

A COURSE PLANNING METHOD TO INCORPORATE COLLABORATIVE LEARNING IN INFORMATION SYSTEMS COURSES

James A. Spruell

Dept. of Computer & Office Information Systems
College of Business Administration
Central Missouri State University
Warrensburg, MO 64093-5073

Louis A. Le Blanc

Department of Management
University of Arkansas at Little Rock
College of Business Administration
2801 South University
Little Rock, Arkansas 72204-1099

ABSTRACT: Numerous researchers have investigated the relative merits of passive versus active learning. The research methodology, situation and approaches have varied. But the general consensus is that students comprehend and retain more material when actively involved in learning. The lecture process unfortunately places the students in a passive role and may limit their intellectual growth.

Collaborative learning concepts provide a powerful strategy for enhancing MIS instruction by making learning active. The small group is a versatile organization that can be used to assist the student grasp material and then transform it into experience.

This paper presents a planning process to enable MIS faculty to incorporate collaborative learning activities in their courses. A limited portfolio of collaborative learning activities are described along with possible evaluation techniques.

KEYWORDS: Collaborative Learning, Course Planning, Student Evaluation

INTRODUCTION

Collaborative learning concepts provide a powerful strategy for enhancing management information systems (MIS) instruction by making learning active. The small group is a versatile tool that helps the student grasp material and transform it into experience. A reasonable goal for a well designed course is to incorporate small group activities that involve the learner in each of the four learning styles described by Kolb (1 & 7). This format allows students to grapple with information through direct experience (1st style) and abstract

conceptualizing (2nd style), as well as by applying what they learn through actively experimenting (3rd style) and reflecting upon their experience (fourth style). Learners are placed in a position that fosters the growth and helps them master the material (10).

The group setting also extends the student's education to include a collaborative skill set (2,3,12). Developing interpersonal competence along with the mastery of subject content and intellectual skill development is particularly relevant for the MIS student. Couger and Zawacki

(4) and Couger and McIntyre (5) have demonstrated that often information systems professionals have a very low "social need strength" contrasted with a high "growth need strength." Simply stated, many MIS professionals do not have a strong desire to interact socially while possessing a high need for achievement. The industry demand for MIS professionals that have the ability to communicate and interact as a team while possessing the essential technical and business skills is acute. Collaborative learning is a vehicle that redirects a student's focus from

individual development to one of group effort. Collaborative learning is based upon teamwork, social interaction, and a community orientation. This behavioral foundation complements the technical and business education of the MIS student.

Instructional designs that incorporate collaborative activities require a considerable planning effort on the part of MIS faculty. Collaborative learning concepts are widely used in the behavioral and communication disciplines and provide a solid body of knowledge and experience. For many MIS instructors, their background is often a traditional lecture setting with little exposure to collaborative learning concepts.

The goal of this paper is to provide a methodology to guide the MIS instructor that is using collaborative learning concepts for the first time. A significant section of the paper is also devoted to identifying and discussing potential collaborative learning techniques for an MIS course.

INTEGRATING COLLABORATIVE LEARNING WITH COURSE PLANNING

Instructional designs that incorporate collaborative activity can be formulated in a three step process. There needs to be an accurate statement of learning objectives, evaluation techniques, and learning activities. The learning activities bridge learning objectives with evaluation techniques, as described in Figure 1 below.

The process begins with a statement of the learning objectives, followed by the selection of the evaluation techniques, and concluded with the learning activities linking the objectives and evaluation.

This course planning process can best be illustrated by a recent example at a mid-south university. The faculty member had decided to implement several major changes to an introductory class in MIS. The changes were designed to minimize lecture as a teaching strategy and emphasize collaborative learning activities.

IDENTIFYING LEARNING OBJECTIVES

The most important step in course planning is to accurately define the learning objectives. Often, faculty have difficulty in discerning between learning objectives, outcome measures, and competencies. It is beyond the scope of this paper to elaborate on the differences. However faculty should form a clear picture of what they desire students to achieve in their course(s). The learning objectives should include content to be emphasized and the intellectual and collaborative skills to be fostered, as well as the outcome measures to be employed.

Table 1 identifies the learning objectives for the above noted MIS course example. The learning objectives are stated first at the macro level and later refined at a detailed level. This particular course is intended for management generalists and not MIS majors.

