



Redesign of a Graduate Seminar Course Using Active Learning for Oral Presentation Skills

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Redesign of a Graduate Seminar Course Using Active Learning Opportunities for Oral Presentation Skills

Abstract

This paper presents details of a seminar course offered to mechanical engineering graduate students at Washington State University Vancouver (USA). This is a one-semester-credit course with a primary purpose of giving the students an opportunity to practice presentation skills in front of an audience and to explore topics assigned by the instructor.

In our approach, we engage the students in the process of preparing and giving effective oral presentations. First, two short technical articles selected by the instructor are used to provide a platform to practice and receive immediate feedback from fellow students. Using only two articles enables students to hear the same topic presented by different presenters to clearly see the difference a presenter can make on a given topic. The goal is for the students to incorporate the feedback to their presentations and improve their skills throughout the semester. Towards the end of the semester, each graduate student presents his/her own thesis research with the skills learned from the previous two presentations. The paper provides details of how the course was organized, the types of articles used and the assessment tool. Results on student progress in presentation skills and recommendations for implementation at other institutions conclude the paper.

I. Introduction

Engineers must have strong technical and communication skills to be successful in almost all aspects of their professional work. A study involving hundreds of companies reflected the importance of oral communication skills¹. About 30% of the companies indicated strong oral communications skills as important in new hires^{1,2}. Also, 73% of the companies believed more emphasis should be placed in developing this skill. At the undergraduate level, universities provide communication skills training through general education courses and usually with project presentations by student teams in engineering courses³. At the graduate level, seminar courses tend to be used as a place to develop oral communication skills. Typically, presenters from outside the department and/or department faculty give weekly seminars and the students are in the audience⁴. Other approaches include having each graduate student present a topic of his/her selection⁵, community building through seminars⁶ and Ph.D. students collectively identifying and presenting topics related to challenges they face in the program⁷.

Although students get to practice oral presentation, two important components tend to be missing: (1) Feedback to improve specific presentation skills for each student, and (2) A chance to present again after incorporating the feedback. In this paper, we present a graduate-level seminar course where the primary purpose is to give the students an

opportunity to practice presentation skills in front of an audience and receive immediate feedback from the audience. Multiple presentation opportunities are provided throughout the course to allow more practice and to incorporate feedback for improvement.

In the following sections, we first present an overview of the course. This is followed by discussion of results obtained after offering the course in Fall 2015. The paper concludes with lessons learned and suggestions for future improvements.

II. Overview of the course

This is a one-semester-credit course with pass/fail grading in the Master of Science in Mechanical Engineering degree program on our campus. The primary purpose of the course is to give the students an opportunity to practice presentation skills in front of an audience and to explore topics assigned by the instructor.

In a typical graduate seminar course, presenters from outside the department give weekly seminars and the students sit in the audience. The downside of this approach is that most students are very inactive and disengaged from the presentations. Often the topics are beyond the technical knowledge of the students, too.

In our approach, we wanted to engage the students in the process of preparing and giving effective oral presentations. First, two short articles^{8,9} are selected by the instructor. Half of the class is given one article and the other half gets the second article. Then, in the upcoming few lectures, each student presents his/her article in 5 minutes. This completes the first round of presentations by the entire class. Next, the same exercise is repeated with two more new articles^{10,11}, which completes the second round of presentations. Using only two articles in each round of these exercises enabled students to hear the same topic presented by different presenters to clearly see the difference a presenter can make on a given topic. More than two articles can also be used in this approach to give more chances to the students to practice. However, this would hinder the goal of showing the presenter's contribution. Yet another point to consider is the size of the class. If too many students are presenting the same article over and over, it gets boring very quickly. Hence, using 4 articles was a good compromise for the class size of 18. We picked *short* articles^{8,9,10,11} that are about contemporary issues so that students with any background could easily understand and present them. Another approach could have been to pick research articles from the literature (e.g. one article from solid mechanics, one from thermodynamics and one from controls area). But we felt that with such articles students would lose the point of the while exercise and focus on understanding the technical details of the article instead of preparing a good presentation.

