Addressing the Challenges of the Future:

Implementing a Collaborative Student Environment

at a

University Business School

Gail Corbitt
Professor of Management Information Systems
California State University, Chico

Lauren Wright
Associate Professor of Marketing
California State University, Chico

Ben Martz
Associate Professor of Management Information Systems
California State University, Chico

Abstract: Business schools have recently been criticized for failing to address the changing needs of American companies. One of the main areas of concern has been producing graduates who have skills in teamwork. This paper relates one set of activities undertaken by the authors at a business school in order to address this issue. While the findings are experiential, they do hint at serious questions for future formal research.

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Introduction

Recently, firms have discovered that their employees are not adept at handling the demands of an increasingly fast-paced, diverse global environment. The ability to work in groups, the capacity to integrate knowledge across several functional areas and "the ability to maintain productive user/client relationships" (Trauth, Farwell and Lee 1993) are skills that students in the 1990s must have in order to meet the needs of prospective employers. Since all of these skills relate to the ability to work effectively in teams, software tools and environments which support groups and teams are playing an increasingly important role in business school curricula.

In addition to this external pressure, business schools must respond to the internal demand to include creativity (Couger 1996) and to change its education delivery paradigm (Barr & Tagg 1995). Couger's summary of the report, "*IS '95: Model Curriculum and Guidelines for Undergraduate Programs in Information Systems*," notes the explicit recommendation to include the topic of creativity and innovation in a business school curriculum. Barr and Tagg discuss the gap between academia's "espoused theory" and academia's "theory in use." Methods must be found to place students in a combination of "real world - like," learning, work group environments.

One such solution is a Collaborative Student Environment (CSE). We define a CSE as a computer-augmented, group-oriented, student-based, learning environment. As a learning environment, a CSE contains structured interactions between students and students in addition to the traditional student and teacher interactions. For our purposes, the conceptual basis for the learning environment portion of a CSE may be found in Chickering and Gamson's "*Principles for Good Practice in Undergraduate Education*" and the AAHE's "*What Research Says About Improving Undergraduate Education*." Specifically, these papers point to a list of characteristics for quality instruction including; active learning, assessment and prompt feedback, collaboration and integrating education with experience.

One fundamental component added to a learning environment to create a CSE is the use an Electronic Meeting Systems (EMS) or Group Decision Support System (GDSS). These two terms are among those which refer to software designed to enhance the productivity of groups. The software system used in Chico State's CSE is GroupSystems, a set of software tools developed to help support groups in problem solving areas such as; idea generation, idea organization, selection, multiple criteria analysis, structured debate, surveys, group writing and conflict resolution. The cases presented here span several years and therefore, versions of GroupSystems software; not all software tools existed in all versions of the software. We refer those readers wishing to know more about the working of tools referred to in this paper to Ventana Corporation's Internet homepage at www.ventana.com.

The CSE setting provides some interesting alternatives for addressing the challenges associated with the environmental demands placed on business schools by the increasingly complex external business and internal academic environments noted. We

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believe students who have the opportunity to use this state-of-the-art technology to complete group assignments and to enhance the project team approach to learning leave the university better prepared to meet the needs of their future employers.

The objectives of this paper are to identify specific issues facing faculty and students in the current university environment, to describe both general and discipline-specific applications of a Collaborative Student Environment and to summarize the results of the use of a CSE at California State University, Chico.

Criticisms of Business School Curricula

In an American Assembly of Collegiate Schools of Business (AACSB) study (Porter & McKibben 1988), the AACSB surveyed both educators and employers and reported their findings regarding business schools and their graduates. The results indicated that there was too little emphasis in the following areas: people skills; communication skills; creative problem-solving; the importance of the external environment; the global aspects of business; and business ethics. Business schools were also criticized for focusing too heavily on quantitative analytical techniques. Another study, entitled *Five Years Out*, described the criticisms graduate students had of their MBA programs 5-10 years after graduation (Louis 1990). The results paralleled those of the AACSB study. Five years after graduation, more than half the MBAs felt that they lacked the necessary people skills for their current jobs. Two-thirds of the graduates believed that their business school backgrounds had not prepared them for the realities of working within an organization.

