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How can we improve the final year dissertation? A consideration of ethics, quality, and one-to-one supervision

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ABSTRACT

The final year dissertation is seen across many degrees as a capstone achievement. It is set apart from other assessments in terms of its magnitude, its requirement for originality, and the autonomy that students must show in completing it. It is also unique in that it is traditionally carried out within the context of a one-to-one supervisory relationship. However, dissertation modules are prey to a number of problems. First, the person carrying out the research may have difficulty in framing a quality, or even a feasible, research question. Second, where dissertations are based on original empirical work, ethical concerns are particularly crucial, but the ability of the student-researcher to appropriately engage with those concerns is substantially less than that of a mature researcher. Third, support comes from a single source, but the supervisory relationship may be poor, or perceived as poor relative to the supervision experienced by peers. This case study describes a suite of changes that were made to one dissertation module to ameliorate these potential problems. Specifically, supervisors create project frameworks that students work within and the responsibility for getting ethical clearance for these is a supervisor's responsibility. In addition, a substantial programme of specialised support sessions was created to supplement supervision. We argue that these changes did not significantly undermine the autonomy and originality requirements of the module, and present evidence that suggests they had a substantial positive impact on students' learning experience and academic achievement. Ideas for further ways in which the dissertation module could be improved are discussed.

Keywords: dissertation, final year project, student satisfaction, ethics

Introduction

The final-year project, or dissertation, is a capstone learning experience for most undergraduate or Bachelor degrees. It is invariably an extended piece of research or inquiry-based work, which requires students to demonstrate much more autonomy than is the case for typical taught modules. Beyond these core features, there are many ways in which dissertations might vary across disciplines and degrees (Healey, Lannin, Stibbe, & Derounian, 2013). One reason that the dissertation is seen as such a valuable part of a degree is that it is an opportunity for students to develop applied research skills. This has clear benefits for student employability and for their prospects if applying for taught or research-based postgraduate study. Specifically, it allows students to provide concrete examples of the skills they have acquired in interview settings. More generally, though, it promotes an independent approach to learning. Supervisors might set broad task parameters, while the student must reflect on how to best make use of, and develop, their own competencies to successfully accomplish the task. This process perfectly matches the kind of demands that are met in many workplaces.

The dissertation is a particularly crucial learning experience for students who wish to go on to careers involving empirical research. Specific skills that are tested in the dissertation might include independently engaging with the literature in an area, creating a relevant and original research question, designing a study that could answer that question, collecting data, devising an analytic strategy, and then disseminating results (i.e., writing it all up). While all of these are worthwhile challenges and achievements, the initial steps of devising and refining a dissertation topic can be a difficult task for undergraduate students (Abdulai & Owusu-Ansah, 2014). There are a number of problems that students are likely to encounter (Wood, Giles, & Percy, 2012) that will lead to a poor-quality project. For example, students, when given a completely open choice, are often led by what they have encountered on their course. However, lectures, especially from first year, are designed to be an introduction to a topic area and are not always a good reflection of cutting edge thinking in the field. Thus, students may come up with facile replications of well-established effects. Alternatively, students may come up with an original idea, but find that there's no literature to support a rationale or the construction of a theoretical framework. Similarly, they might come up with an excellent idea that requires such resources of time/money/access that it is unfeasible for an undergraduate dissertation. Finally, they might come up with an idea that is ethically inappropriate (Wood et al., 2012).

Edwards (2009) argues that students who are not doing quality science are being short-changed in terms of the learning opportunity that a dissertation is supposed to represent. She also suggests that asking people to participate in poor quality research is tantamount to asking them to waste their time. Quality of research, particularly in terms of whether or not findings can be replicated (and studies reproduced) is a topic of major interest at the moment (e.g., Nosek et al., 2015) and supervisors working with students on dissertations are increasingly aware of these issues. For example, Button, Lawrence, Chambers and Munafò (2016), noting the low power and concomitant spurious effects associated with small-N projects (Button et al., 2013), preregistered a study on the Open Science Framework and collected data with final year students across multiple universities. While the organisational effort this required may be unfeasible for most supervisors, improving quality is still a worthwhile goal. One of the reasons why quality of project is important is that it can lead to a better student experience. Apart from the appreciation students might hold for contributing to demonstrably meaningful work, such work is also more likely to be publishable. Having contributed to a published piece of work, or even possibly being a co-author, could be of enormous significance to the career prospects of a student, especially if they are applying for posts with a research component.