Table 1: Learning Objectives for an MIS Course

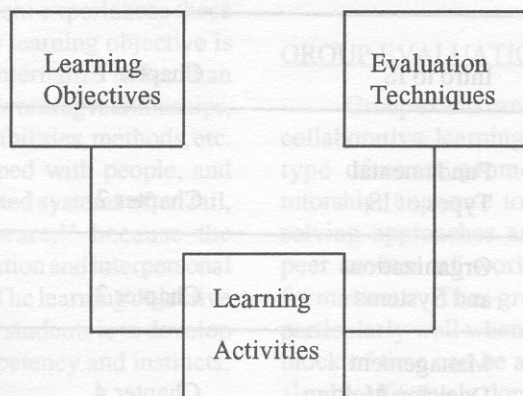
1. Comprehend the basic components of computers and computerized information systems.
2. Understand the development and use of information systems in organizations.
3. Learn five fundamental types of information systems.
4. Know the relationship between information systems and organizational level and understand their role in management and decision making.
5. Understand the goals and applications of personal, workgroup and organizational information systems, their components, and the proper role for business professionals in their development.

Each macro level objective can be subdivided at the micro level to identify the specifics and outcome/performance levels to be achieved. For example, the first objective was to have the student comprehend the basic components of computers. Refinement at the micro level would outline the computer components to be covered stated as an appropriate outcome measures. For example, a micro objective/outcome is to have the student be able to distinguish between operating systems (OS) and applications software, and identify five utility features of a commercial OS software package.

EVALUATION TECHNIQUES

The instructor should be readily able to determine whether the learning objectives have been met in a MIS course. A number of appraisal techniques are available, including subjective and objective exams, term papers, projects, case assignments, etc. Performance appraisal can be either individual or group efforts. Evaluation techniques that cause the student to reflect upon experience or draw abstract conclusions can engage the student across the range of Kolb's (1984) learning styles. The advantage of this approach is to

Figure 1: Linking Objectives and Evaluation Techniques with Learning Activities



make student assessment not only a feedback mechanism but also a learning activity.

The matrix of Figure 2 coordinates the macro learning objectives (rows) with the evaluation techniques (columns) for the example MIS course. Any learning objective can be evaluated by more than one appraisal method. The percentages in parentheses underneath the column headings give the relative weight for each evaluation technique as a proportion of the final grade.

The detailed learning objectives were combined to make the five rows in the sample matrix. If needed, each specific learning objective could be listed and related to an evaluation technique. In the sample matrix, the exams and term paper are individual appraisals and collectively account for 60 percent of a student's final grade in the course. The case assignments and project are small group assignments and together comprise 40 percent of the course grade.

LINKING LEARNING OBJECTIVES AND EVALUATION TECHNIQUES

The initial learning objective (i.e., computer technology) in the matrix relates to the first stated learning objectives for the revamped MIS course, which is a graduate level introductory course. This computer technology component was designated to be handled outside of class time, since this material is undergraduate (i.e., sophomore) level material and many of today's graduate students in business and related disciplines are already very familiar with it. But since there can be considerable variance in the knowledge of computer technology by students usually enrolled in such a course, it was decided that a separate module to be completed very early in the semester would be employed to meet this learning objective. This module, in effect, would be a prerequisite for the last three learning objectives listed in the matrix.

For the first learning objective (i.e., mastery of computer technology), the learning activity was a self-paced, individually-based approach. Hypertext was considered, but such learning materials

Figure 2: Relating Learning Objectives with Evaluation Techniques

	Objective Exam (.15)	Essay Exam (.25)	Paper (.20)	Cases (.20)	Project (.20)
Computer Technology	X				
MIS Foundations			X	X	
Personal Systems		X		X	X
Workgroup Systems		X		X	X
Organizational Systems		X		X	

were not commercially available. A computer concepts text with course notes and study guide was selected. With this learning objective, the learning activity was for each student to study the text material with the assistance of two ancillaries. The evaluation technique was an objective style exam.

