

Best Practices for the Implementation of Goal Setting and Peer Assessment: Curriculum and Research Design

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Incorporating team work in both organizational and classroom settings is often problematic due to uneven effort, participation, and contributions of individual team members. One solution is to incorporate peer assessment of individual effort into team projects. Incorporating goal setting into peer assessments may lead to increased motivation of team members to rate their peers and improved team performance. Setting goals based on peer feedback and subsequent public announcement of these specific goals to fellow team members may increase students' motivation and accountability to assess their peers. This paper outlines best practices for integrating feedback and goal setting in the peer assessment process within higher education, and provides recommendations for designing research to best assess peer assessment interventions. The following are discussed in the paper: goal setting and peer assessment literature, research implications for peer assessments in the classroom, and a model for implementing peer assessments.

INTRODUCTION

Incorporating team work in both organizational and classroom settings is often problematic due to uneven effort, participation, and contributions of individual team members (Gueldenzoph & May, 2002; Fiechtner & Davis, 1985). As teams are prevalent in organizational settings, academicians often incorporate graded group projects into the curriculum. When student groups are employed, the potential for "free riding" is prevalent (Brooks & Ammons, 2003; Mello, 1993; Williams, Beard, & Rymer, 1991). Free riding occurs when a group member doesn't contribute his/her fair share to the project yet receives the group grade. Free riding may occur when groups are too large and students hide in the crowd (Harkins, 1987), students fear that they will be seen as foolish if they contribute more than their fair share without additional reward

(Kerr, 1983; Orbell & Dawes, 1981), or when students do not see themselves accountable for their project contributions (Harkins & Jackson, 1985; Kerr & Bruun, 1981; Williams, Harkins, & Latane, 1981). This paper outlines best practices for integrating feedback and goal setting in the peer assessment process within higher education, and provides recommendations for designing research to best test peer assessment interventions. The following are discussed in the paper: goal setting and peer feedback literature, research implications for peer assessments in the classroom, a model for implementing peer assessments, and practical implementation guidelines.

As reviewed by Friedman, Cox, & Maher (2008a), the increased use of group projects in higher education has led to the greater use of peer assessment (Brooks & Ammons, 2003; Falchikov & Goldfinch, 2000; Gueldenzoph & May, 2002; Hanrahan & Issacs, 2001; Pond & Ul-Haq, 1997). To ensure that team members contribute their fair share of the work, instructors increasingly rely on peer assessments (Erez, Lepine, & Elms, 2002; Karou & Williams, 1993). Chen & Lu (2004) make a case for peer assessments because instructors typically have limited observations of group behavior and peers may be in a better position to distinguish among various levels of performance. Unfortunately, students often find rating their fellow students a meaningless exercise, fraught with frustration (Friedman, Cox, & Maher, 2008a). Peer assessments typically fall into a “black hole” at the end of the semester, where students neither receive feedback nor believe that their ratings will impact anything meaningful other than fulfilling a course requirement that ratings be provided. Little research has addressed how to improve students’ ability and motivation to provide meaningful feedback to their peers. A notable exception is a study that used expectancy theory as a conceptual model to increase student motivation to rate their peers (Friedman, Cox, & Maher, 2008a). Expectancy theory proposes that motivation is a function of three beliefs: that effort will lead to performance, that performance will lead to outcomes, and that these outcomes are valued (Rynes & Gerhart, 2000; Isaac, Wilfred, & Douglas, 2001; Porter and Lawler, 1968; Vroom, 1964). Friedman, Cox & Maher (2008b) found that goal setting and increased accountability increased students’ motivation to rate their peers. Students that set goals and shared their goals with their group believed strongly that peer feedback was associated with higher team member performance. In order for peer assessment to be meaningful, students must believe that their effort to rate group members will lead to accurate ratings, that the peer ratings will be fed back to students and that feedback will lead to outcomes such as improved group member contributions and higher grades, and that these outcomes are valued by students. Expectancy theory helps guide practice regarding implementing peer assessments into the curriculum. Goal setting research conducted in organizational settings provides additional implications for academicians that use peer assessments in their classroom.

