Teaching and Grading in Conferences: Improving Students’ Understanding of Expectations and Evaluations

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Abstract: This paper describes the results of a novel approach in a senior mechanical engineering lab course, which combined team reporting, self-assessment of writing, conference grading, and consultative techniques that help learners improve both their communicative competence and their performance. We argue that the approach increases communications assignments and makes them more effective as teaching tools, without increasing the professor’s workload. Moreover, the approach is similar to industry practices of reviewing communications face-to-face and evaluating them in the context of assigned project objectives, and therefore better prepares students for the demands of the workplace. In addition to the instructor’s assessment, the reactions of the students were obtained by oral surveys. The results indicated that the students believed the approach to increase their understanding of assignments, their attention to and understanding of the instructor’s comments, and their motivation. Finally, initial assessment of student writing indicated improvement resulting from the innovation.

A new method of assessment and feedback

Traditionally, grading of communications assignments in engineering courses involves written comments from the instructor(s) designed to give students feedback on their work. Thus, for written assignments the instructor writes comments in the margins and/or general summative comments at the end or beginning of the paper. Similarly, oral presentation assessments often consist of feedback sheets on which the instructor has written comments during and/or after the presentation.

The ultimate aim of these procedures is of course to improve students’ competence in professional communications. However, it often seems doubtful that this goal is achieved. First, written assessments are time-consuming for the instructor, which can cause faculty to be reluctant to give many communications assignments. Therefore, the practice of written assessment can result in less communicative practice for the students. Even more importantly, research has shown that students often do not profit from written comments. They do not know how to use the comments to improve their writing, have difficulty interpreting the comments, and in many cases do not even read them (Bardine 1999, Elbow 1997, Hodges 1997). The problem appears even more serious when we consider that in engineering industry workplaces collaborative writing is the norm, i.e. comments on papers and presentations are given with the expectation that the writers or presenters will consider the comments and modify their communications accordingly.

Therefore, a more effective way of giving students feedback on their communications assignments

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is called for. In this paper we describe an innovative approach taken in a senior mechanical
engineering laboratory course at the University of South Carolina in the spring 2002 semester.
The approach centered on conference grading, a process in which students bring completed
assignments to a meeting with the instructor, who grades the assignments orally on the spot.
Other elements involved were team reporting, self-assessment of writing, and consultative
approaches that helped the students to improve their communicative skill as well as their
performance on the writing assignments in the course. In the mechanical engineering curriculum at
this university, technical writing is not a required course; the students receive all their technical
writing instruction in three laboratory courses.

The faculty for the course and the staff of the Professional Communications Center in the College
of Engineering and Information Technology have worked together to strengthen the students’
communications abilities. In addition to fundamental skills such as the basics of lab reports, the
target outcomes from the communication emphasis in this course include the following that relate
to writing. We aim to increase the students’ ability to:

- organize information for written lab reports
- understand readers’ and listeners’ responses to one’s writing
- assess one’s own writing skills and plan for continuing improvement
- give advice and feedback to others on written communications

The need for better assessment and feedback

As discussed above in the introduction, research and the experience of many instructors has
indicated that the written comments traditionally provided to students as feedback on their
communications assignments fall short of sufficiently improving students’ communicative skills.
Although many of our points will be applicable to both oral and written communications, this
paper mainly discusses written work. We focus on four ways in which the assessment of written
work in engineering courses could be improved to better suit the educational goals:

- The assessment should help students to improve their work.
- It should help them improve cognitive and meta-cognitive skills involved in written
  communication, i.e. their writing processes as well as their products.
- Both product and process should be part of the assessment; that is, the assessment should
  show the instructor not only how close the student’s work is to the goal but how the student
  is progressing toward the goals of thinking like an engineer in the writing process.
- Assessment should help students acquire not only practices beneficial in the university but
  also practices that will help them succeed in the workplace.