In all presentations, students use Microsoft PowerPoint with an outline provided by the instructor. Each presentation is 5 minutes long. After each presentation, students in the audience ask questions while everybody in class and the instructor fill out the feedback forms (provided in the Appendix). All forms are collected at the end of the session, organized, and returned to the presenter shortly after the class. The overall goal is for the

students to incorporate the feedback from their first presentation into their second presentation to improve their skills. Finally, towards the end of the semester, each student presents his/her own thesis research with the skills learned from his/her previous two presentations.

In Fall 2015, eighteen graduate students took the class. Four articles^{8,9,10,11} in various mechanical engineering disciplines were provided to the students. The class met once a week for 50 minutes. In each session, 6 students made their presentation using the assigned article.

For the last round of presentations, each student was asked to give a seminar on his/her MS thesis research topic. These presentations were given in 15 minutes. They were encouraged to organize their seminars into a cohesive presentation and be selective about what to present. They were asked to review 3 to 4 papers in the thesis research area, tell a complete story about the topic and target the level of the audience as most students would not be familiar with the specific topic. They were also advised to explain concepts in simple and clear terms and be prepared to answer questions after the seminar. Students were reminded to take all feedback from the first two rounds into consideration to improve their presentations.

A couple weeks before their presentation day, each student submitted a detailed outline (1 – 1.5 pages) and an abstract (one or two paragraphs; 250 words maximum). Two randomly selected students in class and the instructor reviewed these and provided feedback to the student in a timely manner to implement changes in his/her presentation.

II.1. Feedback form

We studied various sources to determine primary features of a good presentation. These were then organized into a simple form that could be used by the students to provide quick feedback on the spot right after a presentation.

Along with the feedback form, a survey was given to the students at the end of the semester to improve the quality of teaching and learning in this course in the future offerings. Both forms are provided in the Appendix.

III. Results and Discussion

The feedback form has three sections entitled (1) The Basics, (2) Presentation Delivery, and (3) Slides. From each section, we decided to use only the questions where a rating in the 1-to-3 range was given in analyzing the data.

From “The Basics” section, we used the following questions:

1. Take-away message was clear (Message the audience should be receiving)
2. Knows what he/she is talking about

Figure 1 shows the data for each student where each of the three bars represents a round of presentations (round 1 with articles 1 & 2; round 2 with articles 3 & 4, and round 3 on thesis). As it can be seen, most students had a significant improvement in this category throughout the semester. For example, student 1, had an improvement of 9.2% from his first to second presentation and an additional 6.3% from his second to third presentation resulting in an improvement of 15.5%. Overall, 7 students showed steady improvements throughout the course, 7 students showed improvements from the first presentation to the second but had a slight drop in their thesis presentations (such as student 17). These students were first-semester graduate students who were not quite familiar with the details of their research projects and got lower scores as a result. Two students seemed to achieve mixed and somewhat flat ratings probably because they did not make much effort to incorporate the feedback into their presentations. Two students showed small but steady decline where the new approach did not seem to help in this category.