LITERATURE REVIEW

Goal Setting

Organizational behavior literature resounds with research that concludes goal setting improves motivation and performance (Locke & Latham, 2002; Mento, Steel, & Karren, 1987; Locke *et al.*, 1981; Latham & Yukl, 1975). Goals are the focus of what an individual is trying to achieve (Locke & Latham, 2002; Locke, Shaw, Saari, & Latham, 1981). Friedman, Cox & Maher (2008b) reviewed research that argues that specific and moderately difficult goals lead to higher performance and employee job satisfaction (Mento, Steele, & Karren, 1987; Arvey & Dewhirst, 1976; Steers, 1976), that performance feedback enhances the positive effect of specific

goals (Langeland, Johnson, & Mawhinney, 1998; Wilk, 1998), and that individuals persist in their effort to achieve goals when they value the goal, set the goals themselves, and perceive a gap between the goal and their current state (Fox & Hoffman, 2002). Practitioners recommend the use of SMART goals: specific, measurable, attainable, relevant, and timely (Shahin & Mahbod, 2007; Monaghan *et al.*, 2005; Latham, 2003). Our research on peer assessment, feedback, and goal setting suggests there may be optimal ways to implement peer assessment in the classroom that result in higher motivation of students to rate their peers. Specifically, goal setting based on peer feedback coupled with students' public commitment to goals resulted in higher motivation to rate one's peers (Friedman, Cox & Maher, 2008b), and holistic peer ratings (a single overall rating) given multiple times are viewed more positively by students (Friedman, Cox & Maher, 2008a). In addition, optimal ways to conduct research on the efficacy of peer assessment particularly when multiple instructors and course sections are involved are addressed later in this paper.