An additional indication that traditional business school curricula may be inadequate to prepare the employees of the future comes from a general report issued by the US Labor Secretary's Commission (1991). This report states that American citizens must have the following competencies to be prepared for the workplace of the future:

1) the ability to organize resources;
2) the ability to work with others;
3) the ability to acquire, evaluate and use information;
4) the ability to understand complex systems; and
5) the ability to work with a variety of technologies (including computers).

Even in disciplines where people skills may seem de-emphasized (e.g., Information Systems), prospective employers rank the need to maintain good user/client relationships first (Trauth, Farwell, and Lee 1993).

As final support of this dilemma, over the past five years, the CSU Chico MINS program has conducted focus group surveys of recruiters and managers in its industry council. The council includes companies varying in size, technology-emphasis, recruiting emphasis, etc. For example, Andersen Consulting, Chevron, Cisco, Fireman’s Fund Insurance Company, Foundation Health Systems, Hewlett-Packard, IBM, Intel and Visa International have all participated in these focus groups. Consistently, these recruiters and managers have rated teamwork in the top three characteristics important for a business school hire (Table 1).

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Table 1: Focus Group Survey Responses
(Desired Exit Skills in Graduates)

Top Five Exit Skills	Oct 93	Nov 94*	Apr 96	Apr 97**
Logical Approach to Problem Solving	1	2	7	n/a
Ability to Function in a Team Where Dependence is Required	2	3	1	2
Ability to Work with a Group	3		2	
Interpersonal & Communication Skills	4/5***	1	3 tie	1
Understanding System Development Life Cycle	6	4	3 tie	n/a
Self Motivation			5	n/a
Ability to Own a Problem and Solve it			6	n/a
Leadership Skills		5		3

* focus group was for graduate students only
** separated business skills from technical skills - rating is for business skills
*** identified as two different items in 93; only appeared once in 94, 96, 97

Many business schools have responded to the complaints and concerns by changing their programs to provide more active, experiential learning opportunities for their students (Greising 1989). This trend in business schools toward participatory, collaborative methods of instruction parallels a pervasive trend in higher education. By 1989, over 450 colleges and universities were using collaborative learning techniques (compared to approximately 100 schools in 1980). The changes may be in part a reaction to recent reports indicating that students must be actively involved and engaged to facilitate the learning process (Goodsell, Maher and Tinto 1992; Graham 1992; Johnson, Johnson and Smith 1991; Light 1992; Nicastro and Jones 1994). Instructors are now being encouraged to adopt new teaching methods. These techniques attempt to transform students from passive receptacles to be filled with knowledge by an expert instructor into involved participants who are helping to construct their own knowledge. Some of the active learning methods used most often in business schools include: case study discussions; cooperative learning projects; simulations; group exercises plus in-class discussion; and structured controversy (conflict resolution).

The trends toward active learning are not without problems, however. In general, the concerns center around the efficiency and effectiveness of collaborative group efforts within the class curriculum. While there is an obvious need to increase the number of group activities and to offer more opportunities for students to be actively engaged, the same barriers that plague team efforts in the workplace exist in the classroom as well. A number of authors have documented drawbacks to typical work group environments (Fox 1987; Nunamaker, et al. 1991; Shockley-Zalabak 1991). Drawbacks that relate most directly to the classroom situation include:

1) air fragmentation - or who gets to talk first and/or next (Nunamaker, et al. 1991);
2) interpersonal barriers like dominance, hidden agendas, conflicting goals among participants, socializing, free riding, etc. (Nunamaker, et al 1991; Shockley-Zalabak, 1991);
3) time-consuming activities related to getting all ideas out, offering all students the opportunity to talk, etc., all within a 50-75

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minute timeframe (Fox 1987);

4) fear of negative evaluation (by classmates or the teacher), which may inhibit some students (Nunamaker, et al. 1991).