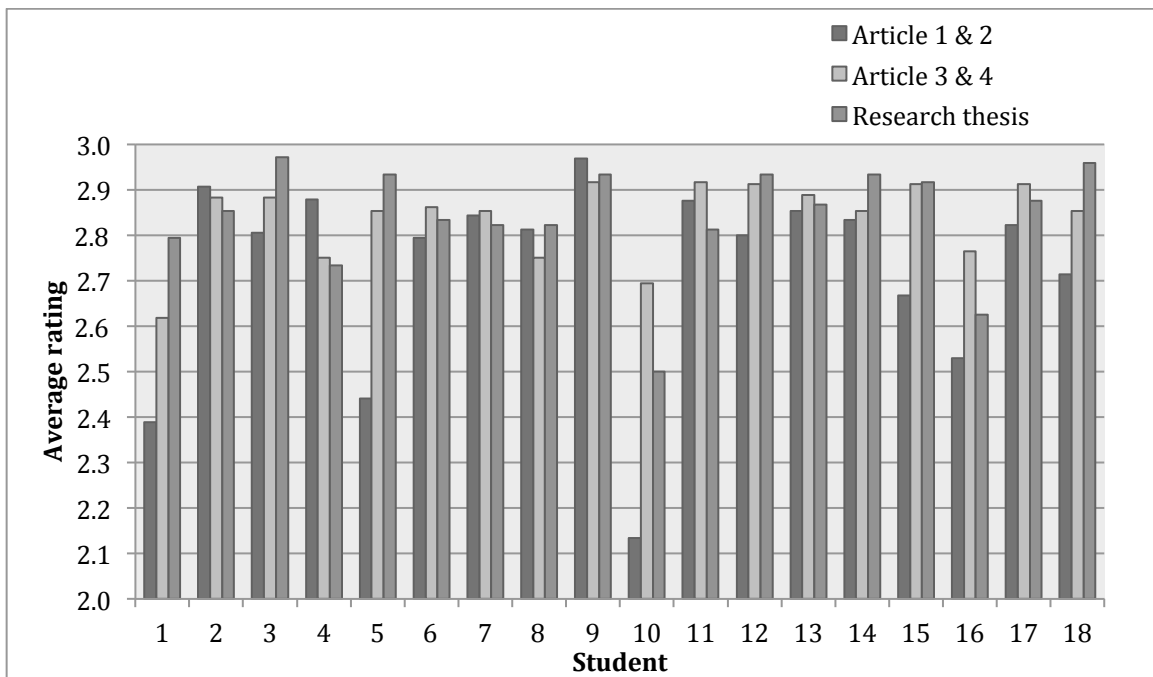


Figure 1 – Selected questions on *The Basics*

From the “Presentation Delivery” section, we used the following questions:

1. Conveyed the “take-away message” with a clear outline
2. Proper introductory material was presented to provide background material for the presentation
3. The main points were well presented
4. Maintained eye-contact with the audience not the screen or the projector
5. At the end summarized effectively what was presented

Figure 2 reflects the feedback from this section. Again, most students had a significant improvement in this category throughout the semester. For example, student 1 showed a

16.5% improvement in his second article presentation when compared with the first article. And yet another 7.5% increase on his performance on his research presentation. That is a total of 24% enhancement throughout the semester. A similar rate of improvement is observed for student 10 between his first and second article presentation. His score declined in the thesis presentation. We estimate that the same factor of being a first-term student and not being familiar with his thesis topic yet continued to be an issue.

