

Video Recording Feedback to Improve Oral Presentation Skills of Engineering Students: A Pilot Study

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ABSTRACT

Outcome "g" of the ABET 2000 Engineering Criteria requires engineering programs to demonstrate that, by the time of graduation, students have the ability to communicate effectively. Universidad del Turabo's Department of Mechanical Engineering, a program accredited by the Engineering Accreditation Commission of ABET, has identified the following performance criterion for outcome "g": Delivers an effective oral presentation. A performance criterion is defined as a specific, measurable statement identifying the performance required to meet the outcome, confirmable through evidence. This paper describes a pilot study carried out by the authors to improve the skills of our graduates by using video recording feedback. The students get to watch their performances on video tape, and are given the opportunity to evaluate their performances, prior to delivering a second oral presentation, which is also assessed and evaluated. The hypothesis of the study is as follows: "Engineering students will improve their oral presentations skills by obtaining feedback from watching videos of their own presentations, and by evaluating their performances using a rubric". Two presentations in the course *MEEN 475 Multidisciplinary Experience in Industry*, separated by one month from each other, were evaluated for this pilot study. The results are encouraging; the self-evaluation of the three students, as well as the evaluation by one of the authors, detected a considerable improvement in performance during the second presentation. In light of these positive results, the investigation will continue next semester.

Keywords: Video Feedback, Turabo, ABET, Performance Criteria

1. INTRODUCTION

Outcome "g" of the ABET 2000 Engineering Criteria (ABET, 2007) requires engineering programs to demonstrate that, by the time of graduation, students have the ability to communicate effectively. Bussard (1982) defines communication as "the ability to listen to others, to receive and convey information through writing, drawing, and speaking, and to keep an audience in mind while communicating". Universidad del Turabo's Department of Mechanical Engineering, a program accredited by the Engineering Accreditation Commission of ABET, Inc. has identified the following performance criterion for outcome "g": "Delivers an effective oral presentation". A performance criterion is defined as a specific, measurable statement identifying the performance required to meet the outcome, confirmable through evidence. This paper describes a pilot study carried out by the authors to improve the skills of our graduates by using video recording feedback.

Bussard (1982), from the Cooper Union School of Engineering, reported that videotaping of oral presentations took place in his school in 1982. In the assessment, many students singled out videotaping feedback as a significant learning tool. Dent and Preece (2002) cited three papers that used video recordings as a learning tool for improving clinical skills in medical school. Among the papers cited, Paul, et al (1998) reported that 73% of the students thought that self-observation influenced the development of clinical skills and that 80% thought

feedback from peers and tutors was helpful. They conducted the exercise in a single session in which all the participants (students and faculty) had the opportunity to reflect on their own performance, to give and receive peer critique, and to hear feedback from the tutor. In their video recorded study, Dent and Preece (2002) incorporated post-graduate education students with a knowledge of educational principles. Liebermann et al (2002) presented an overview of diverse technologies, including video, that were used to provide athletes with relevant feedback. Each technology described was based on the assumption that feedback would eventually enhance skill acquisition and sport performance. Lee and Wu (2006) used video recording feedback to improve learning of trainee teachers involved in a Teaching Practicum course. The results of questionnaires that were administered to all participants of the study indicated that the system effectively enhanced their teaching experience.

2. GOAL, OBJECTIVES AND HYPOTHESIS

The goal of this study is to determine if video recording feedback increases the ability of students to deliver an effective oral presentation.

The objectives are the following:

1. To determine if video recording feedback in our population of senior graduating students is as effective as has been previously reported in the literature.
2. If video recording feedback is proven effective, to recommend additional studies to optimize the usage of this learning tool.
3. If video recording feedback is proven effective, to recommend improvements to the facilities and equipment for video recording of the oral presentations.

The hypothesis of the study is as follows: “Senior graduating engineering students will improve their oral presentations skills by obtaining feedback from watching videos of their own presentations, and by evaluating their performances using a rubric”.

3. METHODOLOGY

The senior design course *MEEN 475 Multidisciplinary Experience in Industry* offered in the first semester of the 2007/2008 academic year was selected to conduct the study as it requires four oral presentations throughout the semester. In this course, students work on a problem assigned by local industry and team together in groups of three or four students. Only one group was selected to conduct the study and only two of the presentations, separated approximately by one month from each other, were recorded. All students presented orally for approximately the same amount of time (5 minutes) at each presentation. The presentations were conducted in the English language which, although it is not the primary language of most of our students, it is the language used in the professional engineering world.

The camera used was a SONY, model DCR-DVD201, with an cost of \$899.99 in 2005. It uses DVD disks of 3.0 inch diameter. The camera was mounted on a 5-1/2 foot tripod during video recording. The equipment is shown in Figure 1. A typical classroom, rather than a television studio, was used to deliver the oral presentations (Figure 2). The camera was always aimed at the presenters. Our laboratory technician, which does not have any audiovisual training, kindly accepted to perform the video recording. No microphone was used except for the one built into the camera. For feedback, the disks were replayed directly from the camera to the 13 inch monitor shown in Figure 1. All the students signed a release form to allow the video recording to be used in any educational setting.