The student experience is also likely to be influenced by the quality of the supervisor, which varies along two dimensions: first, the pedagogical skill of the supervisor and, second, the supervisor's research expertise. In relation to the first, any module where teaching is driven through direct interactions with a tutor will naturally be highly dependent on the quality of that tutor (in terms of their experience and teaching ability) and the relationship between the tutor and the supervisee (Del Río, Díaz-Vázquez & Maside Sanfiz, 2018). In relation to the second, most universities value the goal of research-led teaching (Schapper & Mayson, 2010), and the research dissertation is probably the place where the value of research expertise in the teacher is clearest. However, some supervisors are likely to be relatively inactive researchers, or may be early-career researchers who are still developing their own research skills and experience. In combination, these two factors suggest the possibility that students will perceive a lack of equity in the supervisory experience, which may lead to a reduction in satisfaction.

This case study describes a final year dissertation module that was redesigned to improve the student experience. In particular, there was a focus on improving the quality of projects being done and the quality of the supervisory experience. In accomplishing these goals a number of additional benefits also became apparent. The specifics of the case study, as well as the benefits that followed the changes that were made, are described below.

The Case Study

The case study took place within the BSc Psychology at a university in the North of England. Until recently, the final year project on the course used the traditional model implicitly described above, where students had to generate their own research topic (typically taking inspiration from example studies suggested by their supervisor) and then complete an ethics form that led to the study itself being ethically approved. Projects were often of poor quality and the process of moving towards a study that could be ethically cleared was often laborious, for both student and supervisor. Observing an opportunity to improve the experience of both students and supervisors, we redeveloped the module with the following aims:

- Improve the quality of studies being carried out by students
- Improve the student experience by increasing the equity of supervision across students

These aims were supported by two subordinate goals:

- Improve and streamline the ethics process
- Get students working collaboratively

Quality

Previously, students created their own projects with guidance from staff. The process of coming up with an initial idea to developing a methodologically complete study was a lengthy one and often led to poor quality projects. To improve the quality of the studies being done supervisors now devise complete projects which students sign up to, which ensures that the research questions being asked are more relevant and the methodologies being used are more rigorous. This model is not new, but is more typically used in the physical sciences, engineering, and maths (Healey et al., 2013). These projects align with the supervisor's own research expertise (an example of research-led teaching) and can provide data that are actually useful, either for pilot work or for potentially publishable research.

From the students' perspective, rather than tentatively moving towards a project proposal that may have very little academic merit, students can now be confident that the project they have chosen to work on is worthwhile. However, we also wanted to ensure that students still have the capacity to demonstrate a degree of autonomy in their research. As such, all students have some say in the specific variables being studied and methods being used (as long as they fit within or alongside the parameters of the study defined by the supervisor). Further, if students really do have an original and worthwhile research idea that can't be encompassed by any of the projects on offer, then they can approach a prospective supervisor in second year. That supervisor can then get the project on the books in advance of the student starting in third year.

Equity of Supervision

The quality of the tutor and the relationship between the tutor and the supervisee (Del Río et al., 2018) are key determinants of the student's experience of their dissertation. While the use of a formal supervisor-supervisee contract or agreement of expectations can help ensure that this relationship is a good one (Derounian, 2011), problems, such as a supervisor failing to provide sufficient support for students, may still occur. Another factor to consider is the degree to which the supervisor is an experienced researcher. Early career or research inactive staff may not have the research competencies needed to provide a satisfactory supervisory experience. To reduce the potential for variance in student experience, we decided to centralise some of the teaching responsibilities that had previously fallen on supervisors. We developed a series of lectures and optional workshops for the module that covered a wide range of topics. Students sign up only to those workshops that are relevant to their own study. Workshops deal with design and data collection in semester one (e.g., setting up a focus group), and with data analysis (e.g., factor analysis) in semester two. In addition, there are workshops on academic writing skills (e.g. writing a discussion) as well as analysis support drop-in sessions run by PhD students. Using a range of support mechanisms and structures in this way is in line with the suggestions of Healey et al. (2013) in their discussion of how undergraduate supervision models can be rethought. Many of these group sessions cover content that would otherwise have been dealt with on a one-to-one basis with supervisors. This substantially reduces duplication of work and improves consistency in the student experience. Outsourcing training for particular research skills also means that students wishing to use a particular technique need not necessarily be supervised by someone who is familiar with that technique. A common occurrence in this vein is where the number of students wishing to do qualitative projects exceeds the supervisory capacity of available qualitatively-orientated supervisors (Wiggins, Gordon-Finlayson, Becker & Sullivan, 2015). Finally, presenting students with an array of workshops that they can choose from gives them an opportunity to demonstrate autonomy in how they craft their degree experience.