Given the increasing emphasis on teamwork and the issues that can arise regarding group activities that are traditionally used in classrooms, the CSE provides an effective way for students to increase both their group-related learning and their in-class productivity.

General Applications Of CSE

For our purposes, a Collaborative Student Environment (CSE) is defined as computer-augmented, group-oriented, student-based, learning environment. This definition works to narrow the broad environment for our discussion. First, the environment is computer-augmented, meaning that computers are available for use but are not required in all situations. Second, the CSE is geared specifically toward supporting group work. Third, the individuals are students, not experienced group members or politicos. Finally, and most importantly, the CSE is a learning environment where it is not necessarily career-ending to make a mistake.

Specifically, the CSE described here is found within the College of Business at California State University, Chico. It includes a 16-person electronic meeting room, a break-out conference room, GroupSystems software, University-wide email system, listserve capability, five electronic classrooms and student-team oriented curriculum. This means that the application of the CSE is beyond a particular functional area (i.e., management, marketing or accounting) in this setting. There are many general, group-oriented, applications that can be used in any of these disciplines, including: electronic discussions; developing evaluation criteria; group writing activities; and conflict resolution.

Electronic Discussions

Class discussion is a teaching technique that is utilized in nearly all business school courses. Students discuss films, articles, books, lecture content and other discipline-specific topics. Typically the instructor has a list of questions that he or she poses to the class, to which various students respond. Typically, only the most prepared and/or the most outspoken students participate actively in the discussion. Unless the instructor is particularly skilled at drawing out the less vocal students, most class discussions are dominated by the same few students each time.

Electronic discussions help equalize the input (Benbasat and Lim, 1993; Gallupe et al.), since every student has the same opportunity to offer ideas, opinions or criticisms. Questions can be "tossed out" for the class to discuss via Electronic Brainstorming (EBS) or Topic Commenter (TC). EBS was designed around manual brainwriting methodologies from Osborn and Whiting (Osborn, 1953; Whiting, 1958). EBS is a very effective tool when one question is the focal point of discussion and where diverse opinions are likely to occur. This effectiveness is more pronounced when the topic lends itself to discussion or debate because the process provides a means to encapsulate a whole “stream” of thoughts

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produced by the group. On the other hand, if many questions need to be addressed that all relate to a similar topic (i.e., a case or anarticle), Topic Commenter may be the most appropriate choice. Here automated support can be found for manual methodologies such as 5-M, etc. (IBM, 1989) which allow for open-ended responses to a set of questions directed toward a theme.

The CSE adds strategically different characteristics, both benefits and drawbacks, to the student's learning environment. First, after starting the session, the instructor has the opportunity to become an anonymous participant. In this manner they may act as an unobtrusive catalyst in the discussion. Second, because all comments are anonymous, students cannot distinguish which comments come from the teacher and which are from fellow students. This attribute of electronic discussions has two supporting advantages: it equalizes input for all involved; and it discourages students from "talking" to impress the teacher when they may not actually have much to add to the discussion. Finally, one confounding drawback is the teacher is not aware of who participates most and has little way to assess individual students' preparation for the discussion.

Team Based Final Exams

One of the more interesting applications of the CSE is that of team-based final exams. In a team-based final exam, each student in a team of five or six is asked to complete an open ended discussion question. The questions are encoded into, and recorded by, the Topic Commenter tool in the GroupSystems software. Each student then opens the assigned question and responds. A second pass is initiated where each student opens a second question, reads the original student response and comments. Under the guidelines of the test, the second student may agree or disagree with the original answer, but must explain their new response. The final phase of the team- based exam asks the whole team to look at each set of original and secondary responses, and to discuss them verbally with the instructor.

Initial reactions to the team-based exams have been positive. Students get immediate feedback; not necessarily grades, but a reaction to their answers from instructors and peers. Students are provided multiple methods to communicate and relate their knowledge on a subject. The instructor now has three levels of student response by which to establish a grade: the classic historical response, a secondary critical response, and verbal interaction in the final phase. In this scenario, anonymity may be disabled if individual grades need to be assessed.