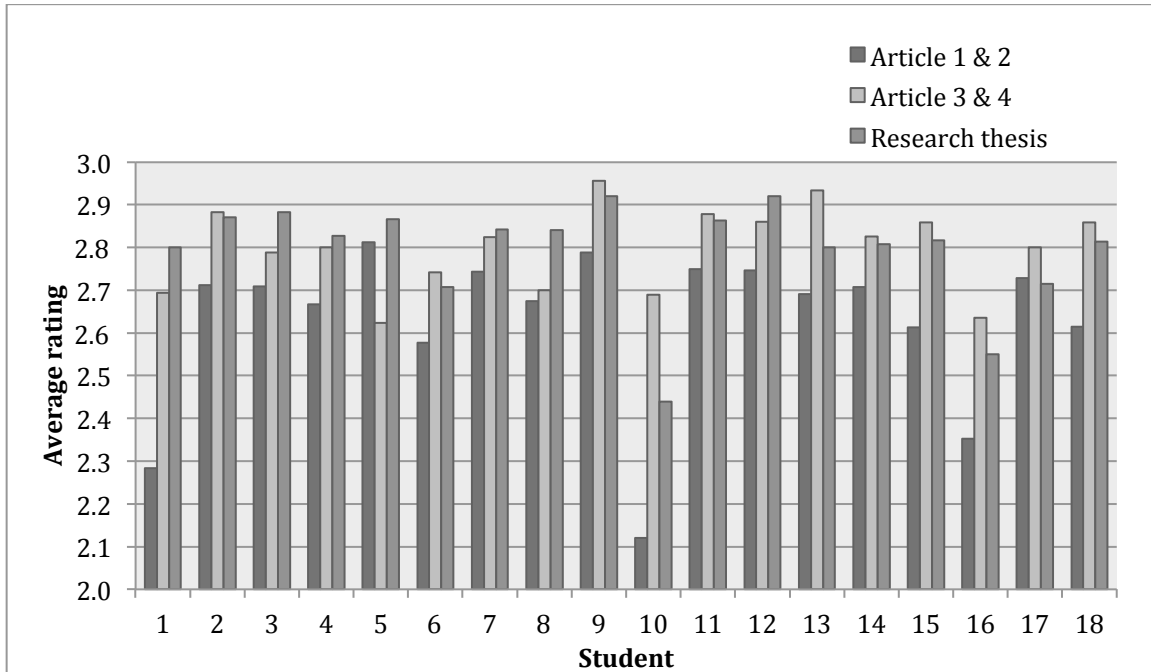


Figure 2 – Selected questions on *Presentation Delivery*

Overall, 5 students showed steady improvements in this category throughout the course. One student (5) had a drop in his score in his second presentation but recovered and did even better in his thesis presentation. Eleven students showed improvements from the first presentation to the second but had a slight drop in their thesis presentations (such as student 2). This may be due to the more complicated and technical details they had to present in the thesis presentation. Some of them got a bit more nervous and others had difficulty in conveying the main message clearly. In this category, no student showed steady decline.

One could draw similar conclusions about Figure 3 in which the following two questions were selected from the “*Slides*” section of the evaluation form:

1. Each slide had a simple message
2. Graphs were used effectively to present relations between variables

Overall, 7 students showed steady improvements throughout the course, 9 students showed improvements from the first presentation to the second but had a slight drop in their thesis presentations (such as student 2). We thought that the more complicated technical details in the thesis presentations made some of their slides appear more

cluttered, hence impacted their scores. In this category, no student showed steady decline.

A survey was given to the students at the end of the semester for the purpose of improving the quality of teaching and learning in the course in its future offerings. Figure 4 shows the survey results on the scale of 1-to-5 (5 highest). The survey is provided in the Appendix.

