

Using Peer Evaluations to Assign Grades on Group Projects

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Through the use of individual and group projects the learning experiences of students can be enhanced. However, in group projects there is a concern about equity when assigning grades. If the same grade is assigned to all member of the group there is the underlying assumption that all members of the group contributed equally. Given the variety of talents, abilities and motivators of students in construction education that assumption lacks validity. However, through the use of peer evaluations, the members of the group are allowed to voice their perceptions of their contributions and those of the other members in the group. By quantifying these perceptions and weighing them individual grades can be derived that do not inflate to overall grade on the project. If properly administered, these evaluations can become a motivator for enhancing involvement. In addition, the students can develop skills necessary for accomplishing objectives through group decision making as well as team building strategies.

Key Words: Peer Evaluation, Group Projects, Performance Scoring

Introduction

Through the use of group projects the quantity and complexity of materials covered in a particular course is substantially increased. The typical fifteen-week semester sets a physical boundary around methodology and the quantity of information that can be presented. Furthermore, if only individual assignments are used there is the physical limit of the amount of work that a single individual can perform. Through the use of projects, making the learner a participant in the process enhances the learning experience. According to Smith (1995) learning by doing, when used properly, is a much more powerful learning technique. The student is actively involved in the learning process. Learning by doing in a group can be even more effective. Students need to learn to work in a group. Industry, indeed most of society, organizes its activities by groups and bases its rewards partially, if not completely, on group effort. The need to work in groups is echoed by many others (Barley, 1990), changes in technological environments has resulted in an increasing emphasis on work groups (McMaster, 1995). The design of complex products such as aircraft and automobiles has long been accomplished using working groups rather than individuals. (Cooley, Hawkins, Hamilton and Crick, 1994) Among the benefits are improved designs, real world experience and the development of team skills. Drawbacks are cumbersome decision-making, inefficient task accomplishments and the possibility of destructive inter-group conflict. The use of group projects enhances learning not only of the subject matter but facilitates the development of the skills necessary for consensus and team buildings. Katzenbach & Smith (1993) provide the following differentiation between teams and groups: "Teams require both individual and mutual accountability and produce discrete work products through joint contributions of their members -- a team is more than the sum of their parts." All of these secondary benefits clearly point out the advantages of using

group projects to enhance learning. However, they also uncover the difficulty in evaluating the performance and contribution of the individual members of the group.

Individual Evaluation

There can clearly be arguments for not evaluating individual members on the team. First, the concept that a team is a unit and that they should share equally in the rewards as well as the punishments. However, in the academic arena there is a need for equity and fairness. According to Michaelson and Black (1994) The grading system must be responsive to students concerns for fairness and equity. This concern for equity on group projects can be alleviated by using peer assessments and evaluations. Michaelson and Black (1984) go on to point out that these evaluations can serve other purposes. "The peer evaluation solves two important motivational problems. One is providing an incentive for participating in group discussion. The other is that it tends to remove students' fear that they will have to choose between getting a low grade on the group assignment and having to "carry" group work." Taking courses pass fail, which is in some ways equivalent to the student that does not contribute to the group. Research shows that students often use the pass / fail option to reduce the effort and study time in that area so that they can concentrate on other courses where they are being graded. Consequently, students do not perform as well or learn as much in these pass / fail courses as in a regular course (Jacobs & Chase, 1992). Therefore, when assigning group projects, it is important that the individual student understand from the beginning that he / she will receive an individual grade based on their individual participation in the group. Furthermore, Grades provide two important benefits for students: motivation and feedback. Grades do not motivate students to study. Although some students would study and learn without grades, most would not. Eison and Pollio (1989) found in a research study of 5,000 undergraduates that over 50% of the students felt they would not learn or remember very much without being grades.

In the studies by Saaverda and Kwun (1993) they found that "on the whole, both field and laboratory studies indicate that peer assessment is a valid and reliable evaluation procedure." Mitchell and Lindin (1982) point out a short coming in these evaluations is that group members typically are unwilling to differentiate performance, as evidenced by their tendency to underrate peers who are more capable than the average member and to overrate those that are less capable. Whatever shortcomings exist in the peer evaluation process the concern for equity and the motivation that they provide compensate for whatever lack of reliability that exists. Using multiple evaluation procedures can compensate for this lack of reliability. In this scenario a portion of the students final grade in the course is made up of individual projects, group projects, papers, presentation and exams.

Another essential element in peer evaluations is confidentiality. If there is the fear that the other persons within the group can find out how they were rated by there other group members, peer pressure could result in the group members giving everyone the same rating. This would clearly adversely impact reliability and validity of the peer evaluations.

Developing the Evaluation Procedure

Peer rating scales are easy to design, administer and score (Kane & Lawler, 1978). In order to take advantage of the positive motivators for peer evaluations on group projects planning is required on behalf of the instructor. One of the first issues concerns how many people will be in the groups and how will they be assigned to the groups. From a peer evaluation perspective groups of three or more makes it very difficult for the members of the group to determine how they were rated by their peers. However, from a work load perspective, the groups need to be just large enough so that all members must contribute in order for the project to be successfully completed. The issue is percentage of the grade will be impacted by the results of the peer evaluations. Typically 25 to 40% works best. The peer evaluation process takes points from those who did less and gives them to the persons who did more of the work on the project. The greater the percentage the greater the number of points can be transferred. Another issue that needs to be addressed before any group assignments are made is how to deal with those group members who refuse to participate in the peer evaluation process. In order for the peer evaluation process to work fairly, all of the perceptions of all of the group members need to be compared and evaluated. If someone does not participate that objective cannot be accomplished. Therefore, a motivational policy needs to be developed prior to making any assignments. One possibility is to assume that the non-participant contributed nothing toward the project and factor that into the evaluation process. Another possible method is to use the other group members evaluations to assign the individual grades and then assign some penalty for not completing the evaluation process.

