adapted the context and decision rules that are embedded in this simulation to match the cultural norms that impact on the exercise of leadership and the implementation of organizational change in Thailand.<sup>16</sup>

### Assessing the Results

At the conclusion of the three-year simulation the learners will have achieved some pattern of results related to IT adoption and productivity. The level of success of *IT 2020* adoption is assessed by the number of people who reached the Early Use and Routine Use stages of change. Productivity improvement is assessed over the course of the three year period of implementation.

Using these two criteria and a set of internal decision rules, the computer assigns the project team to one of size levels of expertise in terms of their change management: Novice, Apprentice, Manager, Leader, Expert, Master. For each level, additional feedback is offered to the team including advice on how they might improve their strategy the next time they play.

Student learning via this simulation is assessed through several means.

- Each team of three students writes a strategy analysis paper that describes their goals and strategies and which analyzes the process and outcomes of their implementation effort. This paper fosters teamwork and serious reflection on how to apply change theories to the simulation. Without this

assignment, students could master the simulation without learning to apply the underlying principles of organizational change.

- Teams complete Team Participation Assessment Forms that ask them to rate their team mates on desired teamwork competencies including Responsibility and Punctuality, Quality of Work Submitted to the Team, Cooperation, and Leadership.
- Each student writes a personal case of change in their own organization. This assignment fosters synthesis and transfer of learning and allows us to assess depth of student understanding, application, analysis, and synthesis.
- Each student completes the simulation one time on their own as part of the final exam.
- There is a final exam which serves as a check on individual student understanding in a controlled environment.

### Methodology

This research was carried out at the College of Management, Mahidol University in Bangkok Thailand. The College offers the Master of Management degree in a variety of specialization areas (e.g., General Management, Entrepreneurship, Human Resources, Innovation in Management, and Marketing and Management) in a two-year program. All materials and instruction and assessments were conducted with English as the medium of instruction.

Problem-based learning is incorporated into the College's Master of Management program in a variety of ways.<sup>17</sup> However, the most significant implementation occurs in the Capstone portion of the Master degree program. Students have several Capstone Project options, one of which is a PBL Track. The PBL track involves completion of four

six-week long PBL projects. The *Making Change Happen* simulation is incorporated into one of the six to eight PBL projects from which students may choose.

In conducting this research, we examined data on the use of this project on *Leading Organizational Change* in the PBL Capstone. This Capstone module is typically offered to several “sections” of students during each trimester. During this period, the course was taught a total of 53 times, by a total of three instructors.

### Research Questions

The broad questions addressed in this study were stated earlier:

- Is the problem-based simulation, *Making Change Happen*, and effective means of learning to lead change?
- To what extent does the project achieve the espoused goals of problem-based management education?”

We restated this broad question in terms of several more specific sub-questions:

1. Do students perceive the problem-based learning project module, *Leading Organizational Change*, as an effective approach to learning?  
Hypothesis #1: The *Course Effectiveness Rating* of the *Leading Organizational Change* course will not be significantly different from the rating of other Non-PBL courses in the College.
2. Does the problem-based learning project, *Leading Organizational Change*, create a more active learning environment?  
Hypothesis #2: Student ratings of the *Leading Organizational Change* course will not be significantly different from the ratings of other Non-PBL courses on the extent to which the course creates an active learning environment.
3. Does the problem-based learning project, *Leading Organizational Change*, encourage students to learn from each other?  
Hypothesis #3: Student ratings of the *Leading Organizational Change* course will not be significantly different from the ratings of other Non-PBL courses on the extent to which the course encourages students to learn from each other.
4. Does the problem-based learning project, *Leading Organizational Change*, make the course content about leading change practical?  
Hypothesis #4: Student ratings of the *Leading Organizational Change* course will not be significantly different from the ratings of other Non-PBL courses on the extent to which the course makes the course content practical.

### Instrument

In order to assess the perceived effectiveness of the change project at achieving key goals related to problem-based management education, we relied primarily upon student course evaluations. These are standard student evaluations of courses collected at the end of every course.

The questionnaire consists of 15 five-point Likert items using a response scale ranging from 1 to 5. Student response to these items assumes that a higher score represents a greater extent or higher effectiveness. The items are not grouped into subscales.

The questionnaire includes several relevant questions that bear on the points of interest in this research. These include the following:

1. Please rate the overall effectiveness of this course.
2. Please rate the extent to which the instructor is able to make the course content practical.
3. Please rate the extent to which the instructor is able to involve students actively in their learning.
4. Please rate the extent to which tasks and assignments assess student understanding of the content.
5. Please rate the extent to which the course encourages students to learn from each other.

