Introducing Research Methods and Skills in a Workshop Environment

Abstract

'Research Seminar Series' is a 10-credit, Level M module offered to MSc/MEng students undertaking programmes in the areas of Electrical and Electronic Engineering at the University of Bradford. The module's aims are twofold: i) to disseminate state-of-the-art information that could form the basis for future research programmes; and ii) to introduce the stages involved in the preparation and presentation of a research paper.

To achieve its aims, the module comprises two main streams: 1) Students attend a series of regular, hour-long seminars, presented by invited experts from industry and academia, with the aims of broadening understanding, highlighting best practise and introducing new concepts outside of the normal realms of study. 2) Students respond to a Call for Papers, by performing research into a topic of their choice. Students then present their papers in a workshop environment to their peers to conclude the module. Papers are published in the form of Workshop Proceedings, which are provided to students and form the recommended text for the following year.

1. Background

Taught MSc programmes, which typically evolve from the research strengths of the host academic unit, provide an excellent opportunity to link research and teaching. With this in mind, a 10-credit module, *Research Seminar Series*, was introduced in 2002, with the primary aims of providing training in the research methods and skills associated with performing a research project and disseminating the latest advances in research through a regular series of seminars.

The module is core in four MSc programmes offered by the School of Engineering, Design and Technology at the University of Bradford, which cover a range of specialised topics from within the broad area of electrical and electronic engineering.

2. Methodology

The *Research Seminar Series* module runs throughout a 12-week semester. Each week, a research seminar is scheduled, the content of which can vary from state-of-the-art research to seminars developing professional skills, such as how to make effective presentations. Technical seminars aim to broaden a student's knowledge, and often contain material that is not part of the MSc curriculum. The presenters of the research seminars are drawn from industry and academia, as well as research assistants and PhD researchers from within the School.

At the start of the seminar a Call for Papers is announced, which is modelled on standard conference practice. The Call provides the scope of topics to be considered and submission guidelines, including the deadlines associated with each stage of the process. Students respond to this Call by initially submitting a 200-word abstract, after 4 weeks. The abstract is assessed and accounts for 20% of the final mark. Upon acceptance of the abstract, students then proceed to develop a research paper of 3000-words, the format of which is based on a standard IEEE two-column format. The paper accounts for 60% of the final mark and is submitted after 10 weeks.   Both the abstract and research paper are submitted electronically via Blackboard.

A selection of the submitted papers, which meet the assessment criteria and presentation format, are collected into a Workshop Proceedings, which are provided to all students. All students then present their work in the Workshop in week 12, which accounts for the final 20% of the module.

3. Issues

The intention from the outset was for students to submit their abstracts and full papers electronically. In the first couple of years of operation, when class sizes were relatively small (in the region of 30 students), submission via e-mail was the adopted approach. However, as class sizes increased, submission through e-mail was no longer convenient for the academic. At about the same time, the University began to promote Blackboard as its preferred Content Management System, which offered an appropriate interface for electronic submission of abstracts, research papers and PowerPoint presentations. Blackboard also offered the facility to automatically check for plagiarism upon submission, by linking it with the turnitinUK software.

Scheduling the Workshop can also be problematic. Typically, each session comprises six 15-minute presentations. With a class size of 80 students, to timetable all presentations in one afternoon requires a number of parallel sessions to be scheduled, each of which needs to be chaired by a member of academic staff. Up to 12 academics from the department now get involved.

4. Benefits
The Workshop Proceedings, which can run to around 200 pages for the larger MSc programmes, have proved to be a valuable source of information. The Proceedings also provide a permanent record of student achievement and act as a showcase for the MSc programmes that the School has on offer. Students benefit from the opportunity to present their work to their peers, which in some cases can be their first experience of public speaking, and may cite their papers when applying for jobs or postgraduate research positions.

5. Evidence of Success
The Research Seminar Series is now in its sixth year of operation and the range of marks for the past three years is fairly consistent year-on-year. The module has a high pass rate (83.3% in 2007) and those students that fail the module tend to have not completed all elements of their coursework according to the guidelines or have fallen foul of the plagiarism detection software.

In line with the School's MSc course offerings, Workshop Proceedings have been produced each year under three subject areas: Personal, Mobile and Satellite Communications and Radio Frequency Communications Engineering; Real-Time Power Electronics, Control and Electronic Systems; Information Technology in Electronic Commerce. In total, the three sets of Proceedings have accounted for 1562 pages of research papers over the six year period. The University's Library has 29 copies of the various Proceedings in stock, which have spent 1376 weeks on loan over the six year period.

Students are often motivated to pursue further outlets for their papers, as evidenced recently, when one of our students presented his paper at a Royal Institute of Navigation 'New Navigator' Seminar, which was intended for University researchers to showcase their work.

6. How Can Other Academics Reproduce This?
It should be relatively straightforward to replicate this module, either in another engineering discipline, or in a wider context. The module has already been run through the School's franchise operation in Malaysia with similar results to those at Bradford. The main requirements are to establish a regular series of research seminars and to issue a Call for Papers in an area appropriate to the discipline. Academics would then need to prepare templates for the preparation of the research paper, design suitable marking schemes for abstract, paper and presentation and schedule a Workshop at the end of the module, supported by Workshop Proceedings.

7. Reflections
The Research Seminar Series module achieves its aims of linking research to teaching. A major output of the module is the Workshop Proceedings, which, at present, are put together in paper format. This can be a time-consuming exercise, especially with large class sizes. In the future, the use of electronic proceedings supported by a Book of Abstracts may be considered, which is in line with how today's Conference Proceedings tend to be produced.

8. References
6[Th] Personal, Mobile and Satellite Communications and RF Engineering Workshop Proceedings, 25 April 2007, University of Bradford (179 pages).
5th Real-Time Power Electronics, Control & Electronic Systems Workshop Proceedings, 25 April 2007, University of Bradford (97 pages).
Copies are available on request.

Background Information

Discipline	*Generic*
Participants	*80 Students, up to 10 presenters of research seminars, 1 academic and 1 teaching assistant, supported by up to 12 academics during the Workshop.*
Level	*Master*
Pedagogical Approach	*Investigative learning supported by technical broadening through research seminars*
Teaching Methods	*A series of seminars on specialised research topics and professional skills. Practical assessment of technical writing and presentation skills.*
Materials Required	*Web access, literature search facilities, journal and conference paper access, in-house generated Call for Papers and Workshop Proceedings.*
Assessment used	*Assessment is divided into three coursework components. The 200-word abstract accounts for 20% of the final mark. The 3000-word research paper accounts for 60% and the 15-minute presentation accounts for the remaining 20%.*
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