Employing the "Partnering" Concept With Students Teams

Robert Martinazzi
University of Pittsburgh at Johnstown

ABSTRACT

In industry, team performance significantly impacts both the internal and external stakeholders. Consequently, teams must develop the ability to communicate effectively especially with other "partnering" teams working on the same project.

The purpose of this paper is to offer a model of a "partnership" or "partnering" experience for student teams in an academic setting. The model involves two teams becoming functionally interdependent upon each other in order to learn new course material. Each "partner" team receives separate instruction on different segments of course material. After the individual team instruction occurs each "partner" team is required to prepare and present, as a team, an instructional period on the material they learned to their other "partner" team.

The responsibility and accountability of each team for both learning and teaching culminates when testing occurs on the new course material. "Partner" teams are tested on what was taught to them by their other "partner" team and ***not*** on what they learned firsthand from the course instructor. Both "partner" teams receive the identical test score earned by each "partner" from their portion of the examination.

INTRODUCTION

One of the most challenging and rewarding aspects of teaching involves developing a learning environment which stimulates and motivates students to learn. Research indicates learning is greatly enhanced when students play an active part in the learning process. Employing student learning teams and having them experience a "partnering" model greatly expands the active participation of students on teams.

The model has student teams accepting direct responsibility for learning and teaching specific sections of a course. Shifting the team's role to "partner" and "teacher" creates a paradigm shift which heightens both individual and team awareness and opens them up to new levels of understanding and comprehension of course material. The interdependent nature of the model provides student teams with a unique experience similar to industry .

BACKGROUND

Teaching and lecturing are not necessarily synonymous. While it can be effective for certain kinds of learning, research shows that lecturing is not the best method for meeting higher cognitive objectives of education.[(1)] New methods of increasing the effectiveness of the classroom experience usually focus on some form of interactive learning. A recent paper surveying current teaching practices in Engineering Economics revealed that 57.1% of those

surveyed used some type of formal or informal "group" as part of their classes. The groups had students working together in labs, on term projects to include presentations, doing homework together, analyzing case studies, and working on spreadsheets. [2]

The "partnering" concept involves the next generation of team learning. It shifts the team's perspective from "team centered" learning to "partner centered" teaching. Teaching a subject is the best way to learn it thoroughly and "partnering" focuses on that reality. "Partnering" changes the team's behavior by increasing its receptivity to the course material for which they are subsequently held responsible and accountable to their "partner" teams when testing occurs.

CONCEPT DEVELOPMENT

On the first day of class students are introduced to the concept of student teams. "Partnering" is specifically discussed as a requirement for those choosing to be on teams. About one month after classes begin and the teams completed development of their mission, roles, and operating processes, the actual "partnering" experience occurs. In Engineering Economics the course material used involves "Present Worth" and "Capitalized Cost" methods of analysis. In Engineering Statics the topics are "Method of Joints" and "Method of Sections" for analyzing trusses.

Using the Engineering Economics class as a specific example, teams are designated as either Partner "A" or "B" for ease of identification. Partner team "A" comes to class and receives instruction from the professor on the "Present Worth" method of analysis. Partner team "B" does not attend this session. Partner team "A" then does the assigned homework, contacts the professor with any questions and clarifications of the material, prepares a lesson plan on "Present Worth", and schedules a time with Partner team "B" to deliver their instruction on the subject.

Partner team "B" then attends a class with the professor on another specific subject. As noted it is "Capitalized Cost" for Engineering Economics. Partner team "B" then follows a similar scenario for teaching Partner team "A" the material they learned.

When examinations are conducted, each partner team is tested on the material they learned, ***not directly from the professor,*** but rather from their partner team. The grade received by a partner team on their tested material is also assigned to their other partner team thereby linking the partnership from a performance perspective. This interdependent nature of learning and testing significantly helps students develop their interpersonal skills so essential for success in industry. Inherent in the "partnering" concept is the personal and team responsibility and accountability since they have a common destiny through grade sharing.

CONCEPT IN PRACTICE

The "partnering" concept was implemented in the Fall 97-1 term in both Engineering Economics and Engineering Statics. The Engineering Statics course is at the sophomore level and had a relatively small class size of fourteen (14) students. The Engineering Economics class is a junior level course and the class contained thirty five (35) students. Students in both classes came from

the Civil, Electrical, and Mechanical Engineering Technology Departments and the teams were constituted with students from all three disciplines.

