TEAM-BASED LEARNING:
PROMOTING CLASSROOM COLLABORATION

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ABSTRACT

With the increased emphasis on teams and collaboration in the workplace, many teachers are requiring students to work collaboratively in their courses. Teachers struggle with determining how best to provide students with effective learning experiences in a collaborative environment. Traditional methods of team assignments and group work in the classroom have, at best, produced mixed results with varying levels of success and questionable levels of satisfaction among students and teachers.

This paper describes a specific approach to classroom collaboration called team-based learning and demonstrates how the authors have implemented this approach to learning in a variety of undergraduate courses they teach. Assessment data collected over the past year are also reported to provide quantifiable measures of the effects of the team-based approach on student learning, along with the authors' experiences in effectively implementing this method of collaboration in the postsecondary classroom environment.

Keywords: Teams, team-based learning, collaborative learning, teaching methodologies.

INTRODUCTION

During the past few decades, organizations have moved toward a collaborative model of work in growing numbers. Similarly, IS staffs have turned to teams as a way to leverage resources and improve work products and systems.

The impressive results of teams have bolstered their popularity, bringing many potential advantages to organizations: enhancing communication and decision making; increasing productivity with higher levels of involvement, commitment, motivation; improving processes; and distributing workloads.

> Society at large, as well as most professional organizations, is increasingly recognizing the value of people who know how to work effectively in teams
> on intellectual tasks, and they are calling on colleges and universities to incorporate this kind of learning into the higher education curriculum (6).

Business schools and IS programs in particular have promoted this need for faculty to include team-based learning in the classroom. However, faculty often struggle with how to design and implement effective teambuilding experiences. Traditional methods of team assignments and group work in the classroom have, at best, produced mixed results with varying levels of success and questionable levels of satisfaction among students and teachers.

This paper describes a specific approach to team-based learning developed by Larry Michaelson at the University of Oklahoma and demonstrates how this approach to learning has been implemented by the authors in a variety of the undergraduate business and information systems courses they teach. Specifically, the paper reviews two basic activities critical to implementing team-based learning and how to successfully accomplish these activities: (1) forming and managing groups; and (2) promoting accountability.

The paper concludes with assessment data collected by the authors over the past year in courses where they have implemented Michaelson's team-based learning. The data provides a quantifiable measure that supports the benefits of team-based learning on student learning. In addition, the authors share their own experiences in effectively implementing this approach to collaboration in the postsecondary classroom environment.

IMPLEMENTING TEAM-BASED LEARNING

Through the past several decades, the use of group and collaborative assignments in classroom settings has increased. The popularity of group work in college courses has increased as instructors see it as a way to facilitate student learning through focused discussion and interaction to better prepare students in ways that reflect the reality of the workplace—with collaborative work and team projects a growing dimension of organizational work (8).

Understanding the crucial differences between cooperative learning and team-based learning is necessary in developing authentic team-based learning activities. Cooperative learning can be characterized by three things: (1) using assigned roles within groups; (2) having the teacher monitor the groups to see how they are handling the content and how well the groups are working; and (3) spending time after the small-group exercise to process the small-group activity (6). Team-based learning differs from cooperative learning in that it "relies on the teams themselves to monitor individual and group performance and to improve performance as necessary" (6). Prompt, discriminating feedback on individual and team performance becomes the key responsibility of the teacher when using team-based learning.

Merely creating groups and mandating group assignments may involve cooperative learning but does not necessarily enhance students' teambuilding skills or reflect the actuality of workplace collaboration. More than just a tool or technique instructors utilize from a repertoire of instructional methods, team-based learning is an "instructional strategy that is designed to (a) support the development of high-performance teams, and (b) provide opportunities for those teams to engage in significant learning tasks" (4).

As an instructional strategy, Michaelson's team-based learning is a semester-long approach to learning that suggests ways to maximize the benefits of collaboration in educational settings (9). Michaleson's strategy involves specific methods of forming and managing groups and promoting accountability—each of these dimensions briefly described in the following sections.

FORMING AND MANAGING GROUPS

The critical components in forming and managing groups used for team-based learning consist of the following three issues: (1) how the groups are selected; (2) group size; and (3) duration of groups.