The learning activities for the remaining learning activities are designed to consume the majority of class time for the semester. It is here that significant

collaborative learning activities would be implemented. The next element of the course planning process was to construct a course calendar by individual class period. Figure 3 illustrates an abbreviated course calendar of limited duration to demonstrate the coordination of learning objectives, evaluation techniques and learning activities.

The abbreviated course calendar relates the details of the second learning objective (i.e., MIS Foundations) and daily

Figure 3: Abbreviated Course Schedule with Collaborative Learning Activities

Class Meeting	Topic	Reading Assignment	Learning Activity
1	Intro to IS	Chapter 1	Role Play Mini-Case
2	Fundamental Types of IS	Chapter 2	Spreadsheet & Database Assignments
3	Organizations and Systems	Chapter 3	Lecture Homework
4	Management Decision Making	Chapter 4	Case Study

learning activities. The planning matrix (Figure 2) indicated that the "MIS Foundations" component of the course would be evaluated by a paper (individual effort) and a written case assignment (group activity). Class activities are collaborative, with the exception of one lecture. Each class activity is designed to prepare students to perform well on the term paper and the case analysis. It is assumed that if students score high in on the course evaluations they will also perform well in related real world tasks.

The entire course is planned in this manner. Each macro objective was expressed in enough detail to cover 30 class meetings (e.g., a 15 week semester with two class meetings per week). Every class meeting was planned to relate each learning objective and its evaluation technique through the learning activity.

TOPOLOGY OF LEARNING ACTIVITIES

MIS Faculty can utilize a wide variety of collaborative learning activities and Student Team Learning (STL) variations (12). The following are just a few examples of such activities that can be employed in an MIS course, either graduate or undergraduate.

ROLE PLAYING

Role plays are particularly useful in covering material that may be abstract for the student. The advantage of the role play is that the instructor does not tell the student about the frustrations that end users experience with work changes, the annoyances and intrusions into their work, ethics, etc. The student experiences these feelings. Part of the learning objective is for the students to internalize rather than intellectualize about working relationships, professional responsibilities, methods, etc. Systems are developed with people, and Lucas (8) has suggested systems often fail, or become "shelfware," because the analyst's communication and interpersonal skills were lacking. The learning objective of role plays for MIS students is to develop and internalize competency and instincts.

SHORT CASES

Mini-cases, approximately one page in length, are useful for introducing topics, strengthening critical thinking, and developing student interest. Short cases can relate the most mundane aspects of MIS concepts to interesting, real world situations. The one-page format of the mini-case allows the instructor to cover the case scenario within a single lecture period and without the lengthy preparation usually required of longer case studies. Students debating points of the MIS case can provide lively and interesting class sessions.

One of the most serious mistakes that an instructor can make is to completely adopt a teaching strategy with which they are not comfortable and familiar.

A Socratic approach can encourage and promote critical analysis by students. In this approach, groups of students examine two or three pertinent questions about the mini-case. In round robin fashion, the instructor draws conclusions from each group on each question and writes the responses on the board without comment. (Comments by an instructor at this stage often hinder student response). After all comments have been made, the class then critiques the responses. The critique of a response is then separated from the student who made the response, reducing the risk of embarrassment. This approach is particularly useful for very difficult or sensitive material.

GROUP EVALUATION

Group exams can provide an effective collaborative learning experience. This type of exam promotes tutoring and tutorship, exposure to different problem solving approaches and points of view, peer review of work, and aids group formation. The group exam works particularly well when a two to three hour block of time can be allocated, but it can also be effectively done within a one hour

class or as a take home exam.

SHORT ASSIGNMENTS

Mini-assignments provide an avenue for reinforcing task-oriented topics such as data flow diagramming, flowcharting, Gantt charts, PERT, etc. After introducing the material, the class is divided into groups (either permanent or ad hoc) and given a problem requiring ten to 15 minutes to complete. The advantage to this approach is that enhanced collaborative learning is combined with immediate use of the new material, reducing the time between concept and practice. Students tend to perform significantly better on material covered in this fashion upon evaluation.

MAJOR PROJECTS

Assigning a group of MIS students to a topic investigation or to conduct a system project provides a sense of real world experience in a classroom setting. The effect is enhanced when the topic investigated (or project undertaken) includes elements of the information system in the corporate setting. The process of interviewing company officials, analyzing data, and working with end-users allows the student to apply and reflect upon what they have learned. Professional growth is fostered as the MIS student begins to build confidence in their own capabilities and judgment (10).