Developing Evaluation Criteria

Another use of the CSE with broad applications is student participation in determining course or project grading criteria. The list of criteria can be generated in tools like the GroupSystems V's Idea Organization (IO) or GroupSystems' Categorizer (CA) functionality. The comment section under each criterion is used to specify how each item can be measured and who is responsible for measurement. Once everyone understands what the criteria are and how they are assessed, students can vote on the number of points to be allocated to each item. Points can be allocated for an entire course or for a single project. For example, 100 points can be used if the evaluation criteria apply to the

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whole course. If points are to be allocated for a single project that is worth 25% of the course, then 25 points may be the maximum number allocated for the project. Usually more than one vote is required to reduce the criteria to a manageable set. One interesting observation is that students are often harder on themselves than the teacher. Students come up with more criteria than can be accomplished within the scope of the project or course which must be reduced. An initial yes/no vote can be taken on the criteria to determine which items on the list can be eliminated (or two votes via allocation can be used to achieve similar results - see Figure 1 for an example).

Peer Evaluation Criteria Development

Criteria for peer evaluation can also be developed with GroupSystems tools. For example, if 20 percent of the total course points are allocated to the group's performance as a whole, an additional 10 percent can be used to adjust the project grade for individual students based on peer evaluation. This adjustment is a way of recognizing that all students in a group may not participate equally and that some students in a group may have contributed substantially more than others. In this situation, students are asked to develop a list of peer evaluation criteria. Some examples of student-generated items include: willingness to participate; knowledge of the subject; actual time spent on group-related activities; ability to participate in grouprelated activities; and in-class presentation skills. Since students typically rate each other on these criteria, they also need to specify how performance on the criteria are measured and what percent of the total peer evaluation points each of the items is worth. This method of peer evaluation helps students be more accountable to each other and discourages students from trying to “witness" their way through a group project. For these reasons, peer evaluation should always be included in the grading criteria when group projects account for a percentage of the overall course grade. Students often push for including peer evaluation as part of a group project grade. They feel that this makes group members behave more responsibly and that the overall group grade is more fair because there is an adjustment for individual performance.

Peer Evaluation Process

One of the toughest aspects of a team-based environment, whether it is student or real-world based, is group member performance evaluations. Free-riders exist both in the real world and in the class environment. The CSE has been used to evaluate student teams. At the semester midpoint and again at the end of the semester, teams of students responded to a 17-item performance evaluation encoded in the Survey tool of GroupSystems. During the semester, team members were asked to evaluate each other and their team leader; one time using paper and pencil, and one time in an electronic environment. When compared, there was little difference in the aggregate and relative ratings given team members. No method significantly produced higher team member ratings than the other. The main difference between the methods lies in the satisfaction recorded by the team members. Seventy-two percent of the students indicate that, given the choice between manual and electronic reviews, they prefer electronic. This level of satisfaction seems based upon the anonymity characteristic of the software and speed of

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completing the review.

Team Project Definition

One of the common responses to the request for additional communication skills is to include group presentations on salient topics related to the course content. The compelling question, in a Collaborative Student Environment, is salient to whom. Old-fashioned teaching says let the instructor decide; new learning centered education says help the students decide. To this end, the CSE has been used to help the students develop a set of topics salient to the members of their class. The software facilitates the class members creating a list of pertinent topics which they want to have answered or addressed by the team presenting that topic. In the example from the capstone MIS class below, one team decided on the topic “Making Money on the Internet” and the class responded by entering related questions and suggestions for the presentation. One of the main criteria for grading the presentation was how well the presenting team covered the questions.

4. Making Money on the Internet

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How much money can actually be made?

Need good examples.

Is it possible with the current state of the internet

Who is making this money?

Is this for all businesses or a specific target audience?

Do consumers trust electronic commerce enough?

Has anyone seen INTERCASINO, internet gambling,  it is run out of Canada.
Talk about making big bucks.

Shouldn't the Internet remain free?
Aren't there commerce channels already in existence?