In addition to these closed-end response questions, the course evaluation questionnaire also includes open-ended questions that seek student input on the effectiveness of the course and ways it could be improved. Data from both sets of questions are employed in this research to address our research questions concerning the use of the problem-based simulation for teaching students to lead change.

### Research Design

This research employs a post-hoc, non-experimental design in order to analyze the perceptions of students who have studied the *Leading Organizational Change* PBL course module. We will report these perceptions concerning key indicators of instructional effectiveness and compare the results to other courses offered in the College that do not explicitly incorporate PBL into their course design and also to other courses in the PBL track.

Data analysis began with descriptive statistics and proceeded with testing of the hypotheses stated above. Hypothesis testing was conducted using Independent Sample T-tests of significance. Given the relatively small number of class sections taught with the OC course module (i.e., 53), we set the desired level of significance at .05 to reject the null hypothesis.

When interpreting the results of this research, the reader should keep several points in mind:

- The comparison courses use a wide variety of teaching methods including lecture, discussion, cases, role play, and even PBL. Thus, the comparison group does not compare this module with a clearly specified alternative form of teaching and learning.

- The College places great emphasis on active learning in all of its courses. This means that the comparison groups are also likely to demonstrate relatively high scores on the specified items.

### Sample

As suggested above, the sample for this research consists of students studying various management disciplines as part of a Master of Management program in Thailand. Most students in the College have working experience and are studying in a part-time mode in evenings and weekends. The students are almost all Asian; the majority are Thai nationals with some Chinese and Japanese students as well. We employed data collected from students between the years 2001 and 2005.

The unit of analysis is the course. Therefore, we are interested in student responses on the relevant questionnaire items *for each class section* taught between the 2001 and 2005 academic years. Since the College operates in a trimester system, the period of analysis includes 9 trimesters. This period was selected because the PBL track, including the *Leading Organizational Change* (OC) project module, was first incorporated into the College curriculum in June 2001.

Table 1 includes the sample characteristics broken down into three groups of classes during the 2001-2005 period: the OC course module, Other PBL course modules, Non-PBL courses. During this period, 2001-2005, the OC Course was taken by 1,290 students of whom 1,220 returned valid questionnaires. The data in Table 1 indicate a

level of response for each type of course that is greater than 80%. The response rates for each type of course meet or exceed the requirements for this research.

<b>Students and Classes: 2001-200505</b>	<b>OC</b>	<b>Other PBL</b>	<b>Non-PBL</b>
<b>Number of Course Sections</b>	<b>50</b>	<b>251</b>	<b>987</b>
<b>Average Number of Student per Section</b>	<b>24.42</b>	<b>23.75</b>	<b>24.89</b>
<b>Total Number of Students</b>	<b>1,221</b>	<b>5,961</b>	<b>24,562</b>
<b>Total Returned Questionnaires</b>	<b>1,159</b>	<b>5,308</b>	<b>19,691</b>
<b>Response Rate</b>	<b>95%</b>	<b>89.05%</b>	<b>80.17%</b>

*Table 1: Sample Characteristics*

### Results

The main research question that we address is: “Does this simulation achieve the stated objectives of PBL concerning active learning, collaborative learning, and application of knowledge to practical problems? This question was examined using both quantitative and qualitative data gathered from the questionnaire described above.

#### Quantitative Results

We present the quantitative results first by showing descriptive statistics for the courses.

Then we compare PBL courses with other courses on the specific questionnaire items.

<b>Mean_Course Effectiveness Ratings</b>						
<b>Category</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>Overall</b>
PBL: OC	4.195	3.813	4.037	4.072	4.275	4.078
Non-PBL	3.698	3.916	3.939	4.023	3.967	3.909
PBL: Other	3.633	3.610	3.943	4.080	4.065	3.866