When the group assignment is made the evaluation form, return procedure, deadlines and how they will be factored into their individual grade must be presented. From the experience of the authors a simplistic evaluation works best. Appendix A is an example of a simplified peer evaluation form. This form asks the user to rate their contribution on the project and that of their peers. Furthermore this form defines how it will be used in assigning the final grade, when it is due and how it shall be returned. From a practical perspective it is advantageous to have these evaluations returned to some location outside the classroom. This adds confidentiality and removes some of the peer pressure.

Applying the Results

The first step in applying the results of the peer evaluations is to assign a grade for the project. This is the grade that all of the members of the group would make if they had all contributed equally to the project. The second step is to develop an evaluation matrix similar to the one found in Appendix 2. This matrix has the team members names on both the horizontal and vertical axis. The results of the individual peer evaluations are entered horizontally. When all of the information has been entered, the columns are totaled to develop a total number of evaluation points. Then these individual evaluation points are converted into a percentage score based on the total number of evaluation points for all persons in the group.

The evaluation points percentage becomes the basis for distributing the results of the peer evaluation. This percentage is then multiplied by the percentage of the project that is subject to

the peer evaluation which is in turn multiplied that amount by the number of persons within the group. The result of that calculation is then added to the amount of the grade that was not subject to peer evaluation. Appendix C shows how the evaluation procedure would be applied.

Conclusion

The peer evaluation procedure is designed to help provide equity to grade distribution and to provide motivation to those students who may not be as talented to become actively involved in the process and not depend on some one else to drag them through the project. In addition, this procedure allows for the students to develop the skills necessary in completing group and team projects. When group projects are used in a course multiple types of evaluations need to be performed. Some of the evaluations can be in the form of group evaluations and in the form of evaluations being performed by the instructor.

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Appendix A

Peer Evaluation Document

PARTNER EVALUATION

Group projects are sometimes looked upon as being "unfair." Through the use of the partner evaluation your perception of the quantity of work that you performed and that of your partner is analyzed against the perceptions of your partner. Through this process, hopefully equity is achieved. These evaluations are a serious statement and are used to re-distribute 40 % of the grade on the project. In order for this process to work effectively there is the need for you to be honest and objective. Your ratings and comments are confidential and are destroyed once your grade has been calculated.

These evaluations must be submitted to my mailbox no later that 5:00 PM on Monday. Complete this evaluation and place it in a white sealed envelope. Evaluations that are not in a sealed envelope will be ignored. If you do not submit an evaluation it will be assumed that you did not perform your fair share of the work and your grade on the project will be reduced by two letters.

NAME: _____

I PERFORMED:

1 2 3 4 5 6 7 8 9
None of the work Fair share of the work All of the work

PARTNER 1's NAME: _____

THIS PARTNER PERFORMED:

1 2 3 4 5 6 7 8 9
None of the work Fair share of the work All of the work

PARTNER 2's NAME: _____

THIS PARTNER PERFORMED:

1 2 3 4 5 6 7 8 9
None of the work Fair share of the work All of the work

IF YOU HAVE ANY COMMENTS *CONCERNING* THIS PROJECT OR SUGGESTIONS ON HOW TO IMPROVE THE CLASS PLEASE WRITE THEM HERE.

Appendix B
Evaluation Matrix And Grade Calculation Formula

	Member 1	Member 2	Member 3
Ratings on member 1's Evaluation			
Ratings on member 2's Evaluation			
Ratings on member 3's Evaluation			
Total Rating			
% Member Score			

$$\text{Total Rating} = \sum (m1..m3)$$

$$\% \text{ Score} = \text{MX} / \sum (m1..mx)$$

DETERMINING THE INDIVIDUAL GRADES

Z = Percentage weight of member evaluation

G = Grade on the group project

$$\text{Distribution Amount} = G * Z$$

$$\text{Base Grade} = 100 - \text{distribution amount}$$

$$\text{M1's Final Grade} = (Z * G * \text{M1's } \% \text{ Score} * \text{Number of Group Members}) + (G * (1 - Z))$$

Appendix C Sample Grade Calculation

	Member 1	Member 2	Member 3
Member 1	5	7	5
Member 2	5	5	5
Member 3	5	7	4
Total Rating	15	19	14
% Member Score	.3125	.3958	.2917

Overall Project Grade 85

Partner Evaluations = 40 %

Member 1's Grade = $(.40 * 85 * .3125 * 3) + (85 * (1 - .4)) = 82.875$ or 83

Member 2's Grade = $(.40 * 85 * .3958 * 3) + (85 * (1 - .4)) = 91.37$ or 91

Member 3's Grade = $(.40 * 85 * .2917 * 3) + (85 * (1 - .4)) = 80.75$ or 81

Average of all three Grades = $(83 + 91 + 81) / 3$

Average = 85