Selection of Groups

Research suggests that groups formed by self-selection are the least effective while diverse groups (assigned by the teacher) are most effective. Self-selected groups tend to be more homogenous and lack the resources and diversity necessary to become highly productive (3). In Michaelson's team-based approach the instructor assigns groups by assessing those attributes deemed essential to the success of group projects. Groups are formed by distributing students' skills, assets, and liabilities across groups.

Group Size

Research suggests that groups large enough to have diverse experience and knowledge but small enough to facilitate discussion and involvement by each member is preferred—generally about five to seven students in each group is ideal (5, 10).

Duration of Groups

Michaelson recommends that groups be permanent; working together for an entire semester rather than changing from assignment to assignment (6, 7). Diverse groups (teacher assigned) have a greater potential to become high performance teams, but the diversity may have an initial negative impact in performance (12, 1). Using groups who stay together for the whole semester provides for the needed time for diverse group members to become cohesive and results in higher performance levels (6). Research indicates that diverse groups outperform homogeneous groups after as little as forty hours working together (11).

PROMOTING ACCOUNTABILITY

Key to the success of any team is accountability. Once groups have been formed, several strategies can be used to ensure that individual group members feel accountable to the group (6). Michaelson's approach includes five specific methodologies or approaches to promoting team accountability: (1) setting grade weights; (2) peer assessments;
(3) Readiness Assessment Tests (RATs); (4) group assignments; and (5) adequate and timely feedback.

Setting Grade Weights
Michaelson's team-based approach requires students (in their groups) to collectively set grade weights for assignments and exams, helping them feel more in control of the class and the consequences of their actions. Having students determine the grade weights for assignments results in increased accountability and overall satisfaction with the course.

Peer Assessment

The use of peer assessments also plays an integral role in promoting accountability. Michaelson's process of peer assessment works as follows:

> Near the end of the semester the group engages in peer assessment in which each member assesses the work of the other members of the group in terms of how much each person contributed to the learning and the success of the group. This assessment is then used, either (1) as a component to be added to the group grade, or (2) as a component that is used as a percentage multiplier of all graded group work (6).

When there is variation in an individual student's contribution to the group, the peer assessment results provide for variation in individual credit received for group work. "Individuals who contribute more receive more credit than individuals who contribute less" thus resolving the fairness issue in group grading (6). .

Readiness Assessment Testing (RATs)

One major challenge in achieving accountability for any group-based activity is minimizing the potential for a student to freeload and still receive the same grade as everyone else in their group. Since effective group work presupposes thorough individual preparation and individual responsibility to do so, the team-based approach uses a Readiness Assurance Process wherein individual and group RATs are administered to promote individual preparedness while assessing students both individually and in groups (6).

RATs are typically multiple choice or true/false tests based on reading assignments that are not discussed in class. Students' demonstrate their comprehension of the reading assignment first by taking the RAT individually using a Scantron form. When all students are finished taking the test and have turned in their answer sheets, students take the same test again immediately in their groups (each group is given an additional answer sheet). While groups are taking the test, the teacher is processing the Scantron forms to provide individual results to students as soon as they have completed their group test.

Through the process of taking the RATs, students are accountable to the teacher (both individual and group test scores count toward the students' final grades) as well as accountable to their teammates, since each student must discuss and defend answers to reach a correct consensus answer (7). In the process, the group discussion often clarifies the reading material and minimizes the need for lengthy lecture. The immediate knowledge-of-results design of the RAT system also provides students with higher satisfaction in the assessment process combined with the increased accountability.

Group Assignments

In conjunction with the RAT tests, well-designed group assignments can promote accountability as well. Rather than long papers or presentations which lend themselves to the "divide-and-

conquer" approach, effective collaborative assignments require students to apply critical thinking and problem solving skills to come up with workable solutions. The solutions to the problem require the input and ideas of every member of the group.

For example, with a problem-based scenario, a group may be given a short case that outlines several problems with a specific information system. The case may require the group to analyze the causes of the problem, rank the causes from most critical to least critical, and then provide a short solution to the problem. Having the same problem for each of the groups, requiring them to make specific choices, and inviting simultaneous reporting of solutions are keys to promoting true collaboration among students (8).