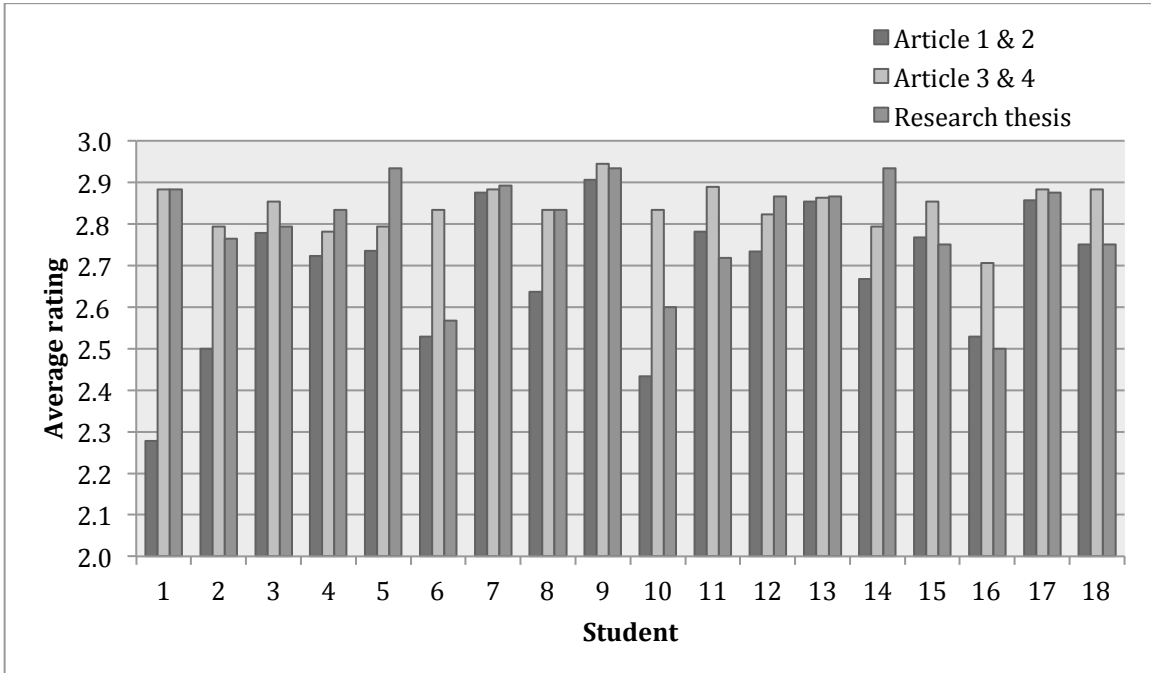


Figure 3 – Selected questions on *Slides*

The students strongly agreed (4.50/5.00) that they became more aware of the existence of different approaches to presentation and also thought that the course made a positive contribution to their education (questions 6 and 10). The next highest score (4.44/5.00) was for question 2 which indicated that the course helped them develop their presentation skills. With a similar score (4.41/5.00) for question 7, students also indicated that the course promoted active learning. Although still a high score (4.24/5.00) was received in question 5, several students indicated in their written comments that the feedback form should be further simplified by reducing the number of questions and by providing a bigger space for them to provide more written comments to the presenter. We already started working on this improvement for the next offering of the course.

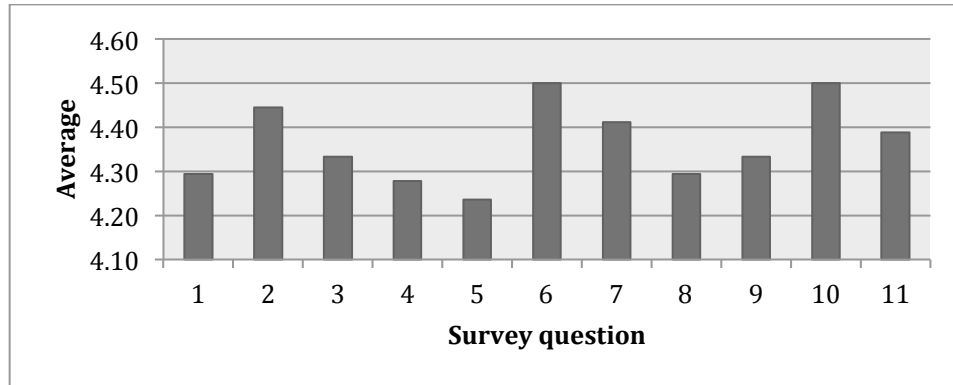


Figure 4 – Results of the student survey

VI. Conclusions

In this paper, we presented a graduate-level one-credit seminar course where the primary purpose was to give the students an opportunity to practice presentation skills in front of an audience and receive immediate feedback from the audience.

The results showed that about 35% of the students continuously improved throughout the course. About 50% showed significant improvements from the first to second presentation but had a slight drop in their scores in the thesis presentation. It was observed that students learned from each other's presentation styles and implemented changes in their next presentations accordingly. Some students were in their first year in the graduate program while others were in their second year. When it came to more complex topics to present, such as their thesis topics, it was evident that the second year students possessed better presentation skills and were more comfortable in front of the audience due to their previous experience such as project presentations in other graduate courses. Also, having deeper familiarity with their thesis topics helped them. Another observation was that the English-speaking students in general were performing at higher level than foreign students due to the language difficulties.

In schools with large number of graduate students, offering multiple sections of the seminar class might scale this approach up. Alternatively, students can be assigned to teams of 3-to-4 to prepare the presentation materials and present by taking turns.