Ethics

There is a growing awareness that universities must treat the ethical clearance of student studies with the same gravity as staff research projects. A university could easily find itself liable for reputational and financial damages if a student project led to harm being done. This would be a breach of the ethical imperative of non-maleficence, but there are other ways in which research may be ethically inappropriate. Indeed, Edwards (2009) suggested two ways in which student research may be particularly at risk of ethical problems: the researcher is less experienced, and there may be a conflict of interest between conducting the research ethically and getting a good mark. However, Hack (2012) found that there were serious disparities in the rigour of the ethics procedures used for student projects across different universities. In many cases, ethics oversight could amount to students or their supervisors classifying the project as low risk, a process that is likely to be both subjective and prey to a self-interest bias.

Previously on this module, students had to design their own study and write an associated ethics form. Following this, the ethical approval process was vulnerable to the kind of problems described by Hack (2012). Now, supervisors create projects that students work on. They complete an ethics form that is checked by the faculty research ethics committee (before the module starts), making the process more objective, rigorous, and consistent. Importantly, this form doesn't refer to a single tightly defined study, but provides a loose methodological framework that could encompass many different studies that differ in small ways. For example, the ethics form, might refer to the use of measures "such as..." rather than a specific measure. In this way, the student still has substantial scope to choose particular stimuli or add their own potential moderators. In addition, students must still complete their own ethics form in relation to the project (a step mandated for psychology student in the UK by the British Psychological Society; BPS, 2016). However, as the study has already been ethically cleared and the student must work within the parameters of that study framework, there is less potential risk if the student ethics form is seen only by the supervisor. Without needing to bear the full weight of a study's ethical approval, the form can be more light touch while still being an adequate academic exercise to allow students to show that they have an awareness of ethical issues.

Team Work

Another reason why the quality of research being done is better is that we now encourage students to work in teams. Teamwork is a valuable transferable skill (Landrum & Harrold, 2003), and is made much more feasible when students are working on variants of the same project. We stress the advantages that come with working as a group (most notably the possibility of sharing the load of data collection), but are also happy to provide one-to-one supervision where the student would prefer to work by themselves. When several students are working to collect data, the final data set can be quite large. This increases the likelihood that the data will be of publishable quality and, at the least, that it will provide a compelling pilot for a possible future study. For example, the supervisor may work with students to devise a core study and ask each student to further contribute their own moderator variable. All students would then collect data on all variables, but would focus their literature review and analysis on just the core variables and their own moderator. If this work is subsequently published, students who had made a substantive intellectual contribution to the study in this way should expect to be included as authors (BPS, 2017); students whose contribution was limited to data collection should not. While the module is still one characterised by independent learning, the addition of a teamwork component means that students have a premade support network to help deal with what is often found to be a highly stressful module (Devonport & Lane, 2006). In addition, there is evidence that working as part of a group actually leads to better academic outcomes for students (Healey et al., 2013). Of course, teamwork brings the risk of problems such as interpersonal conflict and social loafing. These are obviated through the use of formal agreements about supervisor and supervisee roles and responsibilities that are drafted at the outset of the project.