*Table 2: Mean Course Effectiveness Rating for PBL , OC and Non-PBL Classes*

LEARNING TO LEAD ORGANIZATIONAL CHANGE

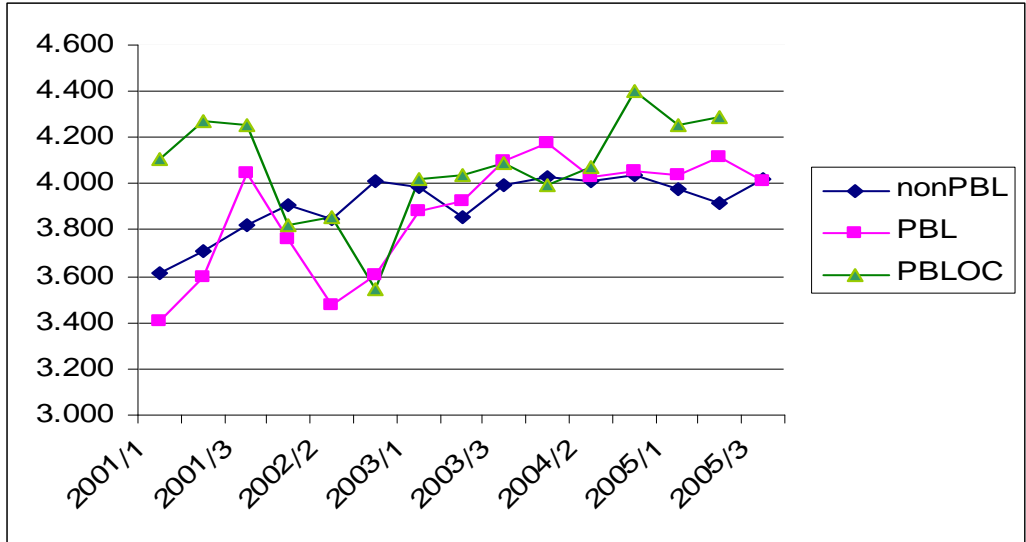


Figure 2: Mean Course Effectiveness Ratings, 2001-2005

Table 2 and Figure 2 display several basic trends concerning the *perceived effectiveness of the OC course* compared with of other PBL and Non-PBL courses taught in the College during the same period.

- The perceived effectiveness of all courses in the College improved consistently during this five-year period.
- For the past several years, the mean course effectiveness rating for all courses in the College has been at a very high level (i.e., 4.0 or higher).
- With the exception of the 2002 academic year, the course effectiveness of the OC module was perceived to be higher than that of Non-PBL courses as well as other PBL courses in the College.

Course Effectiveness Ratings: Standard Deviation						
Category:	2001	2002	2003	2004	2005	Overall

<b>PBL:OC</b>	0.3244	0.2669	0.1822	0.2234	0.1801	0.2354
<b>Non-PBL</b>	0.4597	0.3505	0.4491	0.4529	0.4264	0.4277
<b>PBL:Others</b>	0.4408	0.3911	0.3411	0.2841	0.264	0.3442

Table 3: Standard Deviation of Course Effectiveness ratings

Data in Table 3 and Figure 3 describe the variance in course ratings for the three types of courses. More specifically, they examine the consistency of perceptions *across course sections and instructors* in student perceptions of course effectiveness. A lower level of variance indicates greater consistency in perceptions of course delivery and level of quality. The OC course shows a smaller SD than either of the other two comparison groups for each of the five years. Moreover, the trend is generally decreasing over time.

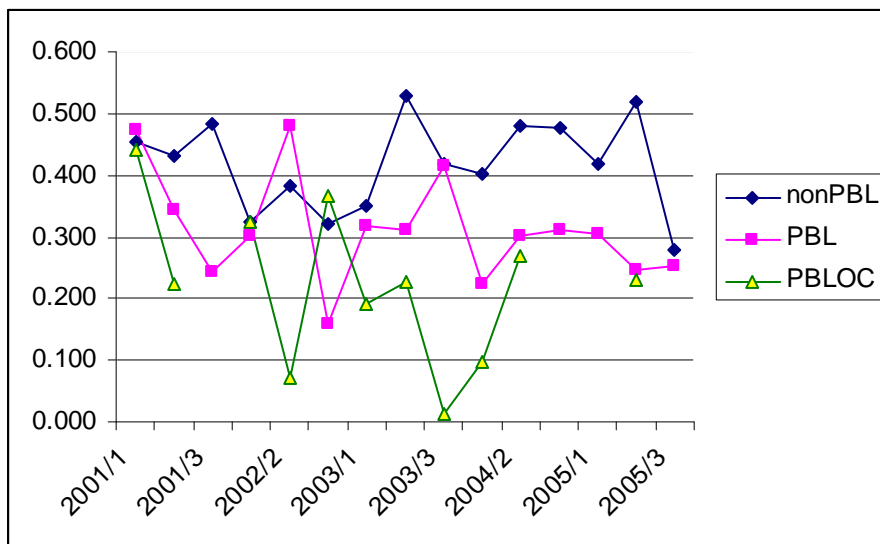


Figure 3: Standard Deviation of Course Effectiveness Ratings, 2001-2005

These descriptive statistics appear to show a positive trend with respect to the perceived effectiveness of the OC course module. Nonetheless, although the differences are quite consistent, they are relatively small in absolute terms. That is, the course effectiveness results across all courses in the College are quite strong.