References

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APPENDIX

Feedback Form

Seminar Presentation Evaluation Sheet

Student Presenting:

Article

<i>The Basics</i>	“3” indicates highest score		
“Take-away message” was clear (Message the audience should be receiving)	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Knows what he/she is talking about	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Finished in the allocated time period	<input type="checkbox"/> Yes (1)	<input type="checkbox"/> No (0)	
Had “back up” slides for anticipated questions	<input type="checkbox"/> Yes (1)	<input type="checkbox"/> No (0)	
Practiced the presentation with a friend at least once before giving it today	<input type="checkbox"/> Yes (1)	<input type="checkbox"/> No (0)	

<i>Presentation Delivery</i>			
Conveyed the “take-away message” with a clear outline	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Proper introductory material was presented to provide background material for the presentation	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Followed the outline throughout the presentation	<input type="checkbox"/> Yes (1)	<input type="checkbox"/> No (0)	
The main points were well presented	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Presenter did not read the slides to the audience	<input type="checkbox"/> True (1)	<input type="checkbox"/> False (0)	
Presenter did not block the projector	<input type="checkbox"/> True (1)	<input type="checkbox"/> False (0)	
Maintained eye-contact with the audience not the screen or the projector	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Spoke slowly and with enough volume	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
At the end, summarized effectively what was presented (recapped take-away message)	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Presenter was relaxed (not intimidated by the audience)	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)

Student Presenting:**Article #**

<i>Slides</i>	<i>"3" indicates highest score</i>		
Introduction slide was complete with title of the talk, name and affiliation of the presenter	<input type="checkbox"/> Yes (1)	<input type="checkbox"/> No (0)	
Mentioned where the study was done (credits)	<input type="checkbox"/> Yes (1)	<input type="checkbox"/> No (0)	
Each slide had a simple message	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Overall, the slides were uncluttered	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Font size was adequate	<input type="checkbox"/> Yes (1)	<input type="checkbox"/> No (0)	
Easy to read fonts were used	<input type="checkbox"/> Yes (1)	<input type="checkbox"/> No (0)	
Text was presented in "point" form like in newspaper Headlines (not complete sentences)	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Slides had lots of pictures and few equations	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Block diagrams were simple, easy to follow	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Graphs were used effectively to present relations between variables	<input type="checkbox"/> (1)	<input type="checkbox"/> (2)	<input type="checkbox"/> (3)
Graph axes were labeled	<input type="checkbox"/> Yes (1)	<input type="checkbox"/> No (0)	
Explained physical meaning of variables	<input type="checkbox"/> Yes (1)	<input type="checkbox"/> No (0)	

If you have any suggestions for the presenter to improve anything in the presentation please write in the space below.

End of the semester evaluation form

Please rate the following questions by circling your answer based on your experience taking this course.

5 = Strongly Agree; 4 = Agree; 3 = Undecided; 2 = Disagree; 1 = Strongly Disagree

- | | | | | | | |
|-----|--|---|---|---|---|---|
| 1. | The in-class discussions enhanced my learning. | 1 | 2 | 3 | 4 | 5 |
| 2. | This course helped me develop my presentation skills. | 1 | 2 | 3 | 4 | 5 |
| 3. | I felt comfortable participating in class discussions. | 1 | 2 | 3 | 4 | 5 |
| 4. | This course helped me understand the importance of oral presentation. | 1 | 2 | 3 | 4 | 5 |
| 5. | The information presented in this course was clear and well organized. | 1 | 2 | 3 | 4 | 5 |
| 6. | This course helped make me more aware of different points of view on presentations. | 1 | 2 | 3 | 4 | 5 |
| 7. | This course emphasized active learning. | 1 | 2 | 3 | 4 | 5 |
| 8. | This course helped my understanding of resources for the topics of my presentation. | 1 | 2 | 3 | 4 | 5 |
| 9. | This course helped me feel more comfortable and confident in front of an audience. | 1 | 2 | 3 | 4 | 5 |
| 10. | This course made a positive contribution to my education. | 1 | 2 | 3 | 4 | 5 |
| 11. | Receiving feedback on my presentation and incorporating it into my next Presentation, helped me improve my overall presentation skills | 1 | 2 | 3 | 4 | 5 |

In a few words, please make any suggestions you may have on how to improve the course for the future.