Outcomes

In general, the reduction in work duplication that came with moving the teaching of dissertation skills from one-to-one sessions with supervisors to group-based workshops, alongside the adoption of meetings where a supervisor works with a team of students rather than just one, means that the teaching on the module is far more efficient than it was. Beyond this, though, there are several more specific positive outcomes from a staff perspective. First, while staff need to do slightly more work early on in creating the project framework, the process of moving students towards a point where they can start to collect data is much smoother. Second, staff may benefit from students doing projects that are personally relevant and more likely to lead to useful pilot work or a publishable data set. Third, the additional efficiencies in the module mean that staff can avail of a sabbatical system that was developed on the back of those efficiencies. This latter point has particular relevance in terms of student experience, as it provides space for early career researchers and research inactive staff to develop their own research competencies and expertise. As argued previously, such expertise is likely to lead to a better student experience and reduce the likelihood of a feeling of inequity in supervisory experience. From the students' perspective, there are also a number of positive outcomes. First, they too appreciate the smoother journey at the outset of their project. A more efficient ethics process at the start of the year means that they are likely to get ethical clearance sooner and start collecting data earlier. Second, some students are excited by the potential to be a named author on a paper. Third, the addition of a workshop-based support system means they are less likely to be vexed by apparent disparities in the supervisory experience.

While we were aware of these theoretical benefits during the planning stages of our new approach, we were concerned that the drastic changes that were being introduced might actually negatively impact on the student experience. To determine whether this was the case, we collected data at two time points: at the end of the year from the last cohort to go through the old, more traditional, system ($N = 202$) and at the same point in time a year later from the first cohort to experience the new system ($N = 196$). All students provided consent for their data to be used.

A series of two-tailed independent t-tests were conducted to compare student feedback from the two cohorts for each of the five items. There was no change in perceived support, but each of the other questions showed an improvement following the addition of the structured workshop system to the module (see Table 1).

Table 1 Differences in Perceived Support and Personal Development Across the Two Cohorts

	Old system <i>M (SD)</i>	New system <i>M (SD)</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
<i>I feel I have improved my personal skills and research competence through the dissertation</i>	5.81 (1.22)	6.13 (1.02)	2.86	.005	0.28
<i>I feel I have improved my written communication skills through studying the</i>	5.64 (1.21)	5.99 (1.02)	3.08	.002	0.31

<i>dissertation</i>					
<i>The level of difficulty/challenge has been about right for me</i>	5.23 (1.45)	5.59 (1.40)	2.51	.013	0.25
<i>The dissertation has helped me develop my knowledge and understanding of the topic I have studied</i>	6.14 (1.06)	6.37 (0.98)	2.21	.027	0.23
<i>I felt well supported in my learning on the dissertation</i>	5.41 (1.62)	5.27 (1.68)	0.84	.40	0.08

We also evaluated whether there was any change in the grade that students achieved for their dissertations across the two cohorts using an independent t-test. This also showed an improvement following the change to the module's structure: students in the new-system cohort (N = 233, M = 63.6, SD = 8.3) did significantly better than those in the old-system cohort (N = 215, M = 61.5, SD = 8.6), $t(436) = 2.60$, $p = .010$, $d = 0.25$.

As described above, some dissertation skills are now taught in a workshop context rather than by supervisors. This slight re-orientation away from the one-to-one model might have been perceived by students as a reduction in support. Reassuringly, though, there was no significant difference in how supported students felt they were. Further, the other four items, which relate to competence, all showed a small significant improvement. As might be expected given this uptick in self-rated competence, the marks achieved by students on the module also increased. Finally, while it is impossible to make a causal connection with the changes we made to the dissertation module, final year students were also more satisfied with the course as a whole according to data from the National Student Survey (an additional 3% of students agreed that they were satisfied with the course in the year these changes were implemented).

Discussion

This case study describes a model for organising a final-year dissertation module. It was designed for psychology students, but could equally be applied to any dissertation with an empirical component and has relevance for dissertations across all disciplines. It was intended to solve (or at least ameliorate) a number of problems that had been observed in relation to the typical way that such modules are run. In particular, putting the onus for coming up with a research question squarely on students and relying solely (or almost solely) on one-to-one supervision can lead to a tendency for students to do poor quality research, a laborious journey towards ethical clearance, and poor student experience due to heterogeneity in supervisors and in the students themselves. Our solutions included allowing supervisors to devise project frameworks that students can work within, creating workshops that teach dissertation skills to complement one-to-one supervision, and encouraging students to work in groups. In several respects, the changes that were wrought have been extremely successful. Students are benefitting in a number of ways, not least in that the student experience and academic achievement have both improved. Staff are benefitting through the quality of research they are getting to supervise and through the introduction of the sabbatical system that was partly resourced through the efficiency that came with the new model.