Figure 1: Video Equipment Used in the Study



Figure 2: Classroom Setting

Students viewed their first presentation in the monitor before they delivered their second presentation. They rated their performances using the rubric shown in Figure 3. This rubric was created by Prof. Julio Vélez from the School of Social and Human Sciences at Universidad del Turabo. The only modification to the rubric was to change the heading of the document. Prof. Vélez uses this same rubric in the course *ENGL 331 Oral Communication* which is a requirement for all engineering students. Exactly the same rubric (except for the heading) is used in engineering courses so as to provide continuity and consistency throughout the curriculum regarding the evaluation of oral presentations. The rubric is based on a five-point Likert scale.

Project Name: _____		
Company: _____		
Team members: _____		
Evaluator: _____ Faculty, _____ Industry/Guest, _____ Student.		
DELIVERY	RATING	COMMENTS
1 – Non-Verbal Communication:		
Appearance	1 2 3 4 5 N/A	
Facial expression	1 2 3 4 5 N/A	
Body language	1 2 3 4 5 N/A	
Gestures	1 2 3 4 5 N/A	
Eye contact	1 2 3 4 5 N/A	
2 – Verbal Communication:		
Volume	1 2 3 4 5 N/A	
Speed	1 2 3 4 5 N/A	
Intonation	1 2 3 4 5 N/A	
Pronunciation	1 2 3 4 5 N/A	
3 – Stage Freight:	1 2 3 4 5 N/A	
4 – Enthusiasm:	1 2 3 4 5 N/A	
5 - Content:		
Introduction of Topic	1 2 3 4 5 N/A	
Organization of ideas	1 2 3 4 5 N/A	
Supporting Evidence	1 2 3 4 5 N/A	
Summary/Conclusions	1 2 3 4 5 N/A	
Evidence of Preparation	1 2 3 4 5 N/A	
Visual Aids	1 2 3 4 5 N/A	
Additional comments: _____		

RATING KEY:

1 = Poor 2 = Fair 3 = Acceptable 4 = Good 5 = Excellent N/A = Not Applicable

Figure 3: Rubric Used in the Study

After the second presentation the students once again reviewed their delivery in the monitor, and rated their performance with the same rubric. Neither of the authors was present while students reviewed the presentation in the monitor and while they performed the evaluation. The second author, Dr. Ferdinand Rosa, reviewed the presentations independently and evaluated them using the same rubric. The results of the evaluation were not used in the calculation of the final grade of the students; it was used purely for assessment purposes. Students were informed of this fact prior to conducting the study.

4. RESULTS

The results of the evaluations are shown in Table 1. The first column identifies the persons conducting the evaluation; the three student members of the group, and the professor of the course, Dr. Rosa. The second column reports the overall average scores for the first presentation while the third column reports the results for the second presentation. The last column indicates the difference between the scores of the two presentations; therefore, it provides a measure of the improvement in oral presentation skills.

Table 1: Results of the Evaluations Using the Rubric

Evaluator	Overall Average 1 st Presentation	Overall Average 2 nd Presentation	Delta (2 nd Pres. – 1 st Pres.)
Student 1	3.76	4.76	+1.00
Student 2	3.19	4.30	+1.11
Student 3	3.41	4.11	+0.7
Professor (Dr. Ferdinand Rosa)	2.60	3.53	+0.93

5. DISCUSSION OF RESULTS

The results shown in Table 1 are very encouraging. The last column of the table, which shows the difference in results from the first to the second presentation, clearly shows that all the evaluators noted an improvement. The average improvement increment was 0.94, almost a full point difference in the five-point Likert scale. The professor was the toughest evaluator. Dr. Rosa's initial evaluation was in the range of 2.0 to 3.0, and the final evaluation was in the range of 3.0 to 4.0. On the other hand, all the students evaluated their first presentation in the range between 3.0 and 4.0 while the second presentation was evaluated in the range between 4.0 and 5.0. We think that this difference may be due to the fact that students tend to inflate their scores in self-evaluations because they think it may influence their final grade.

6. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this pilot study it may be concluded that video recording feedback was very effective in improving the oral presentation skills of our senior graduating student population. This conclusion correlates well with results previously reported in the literature. The hypothesis of the study is validated.

Based on this conclusion we make the following recommendations:

1. To conduct a follow-up study to determine the required number of presentations with video feedback before the learning curve of improved oral presentation skills levels off.
2. To include a control group in the next study. The control group will not participate in the video recording feedback sessions.
3. To consult experts in video recording at Universidad del Turabo to recommend improvements in the facilities and equipment used to record and review the recorded sessions, and to give a cost estimate of the recommended improvements.

7. FUTURE WORK

The investigation will continue next semester. The four oral presentations required in the course *MEEN 475 Multidisciplinary Experience in Industry* will be recorded. Since the last presentation takes place at the end of the semester, only the first three performances will be evaluated by the students. The fourth presentation will only be evaluated by the professor. We seek to determine the number of feedback sessions required before the learning curve of improved oral presentation skills levels off.

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