Peer Feedback

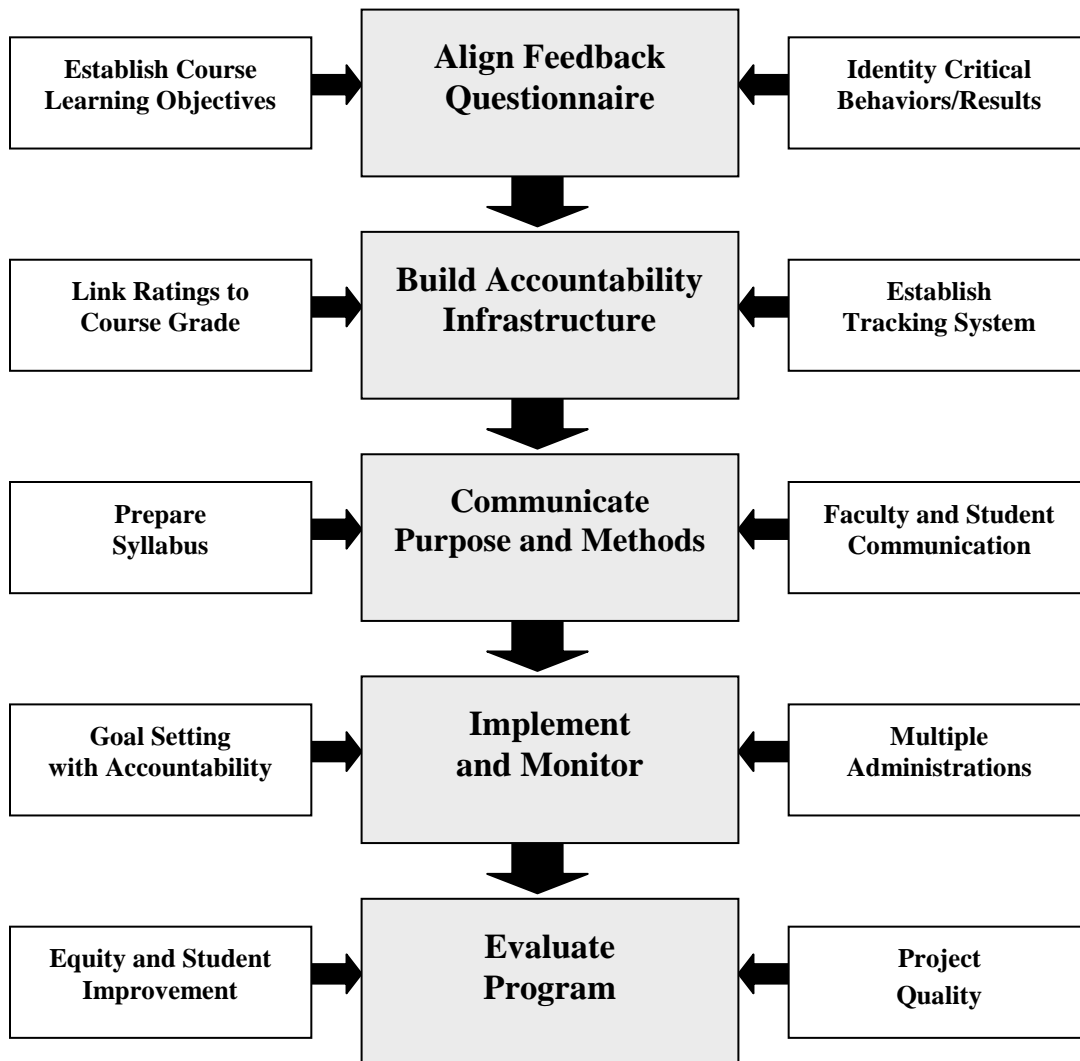
Bracken (2001) reviewed three-sixty degree performance feedback (360⁰) research in organizational settings. Three-sixty degree feedback refers to performance feedback from supervisors, peers, subordinates and others (e.g., customers). The use of 360⁰ feedback is prevalent in industry despite its high administrative and logistical cost. Peer assessment is an important element of 360⁰ feedback. As with peer assessment, the rationale for the process is that each rater has a unique perspective, and that multiple perspectives result in a comprehensive account of an employee's performance. The effectiveness of 360⁰ performance feedback is a function of alignment, validity, accountability, commitment and acceptance (Bracken, 2001). Alignment is the extent that what is fed back to individuals is important and relevant to job, and is linked to organizational goals, strategies, and performance. As organizations strive for a competitive advantage through unique business strategies, it is logical that 360⁰ performance feedback systems must be customized to each organization in order to be aligned (Dalessio, 1998). Alignment can be reinforced by the proper design of the feedback questionnaire, a discussion of the feedback between the supervisor and the employee, and the integration of the 360⁰ system into the human resource system (Bracken, 2001; Walker & Smither, 1999; Jako, 1997). In the classroom, the feedback questionnaire should contain behavioral dimensions (e.g., attends meetings, conducts analyses, creates a PowerPoint presentation) or results that are relevant to the group project and the course objectives as communicated on the syllabus (Brooks & Ammons, 2003; Lejk & Wyvill, 2001). The feedback must also be integrated into the course learning and grading process. For example, if performance appraisal is part of the curriculum, the peer assessment can be an experiential exercise that is debriefed based on learning objectives.

Another important factor that determines the effectiveness of 360⁰ feedback is ratee, rater, and organizational accountability (Bracken, 2001; London *et al.*, 1997). Raters, ratees, and the organization must be held accountable to provide accurate ratings, use the ratings to improve performance, and to support the feedback process respectively. Finally, employees and supervisors must accept the feedback process as worthwhile and beneficial (Bracken, 2001). In the classroom, students must be held accountable to provide honest ratings and use feedback from other students to improve their project contribution. The instructor should integrate the feedback into the course as a learning tool or as part of the course grade.

PEER ASSESSMENT IMPLEMENTATION MODEL

Figure 1 presents a model that guides instructors as they implement peer assessment and feedback in their classroom. The first step is to design the feedback questionnaire so that it is aligned with course learning objectives. Once the learning objectives are written, the course content can then be designed. Should a group project be used, peer assessments potentially can provide students with valuable feedback. Specific student behaviors that result in achieving learning outcomes should be identified and included in the feedback questionnaire (e.g., cooperates with others, punctuality, listens to others, analyzes data, makes presentations, and conducts literature reviews). It is suggested that feedback questionnaires that contain several relevant dimensions of effective behavior are better suited for developmental feedback than a single overall rating (Lejk & Wyvill, 2001).