What problems are there now with unethical ways of making  money?

Big Government will choke power users, it will never happen.!

How would transactions be done on the Internet?  Is encryption safe?
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This interchange creates a better learning environment on several levels. First, the students have participated in identifying and choosing the topics of interest to the class. This helps the teams commit to their topic as they are aware of the stated interest by fellow students. Second, specific areas for teams to address are pin-pointed. This helps the teams prepare and target their presentation. Finally, the coverage (or lack) of the defined

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topic areas provides a measure for the instructor to evaluate the presentation based upon the class criteria.

Group Writing

Students in business courses are often required to turn in group papers or reports. The typical method of completing these written documents involves several steps. First, each group member is assigned responsibility for completing a different part of the paper. Each person then completes his or her part separately. Finally, someone synthesizes all the separate pieces of writing into a single document. While this process can produce a satisfactory end product, it is not truly a collaborative effort. Group members do not have the benefit of seeing what others are writing and responding to it as they work on their own parts, since each person is working in isolation. However, GroupSystems offers an alternative that allows groups to truly collaborate in completing written assignments. By setting the appropriate options, group members can work simultaneously on the same document. Although only one participant can work on a particular section of a document at a time, the section becomes available for others to view or edit as soon as that person is finished with the section. In this environment, group members can create a document together that reflects true collaborative work. (This tool is not just useful for student projects. It can be extremely beneficial to faculty who are co-authoring manuscripts. In fact, most of this paper was complied using this environment.)

Team Journal

Another type of group writing used in many disciplines is the team journal. For this activity, the instructor typically enters questions related to course content in a notebook that is kept in an accessible location (e.g., a specially designated place in the library). Throughout the semester, groups are responsible for reacting to the instructor’s questions and to the comments of other groups. They can also pose questions or raise issues of their own. When this technique is used, students become actively involved in exploring the course material. They also "teach" others the course material through their responses to other groups' journal entries. The team journal activity can be greatly enhanced by using Group Outliner, the hierarchical outlining function in GroupSystems that can be used to organize ideas into different categories. The instructor (or team members) can designate categories that correspond to separate questions or issues. New categories can be added at any time, and group members can easily access or respond to the comments in each category throughout the semester.

Conflict Resolution and Negotiation

One of the more interesting possibilities for using GroupSystems was proposed by a colleague in Political Science. After this person participated in a GroupSystems session, he asked if it was possible to create conflict and then use the tools to reach consensus. While we haven't tried this directly, we are designing an experiment to test the viability of GroupSystems as a conflict resolution tool in a simulated environment. This is an interesting challenge, since Group Decision Support Software, in general, is recognized as

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being better at enhancing idea generation than at facilitating the affinity process.

Discipline Specific Applications

Although a CSE has many general applications, it can also be utilized effectively for discipline-specific applications. For example, it has been used in marketing classes to analyze cases, to help develop advertising campaigns and to perform market research surveys. The CSE has been used most extensively in management information systems courses to date; some of these applications are described in more detail below.

Since the software use in the CSE was originally designed to support project teams in the systems development process, it is not surprising that the applications in the MIS (Management Information Systems) and POM (Production and Operations Management) areas seem limitless at times. Both graduate and undergraduate MIS students appreciate the opportunity to use the GroupSystems tools for "real world" applications. For example, the CSE allows students to use state-of-the-art Group Decision Support Systems technology to:

1) identify user requirements for system projects;
2) get participant input in developing Total Quality Management (TQM) strategies;
3) collect participant input in defining and evaluating current processes in the context of Business Process Redesign (BPR);
4) evaluate system alternatives;
5) develop data specifications for database projects; and
6) document process models in systems and BPR projects.

Student Response To GroupSystems

In all cases where GroupSystems has been used in the classroom, feedback from students has been positive. Talkative students do not have to agonize over whether they are speaking too much or dominating the conversation. Less outgoing students appreciate the chance to express their opinions more easily. Foreign students are able to communicate in a medium (“written conversation”) that is more comfortable than verbal conversation, since most of them have a better command of English in written form than in conversations (especially when their American counterparts speak with an accent or faster than normal).