This leads to two questions. First, are the differences noted in these trend analyses significant? Second, if they are statistically significant, what do they mean? We will address these questions as we proceed. Next we examine each of the hypotheses. The relevant data on which these analyses are based are included in Table 4 below.

Hypothesis	#1: Course Effectiveness		#2: Active Learning		#3: Collaborative Learning		#1: Content Practical	
	Non-PBL	OC	Non-PBL	OC	Non-PBL	OC	Non-PBL	OC
Mean	3.896	4.062	3.935	4.174	3.858	4.108	3.945	4.116
Variance	0.200	0.078	0.202	0.111	0.179	0.092	0.187	0.101
Total Class Sections	987.000	50	987	50	987	50	987	50
Hypothesized Mean Difference	0.000		0.000		0.000		0.000	
df	63.000		58.000		59.000		59.000	
t Stat	-3.964		-4.840		-5.546		-3.625	
P(T<=t) one-tailed	0.000	*sig	0.000	*sig	0.000	*sig	0.000	*sig
t Critical one-tailed	1.669		1.672		1.671		1.671	
P(T<=t) two-tailed	0.000		0.000		0.000		0.001	
t Critical two-tailed	1.998		2.002		2.001		2.001	

Table 4: *t-Test of Hypotheses*

Hypothesis #1. This stated that *the Course Effectiveness Ratings of the Leading Organizational Change course will not be significantly different from the ratings of other*

*Non-PBL courses in the College.* The t-Test used in all of the following analyses was a two-Sample test that assumes unequal variances between the OC and Non-PBL courses. The results of the t-Test in Table 4 indicate statistically significant differences in the perceived *course effectiveness* at a level that allows us to reject the null hypothesis. The OC module is perceived to be highly effective when compared to all other Non-PBL courses taught in the College during this period.

Hypothesis #2. This stated that the *student ratings of the Leading Organizational Change course will not be significantly different from the ratings of other Non-PBL courses on the extent to which the course creates an active learning environment.* The results of the t-Test comparing the OC module with other Non-PBL courses in Table 4 indicate statistically significant differences in the perceived *course effectiveness* at a level that allows us to reject the null hypothesis. The OC module does appear to create a more active learning environment than other courses using various teaching methodologies.

Hypothesis #3. This stated that *the student ratings of the Leading Organizational Change course will not be significantly different from the ratings of other Non-PBL courses on the extent to which the course encourages students to learn from each other.* The results of the t-Test comparing the OC module with other Non-PBL courses in Table 4 indicate statistically significant differences in the extent to which the OC module encourages students to learn from each other at a level that allows us to reject the null hypothesis. The OC module does appear to create a more collaborative environment for learning than other courses using various teaching methodologies.

Hypothesis #4. This stated that *the student ratings of the Leading Organizational Change course will not be significantly different from the ratings of other Non-PBL courses on the extent to which the course makes the course content practical*. The results of the t-Test comparing the OC module with other Non-PBL courses appear in Table 4. These indicate statistically significant differences in the extent to which the OC module makes the content of the subject practical. These results allow us to reject the null hypothesis. The OC module does appear to allow students to see the practical consequences of learning how to lead change.

#### Qualitative Results

As noted above, the College collects anecdotal responses from students every term on summative evaluation forms and formative talk-back sheets. These allow us to monitor student response and provide valuable ideas for improvement. The overall trend of comments on this module has been consistently positive. Examples taken from the most recent term's talk-back sheets include:

- I feel that studying a Master degree should be practical, not only theory. This course links all theory and concepts to the practical application.
- I really like the simulation. It's a great tool to help us understand theory and at the same time we can try the wrong choice (trial and error) to see the next result (what will happen). Better to make mistakes here than at work.

- I learned a lot but it's not easy to learn the module and finish everything required in time as well as write the exam. But I'm proud that I've completed a very worthwhile course.
- Nothing to improve the course; it's quite perfect. Just make it longer because it's fun.
- The class has improved my thinking and enabled me to analyze cause and effect relationships in different situations.
- Actually I only took this class because I couldn't get into the ones I really wanted. I thought I'd already learned about the topic in other courses. But now I'm so glad I took the class. I can apply so much of what we learned to my real life. It has also helped me develop a more open attitude about dealing with people.
- Short but sweet; In 6 intense weeks we understand more about changing organizations and the impact on people inside them. It is the most important thing for every course if we can apply what we learned. This course actually makes me eager to make use of what I learned in the real world.
- It was one that was unique and that I will cherish.