FIGURE 1
CLASS PEER ASSESSMENT IMPLEMENTATION



Accountability increases students' motivation to rate their peers and receive feedback from others. An accountability infrastructure should therefore be established prior to starting the course and included on the course syllabus. Accountability can be fostered in several ways, including keeping project groups small, having students set goals, having students share their goals with the group, and administering multiple assessments throughout the project to track progress. As class size increases, the volume of ratings increases exponentially. A tracking system that aggregates ratings to maintain confidentiality and generates confidential feedback reports is therefore required to handle large amounts of data. Optically scanned questionnaires can be used to increase speed and data accuracy (quantitative ratings), but qualitative comments must be collected using another method. Friedman, Cox, & Maher (2008a) describe a simple excel worksheet that facilitates data entry and generates confidential feedback reports.

Instructors play a key role in any peer feedback program. Instructors should understand their role in the process. For example, instructors should communicate the process, ensure confidentiality, collect data, generate reports, train students to set goals, and generally ensure that feedback is timely. Students should be made aware that peer feedback is a percentage of their grade (if applicable), and should know the schedule for providing ratings and receiving feedback. Students should be shown the questionnaire and understand its behavioral dimensions as early in the project as possible. Students' observations of their peers can then be focused on relevant behavioral dimension, and their subsequent ratings can be more accurate (Brooks & Ammons, 2003; Van Velsor & Leslie, 1991; Young & Henquinet, 2000).

Once the syllabus is reviewed and groups are formed, students begin work on the project. The peer rating process starts immediately as students observe each others' level of contribution to the project. Students should have multiple opportunities to provide peer feedback so that process can be ascertained over time (Friedman, Cox and Maher, 2008a, Brooks & Ammons, 2003). Half way through the project may be a good time for students to get a baseline assessment of their group contribution, provided that sufficient project activity has occurred and students have had adequate opportunity to observe each others' behavior. To increase accountability, students can then set SMART goals and openly share their goals with the group. A second peer feedback can occur at the end of the project so that students can gauge their improvements and determine the extent to which their goals were achieved. It should be noted that a substantive project is required, typically one that lasts the entire course (e.g., write a business plan, consult with a company, or participation in a large computer business simulation).

The peer assessment procedure can then be evaluated during and at the end of the process described above. Peer feedback program effectiveness measures may include project quality, the percentage of students that achieve their goals and improve their group contributions, and the extent that students achieve learning outcomes. Questionnaires can be administered to students to obtain quantitative information (e.g., the extent to which they believe that peer feedback improved group and group member performance). Qualitative information can be collected using focus groups.

PEER ASSESSMENT RESEARCH

Large courses with multiple sections offer excellent research opportunities that investigate factors that contribute to effective peer assessment and feedback. When conducting research on peer assessments, it is important that the peer feedback procedures be consistently communicated and implemented across the sections. Multiple sections taught by different instructors are a two

edged sword. Experimental designs are possible as some sections receive an experimental manipulation while other sections serve as control groups. For example, students in one section set goals while students in the control section do not. Direct comparisons between the experimental and control sections on dependent variables can then be made (e.g., motivation to rate peers, group satisfaction, and course performance). Are students that set goals more satisfied with their groups than students that do not set goals? Experimental designs can be implemented that test these and other hypotheses. Such causal statements that follow from well designed experimental studies are valuable contributions to our understanding of peer feedback. In addition, the validity of the research dependent measures should be reliable and valid. Factor analysis is a good technique for understanding the internal consistency and underlying structure of a multiple item questionnaire (Rummel, 1970).

The other edge of the sword presents ample opportunity to mismanage the peer feedback procedure, invalidate the ratings, and generally do more harm than good. The procedure used should be standardized across experimental sections so that confounding variables are ruled out when interpreting the results. Were students in the goal setting course section more motivated than students in the control group because they set goals? An alternative explanation of these results is that the goal setting class was scheduled at 2:00 P.M. while the control group course section met at 8:00 A.M. Were the observed differences in student motivation a function of setting goals or class scheduling (students typically dislike very early classes)? In this case, the time the two classes met was a confounding variable, making interpretation of the research findings ambiguous. Research in educational settings is difficult, as many variables are not under the control of the instructor or the researcher. Sound experimental design can eliminate many but probably not all confounding variables. Campbell & Stanley (1966) offer an excellent primer for designing and conducting experimental research. Only through the cumulative knowledge drawn from many studies over time will instructors know how to best implement peer assessment in their classrooms. Based on our research, we suggest a series of best practices for using peer assessment in the classroom and testing its effectiveness. Our recommended best practices (Peer Feedback and Research Dos and Don'ts) are outlined in Table 1 below.

