

RESEARCH ARTICLE

Rethinking the final year project report: cutting out the waffle

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Abstract

All final year students in the Department of Mathematical Sciences at the University of Greenwich undertake either a weekly placement or the research methods and project module. The assessment for the project module is made up of a group project, followed by an individual project. In 2012 the University's academic calendar and term structure was changed following recommendations during the UG-Flex project, which advocated the flexibility of a trimester calendar (JISC, 2012). This resulted in the research methods and project students having a significantly shorter period of time to write up their research. As a result, the individual project assessment was redesigned to incorporate a seven-page, 'research paper' style report, cognate to journal articles that students necessarily encounter as part of their research. This paper describes the format of the new report, and discusses findings and feedback from academic staff. In particular, external examiners have commented very favourably on this format and think other HEIs might benefit from adopting a similar approach to project reports.

Keywords: Mathematics, undergraduate, dissertation, project report, academic writing.

1. Introduction

Students studying undergraduate degrees in mathematics, statistics and OR subjects in the department undertake a project in their final stage (level 6). Some students opt to conduct a project while involved in a placement in industry or in a school (Undergraduate Ambassadors Scheme, 2009), but most undertake their project as part of the module: Research Methods and Mathematics Project. This module aims to develop the knowledge and skills that students require in order to undertake and report on an academic project, while working under the direction of a supervisor. It provides an opportunity for students to integrate and extend their knowledge from taught courses using research methods, and to critically assess their own work. An important element of the course is in personal development planning, where students undertake activities to enhance their communication skills, and reflect on their work in the context of career planning.

The assessment portfolio for the course is made up of a group project, followed by an individual project. The former task is designed to enhance employability skills as students reflect on their initial planning and research work as part of a group. Students are required to work with a mixture of individuals that they have chosen to work with, as well as those allocated by the teaching team (Bradshaw, 2009). Groups are then assessed on their written reports and on the communication of their results in group presentations, before embarking on their longer and more in-depth individual research. Throughout each project, students reflect on their progress, and skills gained, in an individual logbook.

In 2012 the University's academic calendar and term structure was changed following recommendations during the UG-Flex project (JISC, 2012). A new trimester calendar was implemented, prompting a departmental review of assessment schedules. The new calendar resulted in the research methods and project students having a significantly shorter period of time in which to submit their work. This impacted the second (individual) project, where the final project

write-up time was reduced. As a result, the individual project assessment was redesigned to incorporate a seven-page, ‘research paper’ style report, cognate to journal articles that students necessarily encounter as part of their research.

This paper presents the new report specifications and template used, and explores the findings, challenges and lessons learned from the past two years of its delivery in the final year project course. Implications for teaching, assessment and learning outcomes will also be discussed, alongside staff and external perspectives on the impact of the change.

2. Report Specification

A new template was specified for the report with the intention to emulate the specifications of academic journal and conference publications. As displayed in Figure 1 the template prescribed rigid formatting requirements, including: font, spacing and margins, as well as conventions for tables and figures. The scope of the project remained the same: students were still required to report on a significant academic project undertaken in a topic of mathematics, statistics or operational research, integrating their knowledge from taught courses. However, in order to fulfil the new specification, student report-writing needed to be precise and strictly relevant.

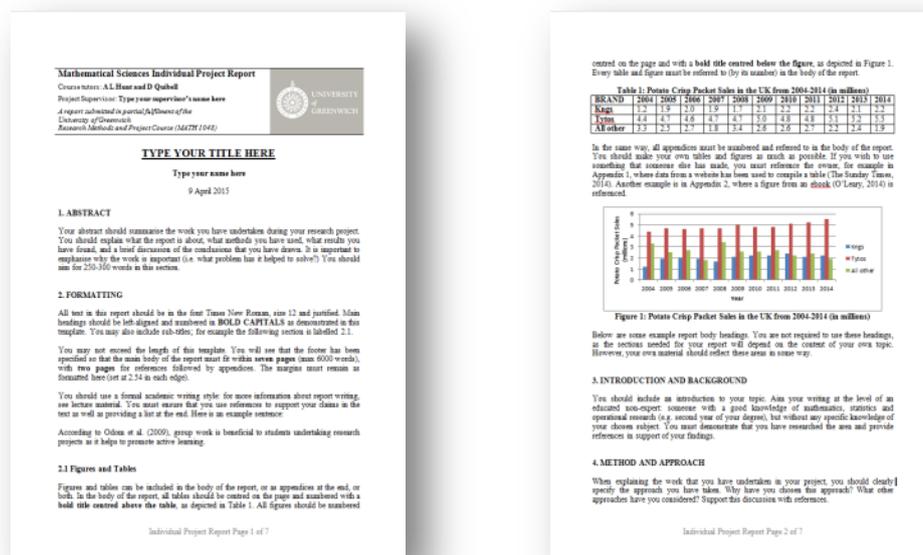


Figure 1. The new project report template

The template allowed for seven pages of report writing (approximately 4000 words), two pages of references, and unlimited appendices. This format encouraged students to be concise and focussed in their reporting, while still including full data-sets, algorithms, and code in the appendices. For example, students undertaking projects in data analytics may describe their work in the body of the report, including visualisation of the key findings, and fully document all analysis in the appendices. Similarly, students programming as part of their project can submit their program, and full code as supplementary material, while the body of the report focusses on analysis and discussion.