#### Discussion and Conclusions

Proponents of PBL assert that this mode of instruction creates a more active, collaborative and practically-focused learning environment. As discussed earlier in the paper, empirical studies, especially in the field of medical education, increasingly suggest that these characteristics of a problem-based learning environment are associated with desirable learning outcomes.<sup>18</sup> However, similar empirical research in management education is notable by its scarcity.

The paper has presented a variety of quantitative and qualitative results designed to address the two main research questions. The first question concerned the perceived effectiveness of the PBL module, *Leading Organizational Change*. The second concerned the extent to which the PBL module created a more active, collaborative, practically-focused learning environment.

### Perceived Effectiveness of *Learning to Lead Organizational Change*

The analysis of data collected from students over a five-year period yielded the following findings.

- The PBL module, which was taught a total of 50 times between 2001 and 2005, achieved a consistently high evaluation from the Master degree students on overall course effectiveness over the entire five-year period.
- The module received a mean rating on overall course effectiveness that was significantly higher than the mean of other Non-PBL and other PBL courses in the Master degree curriculum at a statistical level of less than .001.
- There was less variance in the rating of this module when compared with other Non-PBL and other PBL courses in the Master degree curriculum.
- Student open-ended feedback on the module was similarly consistent in a positive direction.

These findings suggest that students have found the module an effective way of learning to lead organizational change.

At the same time, we must keep in mind that while student perceptions are important, they represent an incomplete picture when assessing instructional effectiveness. Several limitations warrant mention.

- The research design was non-experimental, limiting our ability to identify clear cause and effect relationships.
- The comparison group for the study – Non-PBL courses – included many different types of instructional methodologies applied to different subjects. This was not a clean comparison of a two different treatments.
- The study did not examine the learning outcomes in a pre-post approach to determine the extent of student gains learning in the course.

- The study did not examine the transfer of knowledge to the actual management practice of leading change.

### Perceptions of the Learning Environment

The second research question focused on the extent to which the PBL module created a more active, collaborative, practically-focused learning environment. Even in the absence of learning outcome or knowledge transfer data, this question is important in the light of recent critiques of management education. These critiques have decried the modal learning approaches used in business schools and called for the use of more active, practically-focused learning methods.

We note that this is even true at the Harvard Business School (HBS), the world's leading proponent of case teaching. Even the HBS has accepted the need for significant adaptations to the basic approach to case teaching. In recent years, training programs in case teaching at the HBS have sought to make this approach more learner-focused and learner-directed.

This study compared the PBL module, *Learning to Lead Organizational Change*, with other Non-PBL courses in the College in order to assess the extent to which it created a more active, collaborative, practically-focused learning environment. The data confirmed that the *Learning to Lead Organizational Change* module created a more active, collaborative, practically-focused learning environment. The null hypotheses related to these questions were rejected at a significance level of .0001. Although the data were not reported in this paper, we would also mention that t-tests comparing Other PBL Courses with Non-PBL Courses yielded similar results in the same direction.

These results lead us to a reasonably firm conclusion. Even in a management school in which active teaching is encouraged and teaching excellence is stressed and rewarded, the *Learning to Lead Organizational Change* appears to be highly effective at creating the type of learning environment advocated for management schools of today.

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- <sup>4</sup> Hallinger, P., & Bridges. (In press). *Preparing managers for action: A problem-based approach to management education*. Dordrecht, Netherlands: Springer.
- <sup>5</sup> Colliver, *op. cit.* Copland, M. (2000). Problem-based learning and prospective principals' problem-framing ability. *Educational Administration Quarterly*, 36(4), 585-607. Gijbels et al., *op. cit.*
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- <sup>7</sup> See Copland, *op.cit.* for a notable exception
- <sup>8</sup> Drucker, *op. cit.*, Kotter, J. (1996). *Leading change*. Boston: Harvard Business School Press.
- <sup>9</sup> See Naisbitt, J. (1997). *Megatrends Asia*. London: Nicholas Brealey.; Ohmae, K. (1995). *The end of the nation state: The rise of regional economies*. New York: Free Press.; Rohwer, J. (1996). *Asia rising*. London: Nicholas Brealey Publishing.
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