CONCEPT EVALUATION

Students evaluated the "partnering" team concept at three different times. The first evaluation occurred after the initial partnering teaching experience and before the first examination. This evaluation assessed the team's ability to function in their new role as "teacher". The second analysis took place immediately after the examination. This effort tried to gauge the effects of the concept when the teams were under pressure to perform on an examination. The final appraisal took place at the end of the course providing a comparison with other teaching techniques employed throughout the semester. Initially nearly every team felt intimidated over the "partnering" team concept. As time passed, team confidence in the concept increased as did their self confidence in themselves as teachers. They equated this experience to the "real world" encounters they would have after graduation.

Table 1 shows the examination results for the first two problems on CDOPE-2 for Engineering Economics. Incidentally, CDOPE stands for "Clear Demonstration Of Professional Excellence" which is another name for "Examination". For the Fall 97-1 term the average test score for the "partnering" problem in Engineering Economics was 21.75 out of a possible score of 25. Table 2 contains the examination results for the "partnering" experience in Engineering Statics. The "partnering" teams had an average score of 24.50 for the problems on the Methods of Joints and Sections.

TABLE 1

Engineering Economics
CDOPE - 2
(Fall 97-1)

Team Name	**Partnering Problem Score**	**Problem Method**
Eco Warriors	25	Present Worth
Modern Day Robin Hoods	15	Capitalized Cost
Profit Seekers	25	Present Worth
3 - G's	19	Capitalized Cost
Outstanding Trio	25	Present Worth
Cash Flow	25	Capitalized Cost
Happy Gilmore	15	Present Worth
Pitt Engineers	25	Capitalized Cost
Average Problem Score	***21.75***	

TABLE 2
Engineering Statics
CDOPE - 3
(Fall 97-1)

Team Name	**Partnering Problem Score**	**Problem Method**
Developmental Engineers	23	Sections
Uncertainities	25	Joints
X-Force	25	Sections
Total Package	25	Joints
Average Problem Score	***24.50***	

CONCLUSIONS

"Partnering" with teams works but it must be used with discretion. Specifically, it cannot be used to cover difficult or complex course material. Using it provides a healthy change in the learning experience as identified by the students. Other successful elements of "partnering" coincide with the findings of other research on cooperative learning, namely:

- Students believe when one succeeds, all succeed.
- Face to face interaction supports student's efforts and motivates them to learn.
- When individual (team) responsibility and accountability are stressed, it (learning) is taken seriously by the students.
- Working together requires developing social skills such as leading, teaching reaching consensus, resolving conflict and communicating. [3]

"Partnering" affords students an opportunity to enhance their presentation skills. Student comments after the experience indicate they felt the time to prepare presentation outlines or lesson plans was well spent since this is what they expect to do in an industrial setting. A specific benefit to the Engineering Technology Division comes from the documented proof the experience provides. ABET mandates examples be presented to demonstrate compliance with their requirement for student competency in written and oral communications as specified in Section V.C.5.a. of the ABET Accreditation Criteria. This criteria specifically applies to Engineering and Engineering Technology courses and not just to those communications courses required of the students.

Recently this concept was specifically recognized by the ABET Accreditation Team as an innovative "team teaching" methodology which "will produce graduates who can communicate, demonstrate, and present more completely and effectively in the workplace". [4]

Overall, "partner" teams provides for a dynamic, motivating and interdependent learning environment simulating the actual work place. In addition to learning the required Engineering Economics or Engineering Statics course material, students gain invaluable insights and first hand experience on how to effectively interact with others, work toward common goals, earn trust and respect, and develop a reverence for other human beings. Together these elements form

the basis for experiencing "synergy" in an academic learning environment the result of which is directly transferable and highly sought after in industry.

REFERENCES

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ROBERT MARTINAZZI

Associate Professor of Mechanical Engineering Technology at the University of Pittsburgh at Johnstown, B.S. Aerospace Engineering from the University of Pittsburgh, M.S. Mechanical Engineering from Carnegie Mellon University. Registered professional engineer. Interest include engineering economics, management and leadership development. Worked as project engineer for Armstrong World Industries, does engineering management consulting work and presents seminars on effectiveness and leadership. Colonel (Ret) in United States Marine Corps Reserves.