Students also respond positively when they are able to establish their own grading standards and course content (as described above). With respect to formal grading standards, Figure 2 provides data for two separate terms of project grading criteria. Students in each of the two classes created their grading standards without any knowledge of previous grading criteria, yet the results were very similar. Nearly identical criteria and weights are developed by independent groups of students in the same class from one term to another. Thus, grading criteria remain fairly consistent from one term to the next. And since the students are usually harder on themselves than an instructor is, the grading criteria are usually comprehensive and complete.

Team-based exams have created a method for instructors to triangulate a grade for

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a student using the historical testing methodology of question and response, plus two additional methods of critical review and verbal discussion. The CSE produces a positive impact on the sensitive area of peer performance evaluations for teams. Students are more satisfied (72% preferred) with the speed and anonymity of electronic-based evaluations than with manual evaluations.

Limitations of The CSE

The implementation of a CSE does present some challenges for the classroom environment. For example, without removing the anonymity, it is more difficult to assess the input of individual students in discussions and writing activities. However, this issue can be minimized if anonymous, electronic activities are not used for all class discussions or writing activities and are not the only basis for a student's final grade.

Another problem arises occasionally when students take advantage of the fact that all input is anonymous and use the medium to make lewd, sexist or otherwise unprofessional comments. In practice, these comments are always openly discouraged by the facilitator and are eliminated from the final document that is distributed to classmates. This problem is more typical in brainstorming activities with younger, student participants and has rarely been an issue with upper-division undergraduates or graduate student groups.

Conclusion

Measuring the real effectiveness of the CSE described here is problematic. Clearly, from a research methodology perspective, McGrath’s “horns of the [research] dilemma” are exposed here at their sharpest. There are few controls and multiple confounds. Any conclusions are suspect, so the researchers are left with field study observations from which to derive conjectures and hypotheses for future exploration.

In additional to the author’s observations listed, there are “observations” made by the student and employer environments at aggregate levels. For example, external system measures, such as recruitment (16% increase in companies recruiting; 39% increase in job offers) and student starting salaries (MIS is 22% above non-MIS) both point to more employable students. Viewed as a system input, increasing student enrollment (up 300%) in options where the CSE is used, and from where these observations originate, indicate significant interest and response. All of these observations hint at some underlying factors which may be determined through conjectures.

Our conjectures include: One of the major benefits of the CSE, in the business school environment, may be its ability to modify the traditional curriculum to better meet student and employer needs. The capability of the software to allow simultaneous and anonymous input helps to create a dynamic environment where a greater amount of high-quality work can be completed than in a typical class period. Students are more involved in actively constructing knowledge and creating/evaluating their own learning experiences; thus, they have the opportunity to learn in a more interesting, engaging atmosphere. Since the emphasis is on team work, communication skills and creative problem-solving, students who have been in classes under the CSE should be significantly better prepared to meet the demands and expectations of their future employers than those who have been

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exposed only to the traditional classroom environment.

In summary, we believe that implementing the concepts underlying the student learning environment, and more specifically a Collaborative Student learning Environment, have helped address one of the major issues concerning business schools today – providing skilled students who can work in a team environment. Our support for this proposal is generated both with internal data and observations centered around student reported satisfaction with the peer review process and with external data and observations centered around aggregate positive input and output measures defined as program growth and employer perceived value, respectively. The need to explore the major factors contributing to this improvement are left to more formal examination of the conjectures established from these observations.