Peer Feedback Questionnaire Design

An irrelevant feedback questionnaire that is not aligned with course learning objectives or poorly understood by students will jeopardize the research and antagonize students. Too often instructors borrow a peer assessment questionnaire from another instructor or develop peer assessment dimensions that are not related to course outcomes. Students become antagonized or apathetic about peer assessment because they perceive little if any relevant outcomes. Timing is important as well. There should be sufficient time between peer feedback administrations so that students have time to achieve their stated improvement goals, and peers have enough observations on which to base their ratings.

Instructor Motivation

While using a course with multiple sections and instructors provides an opportunity for an experimental design, the coordination that is required should not be underestimated. We found it necessary to conduct frequent meetings with the instructors involved to ensure that research protocol was understood and adhered to. Our peer assessment research and data collection were not a priority for the instructors involved. Thus, we tried to streamline data collection as much as possible by utilizing teaching assistants and providing instructor support. We developed an

TABLE 1
PEER FEEDBACK AND RESEARCH DO'S AND DON'TS

	Do	Don't
Peer feedback questionnaire design	Align questionnaire with course learning objectives Pretest questionnaires for student acceptance	Simply use a questionnaire that is too general or used in some other course.
Instructor motivation	Build rewards for instructors (e.g., publication co-authorship) Provide instructor support (e.g., excel automatic report generation program)	Expect that instructors will make research and data collection a priority when time and resources are limited Require instructors to do extra work not related to their course objectives
Student motivation and accountability	Integrate the goal setting into the grade structure (i.e., peer ratings count) Require that students set SMART goals to improve their project contribution	Assume that students find peer feedback meaningful or are motivated to rate peers
Group size and composition	Keep group size to a minimum to reduce free riding and increase accountability Seek relevant skill diversity within each group	Allow groups to get too large, as free loaders can hide in larger groups Allow peers to keep adding their friends to the group, making the group too large
Experimental design	Standardize interventions across class sections (e.g., use same PPT to introduce intervention) Train instructors Counterbalance instructors with experimental condition when possible (i.e., have each instructor teach a class with the experimental intervention and one without the intervention) While randomization of students to class sections is usually not possible, test for experimental and control group equivalence	Have instructors have complete freedom with respect to the experimental intervention Compare divergent sections on the dependent variable without accounting for other factors that may be important (e.g., major, gender, age)
Timing	Provide sufficient time for students to provide ratings, get feedback, and set goals Allow time for a second peer feedback administration so assess improvement	Schedule the experimental intervention too late in the project Collect questionnaire data from students during important events such as exams
Evaluate and monitor the process	Conduct "process checks" along the way- meet with instructors and students to check progress and give support Test outcome measures (e.g., project quality, group satisfaction, equal contributions of all group members)	Assume that the research process is on schedule Assume that the instructors have completed questionnaires or other requirements on time or in a quality manner

automated excel report that the teaching assistants could use to easily input peer assessment data and that could also be used to calculate the impact of peer evaluation on individual grades and provide peer feedback to students over the course of the semester. We also provided co-authorship opportunities to instructors involved in the research to increase instructor motivation.

Student Motivation and Accountability

Students also need to be motivated if they are to take the evaluation of their peers seriously. As a result of focus groups conducted with students prior to beginning our research, we found that students do not necessarily believe that faculty will use peer feedback in any meaningful way. Students tended to see peer feedback as a way to “get back” at students that had not contributed to group projects. To change these perceptions we integrated peer ratings into the grade structure and showed students several times during the semester the impact peer ratings would have on their grades. We also found that students saw more improvement in their team members’ performance when they set goals based on peer feedback and were asked to publicly articulate their goals to team members. This intervention resulted in developing a tighter linkage between providing peer feedback and desirable outcomes (e.g. – team members contributing more effort to team projects).

