PREPARING STUDENTS FOR PRESENTING THEIR RESEARCH: A LITERATURE SURVEY

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Abstract. *Presenting scientific results through conference presentations is considered one of the fastest ways to disseminate results and receive feed-back from peers. The presentation format is essential in engaging the public particularly for graduate students looking for prospective employers in the audience, either in the form of PhD advisors, postdoctoral mentors or industry representatives searching for young talents. In this context, preparing students for delivering professional presentations may be essential for their careers. This paper presents a survey of literature presenting courses designed to enhance these skills at graduate level.*

Key words: *preparing conference presentations, posters, courses and training programs*

1. INTRODUCTION

Advice for preparing successful and attractive presentations is ubiquitous. A simple Google search with the terms conference presentations tips returns 25.8 million results. However, the number of formal, scientific approaches to the development presentations skills is significantly smaller, and that of targeted courses for scientific presentations even less. A search on the Scopus[1] database for 'conference presentations' and 'course' and 'graduate' returns 178 documents matches, out of which only 11 refer to courses, or modules that are designed with the specific purpose of developing scientific presentations skills for graduate (some also for undergraduate) students. There are several reasons for this lack of research in this direction. One reason may be the fact that it is assumed that these skills are developed as a secondary effect of the school program: students are expected to present their work and gradually learn how to prepare effective presentations. However, scientific presentations are evaluated by different criteria by colleagues in the same class, by industry, and by other researchers. While the latter may be less demanding in terms of judging body language and vocabulary, they will judge different presentations and, if necessary favor the more professional one. Although comparing presentations is a subjective task given that in a conference participants may belong to different countries and cultures, the common enemy for every one is the boredom (Harden 2008). Given that

it is also assumed that the content of the presentation should top the attitude of the speaker, it seemed a reasonable assumption that no particular effort should be driven towards teaching graduate students the art of presentation.

On the other hand, if such courses exist, it is probably very difficult to measure their impact. Although some evaluation criteria can be set up, it is only in the real conference setting that their results may be proven. However, studies that measure conference presentation impact usually look only at the number of follow-up journal papers publishes, sometimes ranking conferences based on a score computed from this number (Daruwalla et al. 2015; Dumville, Petherick, and Cullum 2008; Durinka, Chang, and Ortiz 2014; Housri et al. 2008). Moreover, Unalp, Tonascia, and Meinert (2007) find that presentations of clinical trials results actually delay publication time in journals. Another factor that prohibits the evaluation of such an endeavor is the identifications of the factors that influence the actual development of presentation skills in the presence of so many external sources of information that may influence students outside the course.

In this context, a survey of literature reporting attempts to design and offer courses targeted to develop presentation may be useful to assist higher education institutions on deciding whether introducing such courses in their curricula may be useful and may offer information about validated programs that managed to prove their effectiveness. The remainder of the paper thus presents a short description of existing approaches, divided in two parts: conference oral presentations and poster presentations. The object of this paper is to present relevant results from studies published as scientific articles, and not to cover informal training programs not reported in the literature.

2. CONFERENCE PRESENTATIONS

The fundamental difference between communicating research through writing and through oral presentations is the different position the author has to take. While it is customary for the author to anonymize himself in academic texts by using specific language to the extent of completely avoiding the personal pronoun 'I' and also of personal opinions that cannot be scientifically validated, a conference presentation exposes the author directly to his audience as a person, not only as a researcher, making the presentation personal and the preparation for the presentation a complex task.

One of the first studies that address the possibility to introduce presentation skills in an engineering curriculum has been presented by Linsky and Georgi (2005) who emphasize that skills required to deliver technical presentations are very different from verbal skills as they also include an analysis of the audience, research, structure, selective media and creation of effective graphics, and dealing with presentation of numbers, equations and technical data. It is suggested that in a technical communication course that requires weekly presentations students gradually become to feel like experts and they report that future presentation becomes less stressful. The authors also highlight challenges related to the design of such a course: how to mimic an actual conference setting? How to avoid bad habits that are already formed in this genre? How to provide students with an authentic practicing experience? The answer for these questions is proposed in the form of using a design course with lab work for practicing technical presentations, as it provides real results with real data. Students are presenting weekly to a live audience and they are critiqued as soon as they finish. An assessment program is also used to evaluate and

measure progress made. In a similar manner, in (Cao et al. 2013) presentation skills are integrated into a 'BitLab' classroom that integrates history of science with prototyping and public speaking.

Another approach proposes a corpus-based online support for preparing oral presentations in science and engineering for Japanese students (Kunioshi et al. 2012). The authors also emphasize the importance of developing presentation skills and the lack of practical programs to deal with this task. The online solution aids students to structure and formulate their presentation by using a corpus of presentations of students in different fields and is proposed as an aid teaching oral presentations within compulsory dedicated courses. In another support based approach (Linder 2012), the author advocates for mentorship programs for pediatric hematology/oncology nurses aimed at supporting them in preparing abstracts for presentations at professional meetings.

As presentation skills are now considered essential for a successful research career, Burkett, Bahr, Pressley, Schneider, & Lusth (2013) propose a program delivered in three formats for preparing students for research: a semester long, a week long and for 2.5 days. In their program, they include conference presentation tips but because of the time limit they cannot offer students the experience of actual presentation. However, they do measure the impact of the program through pre and post tests and focus groups and find improvement in students understanding of research skills.