Helping students improve

In order for assessment to help students improve their written communications, they need to have
an opportunity to incorporate the feedback from the assessment into their work. In the traditional
model, the returning of papers with written comments and a grade to the students is the last step
in the writing process. Since the draft handed in to the instructor is considered the final one, it is
perhaps no wonder that students tend to ignore the instructor’s comments – at the point when
they receive them their part of the writing process is finished, and the comments cannot help them

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improve the writing project concerned. This is very similar to the problem with classroom testing noted by Cross and Angelo\textsuperscript{1}, who found traditional classroom tests to be often used as summative evaluations rather than as mechanisms to provide feedback to teachers and students on whether their goals are being met. They argue that this may cause students to lose sight of the goals; “[n]o matter how clear the teacher is about the ‘big picture’, students are unlikely to share the view unless tests and other assessment measures point them toward it” (15).

We concur with Cross and Angelo’s preference for formative, midcourse feedback, repeated at regular intervals, which can help both students and teachers to clarify their goals and assess progress towards them, while there is still time to make changes based on that feedback.

Improving cognitive and meta-cognitive skills

Moreover, the goals of courses with written communications components go beyond the improvement of the written products to include development in the cognitive and meta-cognitive skills needed for effective writing. Ideally, assessment will also help the students develop in this way. An approach that provides a basis for understanding how conference grading can be superior in this regard is that of Graesser, Person, and Hu\textsuperscript{3}, who argue that a tendency among students to settle for the acquisition of “shallow knowledge” (e.g. lists of concepts, a few facts about each concept, simple definitions of key terms) is reinforced by normal classroom … testing procedures. “What is missing are the deep, coherent explanations that organize the shallow knowledge and fortify learners for generating inferences, solving problems, reasoning, and applying their knowledge to practical situations” (33). Although Graesser, Person, and Hu mainly discuss reading comprehension, their insights can easily be extended to writing if we consider the difference between students’ focusing on the surface structure of their papers (e.g. spelling, grammar, formulaic section headings) rather than a thorough understanding of how the elements of the papers and the connections between elements can function to communicate effectively to the reader.

Graesser, Person and Hu discuss several discourse mechanisms that promote deep comprehension and learning; many of these appear, we argue, in the conference grading process, which helps to explain its effectiveness. For the sake of brevity, only one, the tutoring process, will be discussed here. The writers argue that previous research has shown, not surprisingly, that one-to-one human tutoring is superior to instruction in the traditional classroom environment. Moreover, this proposition holds across varying levels of knowledge and experience on the part of the tutor; i.e., even relatively inexperienced peer tutors are able to tutor effectively. The explanation Graesser, Person, and Hu provide concerns an important difference between conversation patterns typical of tutoring and those typical of classroom instruction. While the traditional exchange of the classroom is the three-step initiation-response-evaluation or question-answer-feedback, in tutoring sessions this sequence is supplemented with two following steps: tutor-student collaboration to improve the quality of the answer and tutor’s assessing student’s understanding of the answer. While conference grading is not one-to-one but rather involves the instructor meeting with the team, this crucial element is nonetheless present; this idea will be discussed more specifically in the following section on conference grading. Moreover, conference grading involves students in the assessment process and therefore provides them an opportunity to learn self-assessment.
Therefore, we argue that interaction patterns in conference grading help to promote the deep learning of both cognitive and meta-cognitive writing skills, and conference grading is thus an improvement over written comments in regard to writing process development.

Assessing both product and process

A third area in which the traditional assessment method could be improved relates to the professor’s evaluation of this kind of development. That is, in addition to the very important goal of helping advance the students’ skills is the goal of allowing the instructor to assess those skills rather than simply assessing the final product. Because conference grading involves face-to-face interaction with the students, with collaborative discussion of questions and problems as discussed in the preceding paragraph, there is clearly far more opportunity for an instructor to gain insight into the students’ mental states and processes than in more traditional methods. For example, according to Graesser, Person, and Hu, student’s deep comprehension is manifested in the quality of their questions; the process of an instructor writing comments provides no opportunity for questions from the students, while the conference provides ample opportunity. In addition, as pointed out by Cross and Angelo, it is also important to assess the student’s self-awareness of their writing skills; reading the paper handed in provides little if any clue of meta-cognition for the instructor, while in the conference students have opportunities to discuss their own writing skills or their beliefs can be explicitly elicited by the instructor.