CRITICAL FACTORS FOR IMPLEMENTING COLLABORATIVE LEARNING

As with any activity, there are several most important elements that are critical to achieving a stated objective. Rockart (11) initiated the term "critical success factors" to high performance. And there are several critical factors for the re-design or initial planning of an MIS course. Implementing collaborative learning components in an MIS course requires a considerable investment in preparation time for an instructor and includes some risk or chance of failure. MIS faculty should be willing to experiment (i.e., have a bias for action), but they can also minimize any risk by observing a few important considerations.

One of the most serious mistakes that an instructor can make is to completely adopt a teaching strategy with which they are not comfortable and familiar. Students intuitively sense when an instructor feels awkward, and this may reinforce their uneasiness in a non-traditional setting.

The rewards of using a non-lecture approach are enormous, but must be approached with a realistic assessment of your own teaching style and a gradual, calculated incorporation of any new techniques into your class presentations. The aim of this paper is to present MIS instructors with some tools and supporting ideas so that they may adopt one or more collaborative learning techniques comfortably within their own teaching style.

The learning objectives of the MIS course need to be carefully explained to the students. Why you are using a non-lecture format, what you are trying to accomplish, and what will be expected of students is essential information to be conveyed to the class. It is also advisable to discuss with students the work load of the course, expected behavior within groups, and the manner in which the grade will be determined. Establishing these policies are particularly important for someone employing these collaborative learning techniques for the first time. Students often are not familiar with the non-lecture format and may feel threatened. As an MIS faculty's expertise grows with collaborative learning techniques, students will correspondingly feel more at ease.

If it incorporates collaborative learning activities, the MIS course should also be structured to foster the rapid development of group activities and enhanced personal interaction. Group dynamics and feedback is emphasized throughout the course as the group activities take place. The critical factor is that the instructor must be committed to the principle that the study of MIS in this course is a team effort, and the instructor should convey that message to the students. The collaborative concept is one that the student might know intellectually, but has rarely internalized.

Desirable collaborative activities can be fostered by applying a few simple rules. At most, the groups should be composed of four to five members who should retain as much control over the group as possible. The group, however, should not be allowed to choose its own members. As selected by the instructor, a diverse background of members will broaden the educational experience. Peer evaluations are essential, and may be structured or guided by "shadow" leadership to sensitize group

The aim of this paper is to present MIS instructors with some tools and supporting ideas so that they may adopt one or more collaborative learning techniques comfortably within their own teaching style.

members to functional group roles and processes. Fostering a spirit of competition between groups can facilitate goal setting, a sense of comradeship and accomplishment. A competitive atmosphere, however, is more effective when balanced with a perspective of cooperative learning, both within and between groups (9).

Establishing an expectation of high academic performance and quality work from the students is essential to group dynamics. The instructor must be very clear on the quality required, and that professional work is the norm. The group setting can generate work that is far superior to any individual effort. The team should promote peer review of course work and hopefully considerable tutoring. The weaker student receives the benefit of role models and individual instruction (e.g., many groups turn into study groups). The tutor receives the same benefit that instructors enjoy (i.e., enhanced learning). Learning within the collaborative setting is highly interactive and effective.

One successful approach to enhancing student achievement is to clearly

establish group goals while retaining individual accountability with equal opportunity for all team members. Simply stated, reward the groups based upon individual learning by all members (12). Establishing group rewards is fairly straightforward. Maintaining individual accountability is fostered by awarding bonus points when all members of the group (a) achieve a stated goal (e.g., passing a proficiency exam), (b) improve each member's performance over a pre-measured score (e.g., lowering your golf handicap), and (c) through peer evaluations. High achievers should be rewarded for taking the time to provide explanations to lower achievers (12). Sometimes, high achievers are tempted to wrestle control of the group away from others to do the work themselves. By focusing the group's attention on learning something as a team (options a & b above) or rewarding effective listening and coaching through peer evaluations can reduce problem behavior.

CONCLUSION

With this planning method, MIS instructors can plan and design their courses to emphasize whichever teaching style, or combination of styles, that they desire. In the MIS course example given in this paper, the instructor's goal was to minimize lecture and substitute collaborative learning activities. With such a detailed course planning method, the goal was easily realized.