Apart from the concrete outcomes that we have measured, self-determination theory suggests various ways in which these changes should be for the best from a motivation and well-being perspective. Self-determination theory posits that we are motivated to fulfil three fundamental needs – autonomy, relatedness, and competence – and that our well-being is best when all three needs are being met (Deci & Ryan, 2000). Dissertation modules fundamentally depend on, and foster, autonomy (Todd, Bannister, & Clegg, 2004). While it could be said that shifting the responsibility for devising the main research question from the students to supervisors reduces the degree to which this is the case, students still have considerable scope to exert control over the precise methods used in their project. Apart from this, though, the additional control that students have in crafting their learning experience, in terms of choosing which specialised workshops are and are not for them, allows them to express their autonomy along a different axis. Reflecting on task needs, one's own competencies, and development opportunities in this way is an excellent example of how this dissertation model supports the growth of work-related skills and prepares students for the world of work. This module also provides an additional means for relatedness needs to be met. Working within a team, which is now encouraged on the module, provides an opportunity for students to forge connections with their fellow supervisees. Other team members may be particularly valuable as a source of social support. Finally, in relation to the competence, the additional support provided through workshops and analysis drop-in sessions gives students a greater sense of mastery over what they're doing. This increase in competence was clearly visible in the significant improvement in marks that students achieved on the module.

While the changes to the module have generally been beneficial (and never, as far as we can see, harmful), there are a number of issues that should be borne in mind by anyone considering implementing similar changes. First, the module is far more complex than it was previously. There are now dozens of workshops on disparate topics all of which need to be staffed and timetabled. Students need to be made aware of these, but so do supervisors. Supervisors also need to be made familiar with many new processes pertaining to project design and ethical approval, as well as general supervisory expectations. In sum, there is a far greater burden in terms of organisation and training than is the case with the simpler traditional one-to-one model. Second, while this model ameliorates many problems, it also opens up new axes where problems might occur. For example, using predetermined projects means that students might choose a project that they ultimately find they do not enjoy. In addition, the fact that multiple people are being supervised on the same project opens up the possibility of harmful group dynamics, or of students who need additional support being inadvertently side-lined.

There are a number of further adaptations that could be implemented if one wanted to further increase the quality of the research being done. It could be argued that this goal is irrelevant to final-year dissertations, where students are doing research as a learning experience. However, Edwards (2009) makes a strong case that getting students to do quality research for their dissertation is an important prerequisite for a quality learning experience. In addition, working on quality research increases the likelihood that students might be included as an author on a published paper. Finally, this model more closely matches the kind of research work that students are likely to do following graduation (i.e., carrying out research work on behalf of a principal investigator). Given the importance of quality and the advantages of the supervisor-led approach that supports this quality, encouraging the use of study pre-registration by supervisors seems like an excellent idea (Bishop, 2013; Button et al., 2016). Pre-registration reduces scope for p-hacking practices and may come with a guarantee of publication irrespective of findings. Apart from the intrinsic value of using pre-registration, its use would also familiarise students with an important current trend in meta-science. Another worthwhile approach, though not one without additional logistical complexities, is getting supervisors and students to collaborate across institutions (Button et al., 2016). As well as creating scope for a larger, broader, sample, the experience of working with peers from other universities is highly valuable for students. It adds a further dimension to the development of team-working skills, allows students to get experience of different working contexts, and supports the growth of vertical and horizontal networking, which has been shown to be associated with students achieving better grades (Hwang, Kessler, & Francesco, 2004).

This case study makes the point that the traditional one-to-one supervision approach can be improved in several ways, at least in disciplines that ask students to do an empirical dissertation. It demonstrates a coherent, effective, and innovative model for how final year empirical dissertation modules can be run. The systems that have been put in place improved ethical rigour, scientific quality, the supervisor experience, and the student experience without clearly undermining the uniquely autonomous mode of learning associated with the capstone dissertation.

Biographies

Diarmuid Verrier is a senior lecturer in psychology at Sheffield Hallam University. He teaches on modules relating to individual differences and statistics, and does research on personality and motivation.

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