Preparing students for employment

Finally, it is generally agreed in the engineering field that educational activities should help students learn practices useful in the workplace; assessment should not and need not be an exception in this regard. Freedman and Adam discuss ways in which practices in engineering courses in universities differ from those in typical engineering workplaces. Two specific areas they describe that might cause problems for students going from the university to the job are collaboration and iteration. Traditional assessment approaches largely entail a non-collaborative, non-iterative writing process. A paper is typically considered a product of an individual student, and, as discussed above, the draft handed into the instructor is the final draft - the feedback provided to the students is not incorporated into the paper. However, Freedman and Adam emphasize that in the workplace drafts are often composed by several writers working together. Moreover, the drafts are then subsequently evaluated by many other readers, often rising in the workplace hierarchy, and writers revise the paper in light of the comments, resulting in an iterative process of revision-evaluation-revision. Their study indicated that student interns were unfamiliar with the idea of collaborating on drafts; more seriously, then often failed to revise their papers or otherwise react to comments from readers. Freedman and Adam connected this problem directly to the normal conventions regarding evaluative comments in the traditional assessment process.

The conference grading approach

We believe that the conference grading approach is more effective than traditional assessment of written work in each of these four areas. The basic elements of the approach as originally implemented in the senior mechanical engineering lab course in 2002 were as follows. At the
beginning of the semester, the students were divided into teams of four, for the semester. For each lab report assignment, each team prepared one report. To facilitate the collaboration process, each team was given access to an electronic share folder. For the grading of each report, an appointment was made for a meeting of all team members and the instructor; the instructor had not seen the report before the meeting. Each student read aloud sections of the report. Following the reading of a section, team members and the instructor commented on what had been read, with attention to the tone, the effectiveness, etc. All team members were required to participate in this evaluation. When all sections of the report had been read and discussed, each student orally assigned a grade to the report and justified that grade.

Over the semester the instructor became increasingly convinced of the value of the process, and the students also reacted favorably, as will be discussed further in the next section. However, the instructor’s perceptions and the students’ feedback also indicated two areas of weakness in the procedure. First, the instructor was unable to adequately monitor how much each team member contributed to the collaborative process. Second, while the students may have helped each other revise sections of the paper, the process was still insufficiently iterative in that there was no opportunity to revise in light of the instructor’s feedback. Therefore, the process was modified in two ways. The team now brings a written account of what each member has done to help prepare the report. In addition, teams who improve their reports by revising in response to the discussion in the conference can resubmit the report and receive a higher grade, and often the professor further encourages revision by assigning a grade contingent on specific revisions.

Gauging student reaction to the approach

The student reactions to the innovative approach were obtained by means of one-on-one interviews conducted during the final week of the course. To encourage frankness, the interviewer was a graduate student from the USC Linguistics Program, unknown to the students; no one but the interviewer and interviewee was present during the interviews and the students were informed that their identities would not be revealed. 28 students were interviewed, out of the total 33 in the course. In the interviews the students were asked to describe their perceptions of all the communications aspects of the course; for the purposes of this paper we reference those that related specifically to conference grading and, in one case, a comment made without reference to any specific component of the course.

Results: benefits for instructors and students

The professor of the course is an author of this article and thus shares his reactions first-hand. For the instructor, there were immediate practical advantages to the conference grading system. The conferences took considerably less time than writing comments on individual papers. The class usually has 32 students, yielding eight teams of four each, and each conference takes about thirty minutes; thus assessment time for each report totals four hours. Moreover, there was a time management advantage in that the conferences were allotted definite times in the instructor’s schedule, thus eliminating the problem of procrastinating on grading, and students, not surprisingly, see the conference time as fixed, eliminating requests for extensions of deadlines. The instructor also perceived an increase in rapport with the students due to personal contact in the
small-group setting.

More benefits were apparent regarding progress toward educational goals. The students in general reacted very favorable to the change; in the interviews, two students recommended that conference grading be instituted in other courses with reports, projects, and papers, and activities that resemble workplace demands. Both the instructor’s and the students’ reactions indicated conference grading to be superior to the traditional grading approach in all four areas discussed above in the section on the need for better assessment and feedback.