To facilitate the implementation of collaborative learning activities in their courses, MIS faculty should develop a portfolio of such activities. With an inventory of collaborative learning models, the MIS instructor then can focus his/her attention on linking learning objectives with evaluation techniques through the collaborative learning process.

REFERENCES

1. Atkinson, G., "Kolb's Learning Style Inventory: a Practitioner's Perspective," Measurement and Evaluation in Counseling and Development, January 1991, pp. 149-161.

2. Beckman, M., "Collaborative Learning: Preparation for the Workplace and Democracy?" College Teaching, Fall 1990, pp. 128-133.
3. Butler, & A. Kedar, "Effects of Intergroup Competition & School Philosophy on Student Perceptions, Group Processes, and Performance," Contemporary Educational Psychology, October 1990, pp. 301-318.
4. Couger, D. J. and R. A. Zawacki, "What Motivates DP Professionals?" Datamation, September 1978, pp. 116-123.
5. Couger, D. J. and S. C. McIntyre, "Motivation Norms of Knowledge Engineers Compared to Those of Software Engineers," Journal of Management Information Systems, Winter 1987-1988, pp. 82-93.
6. Dick, W. and L. Carey, The Systematic Design of Instruction, Scott, Foresman and Company, Glenview, IL, 1985.
7. Kolb, D., Experiential Learning: Experience as the Source of Learning and Development, Prentice-Hall, Englewood Cliffs, NJ, 1984.
8. Lucas, H. C., The Analysis, Design, and Implementation of Information Systems, McGraw-Hill, New York, NY, 1985.
9. Manarino-Leggett & P. A. Solomon, "Cooperation vs Competition: Techniques for Keeping Your Classroom Alive But Not Endangered," Reading Improvement, Winter 1990, pp. 276-281.
10. Murrell, P. H. and C. S. Claxton, "Experiential Learning Theory as a Guide for Effective Teaching," Counselor Education and Supervision, September 1987, pp. 6-9.
11. Rockart, J. F., "Chief Executives Define Their Own Data Needs," Harvard Business Review, March 1977, pp. 81-92.
12. Slavin, R. E., "Synthesis of Research on Cooperative Learning," Educational Leadership, February 1991, pp. 71-77.

AUTHORS' BIOGRAPHIES

Louis A. Le Blanc is Professor of Computer Information Systems in the Department of Management, College of Business Administration, University of Arkansas at Little Rock. Prior to that, he was on the faculty at Indiana University - Bloomington. A native of Houston (TX), Le Blanc is of French Canadian (Cajun) ancestry. After receiving BS and MA degrees from the University of Houston - University Park and the Ph.D. from Texas A & M University, Professor Le Blanc completed post-doctoral study in management information systems at the University of Minnesota's Graduate School of Management and at Indiana University's Graduate School of Business. Professor Le Blanc has recently contributed articles to the MIS Quarterly, Information & Management, Expert Systems With Applications, the Transportation Journal, and Evaluation Review. His research interests include software evaluation and selection as well as the performance appraisal of information technology. He has been employed by AT&T Technologies as a manufacturing systems consultant and served as a Faculty Resident with Andersen Consulting.

James A. Spruell is an Associate Professor of Computer & Office Information Systems at Central Missouri State University and is a former chair of the Department. He received his MBA & Ph.D. degrees from the University of Oklahoma prior to coming to CMSU in 1986. Since that time he has been active in consulting and research in Expert Systems, Local Area Networks, and collaborative learning.



STATEMENT OF PEER REVIEW INTEGRITY

All papers published in the Journal of Information Systems Education have undergone rigorous peer review. This includes an initial editor screening and double-blind refereeing by three or more expert referees.

Copyright ©1992 by the Information Systems & Computing Academic Professionals, Inc. (ISCAP). Permission to make digital or hard copies of all or part of this journal for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial use. All copies must bear this notice and full citation. Permission from the Editor is required to post to servers, redistribute to lists, or utilize in a for-profit or commercial use. Permission requests should be sent to the Editor-in-Chief, Journal of Information Systems Education, editor@jise.org.

ISSN 1055-3096