Acquiring Science Communication Skills through Conference Simulation

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Abstract

In recent years, the acquisition of science communication skills has become an essential learning outcome of academic science curricula. However, far too little attention has been paid to training science students in these skills. In order to fill this gap, we investigated new teaching methods and planned learning activities with the objective to integrate science communication training within the framework of existing course modules. This paper introduces a new way of course organisation, called conference simulation, which turns out to be a versatile tool for students to practice oral as well as written science communication as part of their science courses.

1. Introduction

Recently, several factors have contributed to innovation in teaching [1] [2], learning [3] and assessment [4] [5] in higher education. It is in this context that conference simulation grew out of a need to integrate training communication skills in existing science courses, in order to prepare scientists to fill roles as communicators linking the world of science and technology to society. Our objective was to provide an environment with favourable conditions where students can educate themselves and each other largely in both communication skills and science. Conference simulation is a way of course organisation that combines elements of active learning, student-centred education, competence-driven education, co-assessment and peer assessment. It takes into account the learning pyramid and incorporates five functions of assessment: capturing student time and attention, generating proper student activity, providing timely feedback to which students pay attention, helping students to internalize the quality standards, and marking [6].

2. Conference simulation

Conference simulation can either start at the beginning of a course module or after an introduction. It is organised in several stages, throughout which students play different roles and are considered to be scientists in the field of the course concerned. The successive learning activities facilitate putting the theory of communication to practice while studying the actual topic of the course.
To start with, students select their own favourite subjects, in which they want to gain more in-depth knowledge and make a proposal for their conference work, which they then report to their peers and lecturer. The next stage consists of studying the subject, writing an initial paper about it and preparing a presentation as input for the workshops, where students act like colleagues that discuss their work through presentations and organised feedback. After the workshops, students process the feedback, submit their final paper to the conference and finalise preparing their conference presentation. The scientific committee, again the students, reviews the final papers, making sure that the feedback has been taken into account. Finally, at the conference, students act both as participants and as speakers presenting their work to their peers and lecturers and to other invited students.
In the remaining of this paper we give an account of how conference simulation gives rise to several possibilities in training and refining different science communication skills while studying subjects in science. To this end, we look into more detail at the various stages that constitute conference simulation.

2.1 Call for papers

Conference simulation is organized within the framework of an existing science course with its own scientific learning outcomes. It starts with the call for papers issued by the conference chair, the lecturer of the course module. The call for papers includes the aim of the conference, the topics, and important dates such as the conference date and deadlines for abstract submission, initial paper
submission and final paper submission. The aim and the topics of the conference correspond to the scientific learning outcomes of the course module. Throughout the conference simulation, students taking this science course, act as scientists aiming at participating in the conference with a presentation. They can address questions to the conference chair. Together with the call for papers, students receive two assessment documents, a feedback form and a review form, so that they can get acquainted with the assessment criteria for their paper work from the very beginning. For the presentations there are no preset assessment criteria as these will be defined by the students themselves. For all information concerning the theory and practice of communication, the students are referred to a student handbook [7].

2.2 Selecting and proposing a subject

The first task for the young scientists is to select their favourite subject of study within the framework of the conference topics. To do so, they are encouraged to search in books, scientific journals and conference proceedings, in the library and on the internet. There is no need for motivating them to find a subject they are strongly interested in, as they know they will have to study it in detail. By the time the subjects have been chosen, they have had a good browse through several conference topics and they have selected most of their study material.

Once their subject is fixed, they prepare a proposal for their conference work in the form of a written abstract and a short oral presentation for their peers and lecturer. All abstracts must be written using a template and are submitted via blackboard, the electronic learning platform. The questions that need to be answered are:

- Which subject did I choose? What exactly do I intend to study or to work on?
- Why did I select this subject?
- Why is it appropriate for the conference?

Then a meeting is organised where all proposals are presented and where the conference chair gives feedback about whether or not the proposed work is suitable for the conference. If necessary, students get advice to adjust their proposal.

Students are asked to observe the quality of the communication aspects of these presentations and take note of tips and tops. A tip is a suggestion for improvement and a top is an appreciation of something that was really good. Then all tips and tops are discussed and the students decide which criteria they will focus on during future presentations.

2.3 Workshops and discussions

As soon as their subject is agreed upon, the young scientists personally select their study material and actively study and process it. The study material should consist of different sources such as book chapters and science papers. As a result of their study, they write an initial paper (using a template), in which their subject should be accessible to all their peers, no matter which conference topic they have been working on. In addition they prepare a presentation as a means to explain their work to their peers. They can choose between an oral presentation, a poster presentation or a virtual presentation. At this point the scientists are ready to teach and talk about their subject. Workshops among colleagues (peers) are organised. Before the workshops, papers are exchanged and students complete a feedback form for each paper they have received and read. At the workshops, the scientists present their subject in detail, answer questions, get advice and receive the completed feedback forms. Each presentation is thus followed by a discussion regarding both scientific content and the quality of communication. Also the quality of the feedback is considered, it should be correct and constructive. At the end of the discussion, students have a good idea of how the others perceive their work and how to improve it.

It turns out that these workshops create an excellent learning environment that serves several purposes. From a scientific point of view and as a necessary learning outcome of the science course, the workshops make sure that the students get involved in and learn about various conference topics. Regarding communication, these workshops - preparation included - provide favourable conditions for experimenting with different communication techniques and consequently for training communication skills. Last but not least, the workshops allow for the development of social skills in that students get an understanding interest in what their peers are doing.
2.4 Final paper and conference presentation

After the workshops, students use the received information to finalise their conference preparation by refining their initial paper and presentation into a final paper and a conference presentation. The final papers are submitted to the conference via blackboard.

The scientific committee, consisting of all authors that have submitted a paper to the conference, reviews the final papers, paying special attention to the changes made since the workshops in order to verify if the feedback has been considered. Each paper gets reviewed by at least two members of the scientific committee, each completing the review form. Unlike the feedback at the workshops, the review is confidential. The author of the paper does not receive the completed review forms, for they contain the actual peer-assessment.

Eventually, the conference takes place, where students act both as participants and as speakers presenting their work to all conference participants: their peers, lecturers and other students (all bachelor students of the department are invited).

The participants are asked to write down one tip and one top for each presentation. At the end of the conference the speakers receive their tips and tops.

2.5 Portfolio and self-assessment

Finally, each student hands in a portfolio at a co-assessment session with the lecturer. The portfolio contains all conference documents related to the student’s conference work: the abstract, the initial paper, all feedback (given as well as received), the final paper, the completed review forms, reflections on all received feedback, bibliography, and presentations. The lecturer helps the student reflect on his conference work resulting in a self-assessment mark.

3. Conclusion

This paper has given an account of and the reasons for the development of conference simulation. Using conference simulation as course organisation, one creates an environment with favourable conditions for students to train communication skills within the framework of existing science courses. Students report that they appreciate the many opportunities to practice and experiment with communication techniques, in rather informal settings in the context of the workshops as well as in more formal situations such as the proposal presentation and at the conference.

Conference simulation combines different innovative elements of teaching, learning and assessment, suggesting several courses of action for future study.

References