Group Size and Composition

Student feedback from focus groups suggested to us that keeping group size to a minimum is critical. The academic team literature also suggests that team size is related to team performance and accountability (Cox & Bobrowski, 2004; Mullen et al., 1991). When groups are too large, scheduling out of class team meetings becomes difficult and there exists more opportunity for free loaders to “hide.” We encountered some cases where students wanted to add their friends to the group, resulting in decreased accountability and performance. In addition, friendship may not be the best criteria for group formation. Cox & Bobrowski (2004) recommend that instructors form groups based on diverse skill sets related to the team project.

Experimental Design

In order to systematically test our peer assessment model, we found it critical to use an experimental design. Multiple sections of the course afforded us this opportunity. The following steps were taken to eliminate the impact of confounding variables as much as possible:

- Standardizing interventions across class sections (for example, the researchers used a standard PowerPoint presentation to introduce the students to the peer assessment instrument and goal setting interventions).
- Counterbalance instructors with experimental condition when possible (for example, we had each instructor teach one class with the experimental intervention and one without in order to neutralize as much as possible instructor effect).
- Test for experimental and control group equivalence when scheduling constraints make random assignment of students to class sections impossible.

Timing

We found it critical to be as organized as possible prior to the beginning of the semester with respect to the timing of the experimental intervention. By communicating to instructors as early as possible the timetable for the intervention (when students would form teams, turn in project

sections, provide peer ratings, receive feedback, set goals, etc.), the better the chance the timetable would be adhered to. Constant communication was required throughout the semester in regard to timing. We encountered problems with instructors not grading assignments in a timely manner, students not completing their peer ratings on time, and teaching assistants not inputting peer feedback into the Excel program. Constant diligence and communication with all parties involved was required to ensure that the integrity of the experimental protocol was kept in tact.

Evaluate and Monitor the Process

Conducting process checks through meetings with all the parties involved was critical. We found we could not assume that the research process was on schedule and that instructors, students, and teaching assistants were completing research requirements in a timely manner. At one point, one of the authors likened the process to “herding cats.” While that analogy may be somewhat of an exaggeration it does give one an idea of the diligence, attention to detail, and adherence to research schedule necessary to successfully conduct curriculum assessment research in the classroom. With each research cycle, we learned what to do and what not to do, and made improvements along the way. These continuous improvements provided the basis for our best practices recommendations (Table 1).

CONCLUSION

This paper presents a model for implementing a successful peer assessment system in the classroom and best practices for conducting research to assess the effectiveness of peer assessment systems. The proposed model and best practices recommendations are based both on the literature and extensive experience the authors have had developing peer assessment systems and designing research to assess their effectiveness. While many instructors use peer assessment instruments to evaluate individual contributions to group projects, little research exists that assesses the impact and effectiveness of such systems. Anecdotal evidence is often misleading and instructors may not fully understand the impact of their peer assessment instruments, especially from the students’ point of view. We propose using a peer assessment model that incorporates the following:

- Alignment of course objectives with the peer assessment instrument
- Building an accountability system that links peer assessment to students’ grades.
- Providing developmental feedback to students several times during the semester.
- Linking goal setting with public accountability to developmental feedback.
- Using an experimental design to assess students’ perceptions and motivation to provide peer feedback.
- Developing continuous improvement plans to further refine the system.

Assessing classroom interventions and curriculum innovations is challenging and fraught with difficulties. Nonetheless, it is important to assess in a scientific manner the curriculum changes we implement in the classroom. Too often instructors rely on anecdotal information such as observations, student comments, and teaching evaluations to determine whether a particular curriculum innovation is effective.

The only way to truly understand the impact curriculum innovations have on student learning, motivation, and performance is to develop some type of experimental design that

systematically assesses the innovation. Restrictions such as classroom size, scheduling constraints, and insistence on academic freedom can hinder the assessment of curriculum innovations. The authors were able to test their Peer Assessment Model using a freshman course with multiple sections, allowing for an experimental design. While the nature of the course afforded us an excellent opportunity to conduct pedagogical research using an experimental design, coordinating the efforts across multiple sections and instructors (while keeping the integrity of the research intact) was extremely difficult. Through careful coordination and diligent communication with instructors, we were able to be fairly successful, and learned a great deal about what to do and what not to do along the way. This paper contributes to the literature by offering a classroom peer assessment model, and through the recommendation of best practices for assessing the impact of peer assessment using a systematic experimental design.

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