Adequate and Timely Feedback

Key to most any learning situation is providing adequate and timely feedback to students so they may assess their own understanding of concepts. The use of the RATs is an example of a method where feedback to individual students is almost immediate through use of Scantron forms. For the group tests, the authors have followed Michaelson's suggestion in using the Immediate Feedback Assessment Technique form (IF-AT), developed by Michael Epstein (2). The IF-AT form consists of four multiple choice options that require students to scratch off, similar to a lottery ticket, a covering to reveal the correct answer (indicated by an asterisk "*"). The method provides immediate feedback and creates valuable discussion as groups decide on their answer.

Immediate feedback on application-focused assignments is also important. Rather than having major projects that students submit for later grading, some problem solving situations where groups select from several options to make a "best" choice allows groups to report choices simultaneously and allows discussion and feedback as to the benefits of a specific choice. In this manner, students get reactions from other groups and from the instructor about their reasoning and thinking abilities.

INITIAL RESULTS USING TEAM-BASED LEARNING

Michaelson recommends that teachers provide feedback about the value of teams to students to "sell" students on the value of teams (6). He reports the "team gain" over the best team member to demonstrate to students how the groups continually outperform the individual student (6). Historically, over 99 percent of the teams' scores will be higher than their own best member and the lowest team in the entire class will often score above the highest individual in the class (6).

Following attendance at a workshop on team-based learning given by Dr. Michaelson, the authors implemented his approach in their classes during the 2002-03 academic year. Their findings on the data collected based on individual and group performance on RATs found results consistent with Michaelson's research, with groups consistently out performing individuals. Table 1 shows the overall results of 36 RATs given in the ten classes taught by the authors.

Table 1. Readiness Assessment Tests Scores for Groups vs. Individuals

Instructor	# of RATs Group	# RATs Individual	# RATs Individual tied	Total RATs	% of RATs Group

	Exceeded Individual	Exceeded Group	Group	Given	Exceeded Individual
Instructor A	25	0	1	26	96%
Instructor B	10	0	0	10	100%
Total	35	0	1	36	98%

Out of ten classes taught by the authors and the 36 RATs given, average group scores for Instructor A exceeded average individual scores on 96 percent of the 26 RATs given. The average group scores for Instructor B exceeded average individual scores on 100 percent of the 10 RATs given. Overall, RATs exceeded average individual scores 98 percent of the time with individual scores on RATs never exceeding group scores, but tying the average group score one time in 36 RATs given.

Table 2. Average Number of Points Groups Exceeded Individuals

Instructor	Avg. # Points per RAT	Avg. # Points Group Exceeded Individual	% Group Exceeded Individual
Instructor A	25	2.8	11.2%
Instructor B	92	28.5	30.9%
Total	58.5	15.7	21.1%

Table 2 shows the average number of points that groups exceeded individuals on RATs was 2.8 for instructor A (average of 25 points/test) and 28.5 for instructor B (average of 92 points/test). The overall average number of points that groups exceeded individuals on RATs was 15.7 for both instructors for a gain of 21.1 percent over individuals.

CONCLUSION

Although this introduction to team-based learning has been brief, additional information can be obtained from a University of Oklahoma website (www.ou.edu/idp/teamlearning/ index.htm) and in a recently published book, *Team-Based Learning: A Transformative Use of Small Groups* (6). The question one may ask is "Does team-based learning make a difference?" in both students' performance as well as perceptions and attitudes about the class. From the authors' experiences, team-based learning has enhanced the performance of students in their classes as well as positively impacted students' attitudes toward the effectiveness of teams and the overall class experience.

Team-based learning proves to students the value of teams and the team process while preparing them with essential workplace skills like interpersonal skills, problem solving skills, and critical thinking skills. In addition, team-based classrooms provide students with experiences that teach them the importance of diversity and the value of individual differences and experiences.

The consistency in Michaelson's research and the authors' clearly shows how groups out perform the individual and should help persuade teachers who have yet to utilize team-based learning in their classrooms to reconsider. Teachers must be aware of the significant impact they have on developing the necessary skills students need for success. Choosing what learning experiences to include or not include in their courses can ensure a student's success as easily as failure. Team-based learning is essential in preparing students for success in their careers.

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