Regarding improvement in the written products, the instructor perceived improvement in the quality of both the first drafts submitted and the revisions undertaken after the conference. While ideally this subjective judgment would eventually be substantiated by an objective quantifying measure, some support for the notion that first drafts were of higher quality comes from statements made by students in the interview. One student commented that motivation was increased by conference grading because there was ‘more at stake’ in personally presenting a report than in handing in a written version. In addition, two students mentioned that conference grading was useful for understanding the professor’s expectations and grading criteria; we might logically expect that if students understand the criteria better they will come closer to meeting them. Support for the perception of improvement in the revised versions is tied into another aspect of the approach: its usefulness in helping students understand how to improve the products. Seven students mentioned the usefulness of conference grading for understanding weaknesses and needs for improvement in technical reports.

Advances in the student’s cognitive and meta-cognitive skills were also perceived by both instructor and students; the observations reference various aspects of gains in skills. The instructor observed the students spontaneously peer-teaching during the conferences, thus raising the skill levels of the whole team. One student mentioned in the interview that the process of reading the report aloud was helpful in improving the reports and also the students’ writing skills. Three students mentioned (two in relation to conference grading, one without explicit reference to an activity) that they had increased their familiarity with ASME or technical writing conventions and standards, which suggests both increased skill in this particular area of professional expertise and awareness of the expectations of readers, at least regarding format. Finally, one student mentioned the opportunity to negotiate the grade in the conference, which implies an explicit focus on student self-awareness.

The major source of evidence for the effectiveness of conference grading in allowing for assessment of students’ cognitive and meta-cognitive level and progress comes from the impressions of the instructor. In discussing the reports with students he feels that he was able to get significant insight into the relative depth of the students’ understanding of both the technical knowledge involved in the lab experiments and the writing skills involved in preparing the reports. A student also commented that the conference provided the opportunity to explain how the contents of the report were chosen, which lends support to the professor’s impression that students in conferences displayed the level of their thinking processes. Another relevant student comment is the remark that the professor’s tone of voice was informative as to the relative importance of recommended changes in reports; this reference to the evaluative activity of ranking
the instructor’s comments according to importance suggests that the students were actively engaged with the instructor in assessing the report, thus displaying their level of understanding of his comments (though this conclusion is obviously in need of substantiation).

Finally, the instructor felt that the approach was significantly more useful in acquainting the students with the common workplace practices of collaboration and iterative writing than the traditional assessment procedure. Evidence for collaboration came most basically from the fact that the reports were written by groups rather than individuals, with the reports on the contributions of individuals assuring that everyone did their share. Student comments also referenced the collaborative aspect of the team reports; one student remarked that the teamwork on the lab reports brought students together and therefore helped in completing assignments, and another mentioned that the teamwork approach promoted cooperation among students.

More evidence that the students gained practice in collaborating came from the professor’s observations of peer tutoring, mentioned above, and especially from the students’ active collaboration with the instructor during the conference – asking questions, providing explanations, negotiating understanding, and building on the professor’s statements. As we discussed earlier, a major problem with written comments is that the students tend not to respond to them or even read them; however, they actively engaged with the professor’s oral comments. This finding is supported by remarks of the students themselves that indicate attention to the comments. Two students claimed that the professor’s oral comments and the students’ notes on those comments were clearer than written comments, and four mentioned that the students paid more attention to the comments due to the small-group setting and/or the comments’ being oral rather than written. Also, one student mentioned that having several students, rather than just one, hear the professor’s feedback resulted in more of the feedback being absorbed.

On the other hand, the students did not mention the iterative aspect of the writing process. However, the professor observed that they began to think of their papers as subject to revision in the process of discussing how the reports could be done better. This was followed by actual practice in revision in the cases where they chose to resubmit the papers after revising in light of the discussion. Therefore, the instructor believes the students to have gained in this area also. Additional evaluation of the students’ perceptions of the effectiveness of conference grading is currently underway, by means of a survey focused specifically on this procedure.

**Conclusion**

Problems associated with the traditional practice of writing comments on reports are well known among engineering faculty. Our experience has been that conference grading is an approach that effectively addresses many of these problems. Since instituting the procedure in the semester of spring 2002 the instructor has continued to use it in the senior lab course and is convinced of its superiority over the traditional method. The students have also reacted positively to the method.
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