In this format, the process of reading academic journals, and learning about peer-review and appropriate research sources, informs students' understanding about the technical writing style and format expected. It also allows for convenient exemplars for students; it is straightforward to set a classroom activity around a seven-page piece for peer discussion. Throughout the module,

as part of their personal development planning, students were also encouraged to consider the development of this succinct academic writing technique as a crucial skill towards their future career/future study.

3. Findings

In the past two years, we have found that students learned how to structure their research according to this concise format, and communicate their findings in a succinct manner. In many cases this effectively focussed the students' writing in the main body of the report and found students could still demonstrate their work comprehensively using appendices and other deliverables such as programs.

Student feedback was largely positive, with 86% of students agreeing that the assessments enabled them to demonstrate their learning. However, this included their experience of the group project which may have clouded the judgement of some students who find group work difficult. Tutors noted that embarking on the write-up seemed less daunting for students, particularly for those with dyslexia and dyspraxia. Students also commented favourably on the use of exemplars, i.e. the ease of reviewing previous years' work given the accessibility of the format.

When marking these submissions supervisors commented that the succinct report style enabled discrimination between the varying quality of work: students have "*nowhere to hide*" when there is little room for superfluous information in their reporting. The following comments are from a Reader in the department, who has supervised projects in a number of institutions for 15 years:

"With these new reports, you can test their ability to write briefly and directly, asking them to put their work in a format that will benefit them should they go into research, or industries where they have to write executive summaries and reports. It also benefits staff as it reduces the material that we have to go through, and grading is focussed on the quality, not quantity of work."

It was felt that students were dissuaded from 'padding' their reports with as much material as possible, and instead focussed on the project work itself.

Traditionally, project assessment is particularly onerous, and there can be a conflict about the effective use of tutors' time (Brown et al., 2013). When using the new format, supervisors and markers commented that it was easier to establish the crux of the project work undertaken. External examiners and the moderation panel found that the standard and topic difficulty were comparable with previous years. One external examiner commented on the potential for the "*research paper*" style report and recommended:

"...staff involved in co-ordinating the project module to monitor and 'fine-tune' (if necessary) the changes they have introduced, and to consider disseminating this innovation to the wider MSOR community."

It was also seen by staff as an effective way to showcase student work, as reports are readable, accessible and easily collated. Employers and visitors to our graduate showcase, including academics from other HEIs, commented that the general quality of projects was very high.

Furthermore, it was found that those students conducting their individual research in response to an employer brief produced reports in this format that were fit-for-purpose in conveying their findings to an end-user or client. A number of employers in the private sector and in the civil service have disseminated these reports internally, indicating that they are deemed appropriate for communicating findings to staff. In the past two years, many students working to an employer brief received job offers as a result of their project work.

4. Discussion

The report specification and teaching and learning activities have gone through minor modifications. For example, peer review of exemplars has proved to be successful in informing the students' understanding of the assessment requirements, and in discussions of topic feasibility.

There has been internal discussion about the potential downsides to a shorter report, for example whether provides less opportunity for students to explore different approaches: they may be discouraged from deeply researching alternative solutions in their topic, as the reporting space is likely to focus on the work undertaken (as indeed an academic paper would be). It may also be the case that there is less opportunity for students to compensate for mistakes, i.e. by demonstrating a fundamental misunderstanding early on in the report, and not pursuing other routes. However these should be addressed in the associated logbook submission, where students reflect on their progress and learning throughout the project: the depth of their research is evident in such a log. Also there are opportunities for exceptionally able students to submit papers to journals and/or to present their work at the annual undergraduate conference, *Tomorrow's Mathematicians Today* run by the Institute of Mathematics and its Applications (IMA).

We have found that many mathematics students dislike or resist writing, as it is seen as a secondary skill to their subject. The new format has made the process less daunting for them, but this could also mean that some students are complacent about the task at hand, delaying the start of the write-up. More work is needed to instil the necessity of work-planning, in students' projects, and as a general professional skill.

Our change to the project report has been highly effective. Students, academics, externals and employers have commented favourably and there has been little impact to the quality of student work. Students have continued to progress as usual to MSc and PhD programmes at a variety of institutions and student work has been published as a result of the report being written in this format.

There are a number of upcoming developments to the project module, to support the on-going development of the assessment portfolio, including marking schemes that emphasise orthogonal elements to more clearly benchmark grade boundaries, and exploring the potential for flexibility in the length of the report.

What began as a response to a University-wide calendar shift, has led to an exciting innovation that is popular with students and academics, and projects that have enabled students to pursue further academia and graduate employment. We look forward to reporting on the next phase of the assessment development.

5. References

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