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Figure 1: Course Evaluation Criteria Based on Two Rounds of Voting by Allocation of 100 Points

Item	Mean	Sum of Points
First Vote:		
Exams	20.00	180
Class Discussion	15.00	135
Group Project	13.89	125
Individual Project	12.22	110
Project Presentation	10.56	95
Group Case Study	10.56	95
Report of Class Tours	9.44	85
Current Topic Presentation	5.56	50
Individual Case Study	2.78	25
Second Vote (after eliminating last 3 items and specifying exams):		
Final Exam	16.67	150
Midterm Exam	16.67	150
Individual Project	16.67	150
Group Project	16.11	145
Group Case Study	14.44	130
Class Discussion	12.22	110
Individual Presentation	7.22	65

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Figure 2: Two Terms of Project Grading Criteria Developed By Undergraduates In A System Development Practicum Class

Criterion	Percent-1st Term	Percent-2nd Term
Percent Complete	15	12
Actual Costs/Benefits	4	n/a
Quality of Report	14	16
Creativity of Solution	9	n/a
Logic of Solution	n/a	11
Completeness of Report	14	13
Class Presentation	14	9
User Satisfaction	15	14
User Documentation	9	9
Difficulty of Project	n/a	5
Individual Performance	6	11

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References

AAHE (1996). “What Research Says About Improving Undergraduate Education,” *AAHE Bulletin*, April 1996.

Barr, Robert B. and Tagg (1995). “From Teaching to Learning - A New Paradigm for Undergraduate Education,” *Change*, November/December, 13-25.

Benbasat, I. and Lim (1993). “The Effects of Group, Task, Context and Technolgy Variables on the Usefulness of Group Support Systems: A Meta Analysis of Experimental Studies,” Small Group Research, vol. 24, 4, p.340-462.

Chickering, Arthur W. and Gamson (1987). “Principles for Good Practice in Undergraduate Education,” *The Wingspread Journal*, Johnson Foundation, Inc. June 1987.

Couger, J. Daniel (1996), “ Creativity: Important Addition to National Joint Undergraduate I.S. Curriculum,” *Journal of Computer Information Systems*, p.39-41.

Fox, William A. (1987). *Effective Group Problem Solving.* San Francisco, CA: Josey-Bass Publishers.

Gallupe, R. B., Bastianutti and Cooper. “Unblocking Brainstorms*,” Journal of Applied Psychology*.

Goodsell, Anne, Maher and Tinto (1992). *Collaborative Learning: A Sourcebook for Higher Education.* University Park, PA: National Center on Postsecondary Teaching, Leaming and Assessment.

Graham, Ellen (1992). "Dewey Disciple." *Wall Street Journal,* September 11: Bl, B4.

Greising, D. (1989). "Chicago's B-School Goes Touchy-Feely." *Business Week,* November 27: 140.

IBM (1989). QIT Effectiveness Training Handbook, FSD Owego, New York.

Johnson, David W., Johnson and Smith (1991). *Active Learning: Cooperation in the College Classroom.* Edina, MN: Interaction Book Company.

Light, Richard (1992). *The Harvard Assessment Seminars: Second Report.* Cambridge, MA: Harvard University Press.

Louis, M.R. (1990). "The Gap in Management Education." *Selections: The Magazine of the Graduate Management Admissions Council,* Winter: 1-12.

Nicastro, Mary L. and Jones (1994). *Cooperative Learning Guide for Marketing Teaching Tips for Marketing Instructors.* Englewood Cliffs, N J: Prentice-Hall.

Nunamaker, J.F., Dennis, Valacich, Vogel and George (1991). "Electronic Meeting Systems to Support Group Work." *Communications of the ACM, 34,* (7): 40-61.

Osborn, Alex F. (1953). Applied Imagination, Charles Scribner’s and Sons, New York.

Porter, L.W. and McKibbin (1988). *Management Education and Development: Drift or Thrust into the 21st Century?* New York, NY: McGraw-Hill.

Shockley-Zalabak, Pamela (1991). *Fundamentals of Organizational Communication,* New York, NY: Longman Publishing.

Trauth, Eileen, Farwell and Lee (1993). '"The IS Expectation Gap: Industry Expectations Versus Academic Preparation." *MIS Quarterly,* Sept., p. 293-307.

U.S. Labor Secretary’s Commission (1991). Report from the *Secretary's Commission on Receiving Necessary Skills.* Washington. D.C.

Whiting, Charles S. (1958). Creative Thinking, Reinhold Publishing Co., New York.

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