One of the most comprehensive studies related to teaching students how to prepare a scientific oral presentation can be found in (Arias et al. 2014) with a focus on engineering students as well. In their approach the authors use the Master thesis as a basis for preparing students for presentations in an alternate program to substitute the usual preparation procedure that consists only in one or two rehearsals before the final presentation in front of the tutor, rehearsal that may indeed improve the presentation but will not induce and change in attitude or behavior. The program focuses on developing a set of skills that are considered necessary for a successful presentation: confidence, clear diction, voice projection, high-quality slides, and engaging the audience. Aware that the development of these skills requires both time and practice, the authors designed and improved over several years a program for graduate students in which students can learn both from experts and from each other. For practical reasons, a web tool is used for remote rehearsals and to allow each student to practice and not miss their presentations.

The program is structured in several steps. (1) An introductory seminar; (2) Students are offered references and useful presentation tips; (3) students are divided in three categories according to the stage they are working on for their thesis: beginner, intermediate, advanced; advanced students will help beginners; (4) A key feature is that the duration of the rehearsal presentation depends on the category, with shorter presentations for the beginners; (5) Evaluation also is performed according to category; (6) Students can illustrate concepts in real presentation; (7) a Web tool can be used by students that cannot participate in the presentation; (8) Evaluation is performed by experts and by colleagues; (9) a score is computed taking into account several characteristics: body position, voice level, diction, know-how, answering questions, time, attention audience, organization, media, and typos. Students were selected randomly to enter the program allowing the comparison of results with those that did not participate. Final grades obtained by participating students was higher than average. However, the grade reflects both the quality of the presentation and the content of the thesis and students participating in the program did not benefit only from the experience of presenting and assisting to other

presentations but also from the guidance in planning the research for the thesis in order to respect deadlines for presentation. Thus, implementing such an approach would benefit students in multiple ways.

Another motivation for including presentation skills in university courses is presented in (Li 2015) by identifying the gap between employer's needs and graduate students skills. Thus, surveys show that employers complain about poor writing and verbal skills, inability to solve problems and to collaborate with peers. The author advocates for and alternative inductive approach that could better motivate students in a research-based learning model that uses inductive teaching and learning. All students involved in this project have reported in their alumni surveys a positive impact. Again, however, presentation skills are not targeted in a course but, by using the student-centered approach, tutoring and mentoring participating students in disseminating their results has contributed to their personal skills development.

3. POSTER PRESENTATIONS

Preparing poster presentation may seem less demanding for an outsider, compared to an oral presentation. However, poster sessions offer the opportunity to interact closer with researchers interested in the same topic and in order to engage them the poster has to contain all relevant information. This makes the task of preparing a poster intimidating for young researchers. Few approaches are found in the literature addressing the problem of preparing a poster presentation and most of them are focused on the specificity of a certain discipline. Thus, Durkin, (2011) presents a program that provides support for nurses in preparing and presenting posters. The success of the approach is presented in terms of increased comfort, experience with poster creation, further participation in professional activities and dissemination. It is thus inferred that the support received for poster presentation also yields other career benefits.

Christenbery & Latham (2013) advocate for the introduction of poster development guidelines and strategies in the Doctor of Nursing Practice curriculum as they consider that they should be present throughout the entire education program. Guidelines that are found successful in poster presentations are: emphasizing the message, clear focus, logical format and a pleasing design, all of these being competencies that are acquired through practice.

In (Becker et al. 2012) a framework for training students by organizing a poster competition is proposed with the aim to help students overcome their perceived obstacles in disseminating their research. They identify these obstacles as being: lack of experience with poster presentations, lack of confidence with oral presentations, and lack of time. While no formal course was delivered, students were encouraged to participate in this competition which mimicked poster sessions at professional conferences. Evaluation of students before and after was performed by using surveys; 94% of students indicated that they considered the competition useful and that the department should support the event in the future. However, the underlying message is that it was rather the experience gained by preparing the posters and feed-back received during the competition that made students learn, and no special training was necessary.

Hoe (2014) also includes poster preparation as part of a course designed to enhance undergraduate research skills in STEM disciplines and increase interest in graduate

school. Students are engaged in research activities under the supervision of a mentor: they keep a record of their findings in a laboratory notebook; they perform literature review; they prepare two reports (an interim report and a final one); they deliver an informal oral presentation and prepare a poster. During the entire process, they benefit from guidance from the faculty mentor. This course offers students the experience of research and research communication.

4. Conclusions

Conference presentations and poster preparation, while included in communication skills and thus considered fundamental skills for a wide range of professionals, have not been the focus of attention of formal courses in university curriculum until recently when their need started to be acknowledged. Very few studies present courses designed to prepare students to deliver scientific presentations. Some courses include formal presentations as part of research training.

However, all studies emphasize the importance of effective communication of research. Regarding both oral and poster presentations, the common ground is that ultimately only practice actually helps students improve their skills and that mimicking a real conference situation has more impact than presenting the work only in front of colleagues. The programs that can report improvement both from the evaluators' point of view and from the students' point of view are those that combine traditional teaching, mentoring and practice. Moreover, it can be further inferred from the results that exercising communication of results at all stages of research also improves the overall output.

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