

Systematic Reviews as Undergraduate Dissertation Research Projects: A Reflective Case Study

Nieky van Veggel

Writtle University College, Chelmsford, Essex, UK.

Abstract

in 2014 Writtle university college validated undergraduate provision in veterinary physiotherapy and in 2016 provision for bioveterinary science. using my background in laboratory animal science, I proposed and piloted the use of systematic reviews as final year research projects. in order to fully develop this programme, I have written and delivered both staff workshops to support staff supervising systematic review projects, and a series of workshops for students undertaking systematic reviews. This is further supplemented with a dedicated VLE section on systematic reviews, and written protocols, support documents and templates for use by students and staff. The use of systematic reviews as undergraduate dissertations has reduced the strain on laboratory and animal facilities, which is essential as student numbers for courses using these facilities are ever increasing. Feedback from staff and students regarding the workshops has been very good, and the quality of systematic review dissertations was comparable to “normal” research dissertations. Systematic reviews will directly inform the veterinary physiotherapy students' master's year projects and make these more valid and ready for scientific output. this helps develop Writtle university college's reputation as the institution to go to for evidence-based veterinary physiotherapy. This is significant, as the field is relatively new and underdeveloped. to conclude, systematic reviews make good undergraduate dissertation projects, but implementation needs thorough support.

Keywords: evidence-based practice, staff development, student workshops, veterinary physiotherapy, animal science

INTRODUCTION

Writtle University College is a small specialist university college offering a wide variety of land-based courses. As part of its portfolio, Writtle offers undergraduate courses in animal science, animal management and veterinary physiotherapy. For these courses, students undertake an independent dissertation research project in their final year. Students are allocated staff supervisors for guidance and advice, but independently research an area related to their course. On average, there are 80-100 students undertaking dissertation projects each academic year. Most students traditionally choose field studies, lab studies, clinical studies or similar, using mainly resources provided by the institution, although in some instances industry-sponsored projects are undertaken.

It is against this background that I proposed, piloted, developed and supported a new concept for undergraduate research projects in 2015: the systematic review as a dissertation. This paper will reflect on the development and justification of the idea, after which it discusses the approach I took to make this innovation a success. It then continues with an evaluation of student and staff feedback, of impact on institutional processes and of alignment with the university college mission statement. Throughout, this paper will reflect on current and future developments in response to feedback and institutional demand.

THE CONCEPT

Evidence-based practice (EBP) finds its roots in medicine. Strong developments in the 90s led to the seminal definition of evidence-based medicine by Sackett et al. (1996):

Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decisions about the individual patient.

Over time this definition has evolved to reflect a greater number of health care and applied science professionals (O'Connor and Sargeant, 2015). The 2005 Sicily statement on evidence-based practice defines EBP as decisions about health care based on the best available current and valid evidence (Dawes et al., 2005). The gold standard of using the best available evidence to inform decision making is the systematic review. A systematic review (SR) is a form of secondary research which can reduce potential bias and improve reliability and accuracy of conclusions through systematic and reproducible processes. They follow a standardised method, which covers everything from formulating a research question to presenting findings and making recommendations (Barker et al., 2016).

The systematic nature of SRs makes them ideal as undergraduate research projects. Lab, field or clinical research projects offer a more-or-less standardised systematic framework of experimental study, whereas narrative literature reviews lack this systematic

approach, which makes it more difficult for students to do well. This is supported by research by Arlt and Heuwieser (2011), who found veterinary students performed better in critically appraising the literature when provided with a standardised framework. At Writtle, literature review dissertations have always been the weaker projects due to this lack of structure. To address this, I developed the option of the SR as an alternative to a narrative literature review, providing all students, regardless of the nature of their project, with a structured dissertation project. Considering the lack of EBP and SRs in the animal and para-veterinary sciences, this development is the first of its kind in these fields in UK higher education.

In addition to the pedagogical advantages of SRs over narrative reviews, developing undergraduate systematic review projects also solved an infrastructure issue caused by very successful recruiting of students on the new veterinary physiotherapy courses. The addition of these courses to the Writtle University College portfolio nearly doubled the number of undergraduate students undertaking dissertation projects, whereas the nature of funding in higher education meant that laboratory, clinical and field research resources were limited. As Writtle includes a very well subscribed library with access to relevant databases and search engines, SRs offer a viable option for in depth secondary research with minimal pressure on limited resources.

My idea to develop SR dissertations originates from my MSc studies where I completed a systematic review, and from my interest in evidence-based veterinary medicine. Although one could wonder whether final undergraduate students are capable of critically appraising evidence to a high standard, my experience is that with appropriate support most students tend to perform very well. Similarly, Kasch et al. (2017) found that a majority of final year veterinary students are capable of producing critically appraised topics (CATs) which were rated as good by external experts. CATs are equally critical in appraising literature as systematic reviews, but less extensive in nature.

After discussing my initial plans with colleagues who lead the undergraduate dissertation module, I decided to develop a programme aiming to enable final year undergraduate students to undertake SRs as dissertation projects, and to enable academic staff to supervise these projects.

The APPROACH

The programme consisted of a multi-staged approach, where I organised separate workshops for both staff and students, and provided a range of support materials and quality assurance measures.

Stage one was a staff-support workshop designed to enable dissertation supervisors to supervise undergraduate systematic review dissertations. This three-hour workshop, underpinned by an introductory policy brief, was offered to all academic staff in the institution on a voluntary basis. It started with a short introduction to the concept of SRs and their pedagogic benefits, after which the focus shifted to the various steps involved in undertaking systematic reviews. Twenty members of staff attended the workshop, which represented approximately 40% of academic staff who supervise dissertations. As this was essentially a peer-teaching event, I used a coaching approach, which has been described as an ideal faculty development format for experienced faculty by Huston and Weaver (2008). This meant the workshop was informal, with ongoing time for questions during and after the workshop and peer-support from confident staff to staff needing help. The workshop was registered as a professional development session, allowing staff to record time spent on the workshop in their professional development portfolio. Not only does this approach benefit staff, it also benefits the institution with regards to organisational development and improvement (Caffarella and Zinn, 1999).

The second stage of the programme was a series of four two-hour student support workshops for third year Animal Science and Veterinary Physiotherapy students. These small group workshops were organised in four themes: designing and executing a literature search strategy; selecting evidence; appraising and summarising selected evidence; and presenting the data. Students would have some familiarity with experimental design and statistics through previous modules, so workshops were designed to continue from these pre-existing skills. The workshops ran from Christmas until May concurrent with the dissertation research period. Small group workshops are useful in enhancing active learning, and allow for more efficient skills development than large group teaching (Exley and Dennick, 2004, p.7). I combined the workshops with online support through a dedicated section on the institutional virtual learning environment, an idea based on a similar combination of face-to-face and digital delivery used by Steele et al. (2013) to support online evidence-based veterinary medicine teaching. Twenty students took part in the small-group workshops. This is double the number recommended by Exley and Dennick (2004) for this type of activity. To prevent losing the benefits of smaller groups, I considered splitting the group in half and deliver every workshop twice. However, as this would double my workload, I arranged for a second member of staff to be present during the workshops as an alternative solution. I provided this staff member, who had attended the staff workshop, with advanced training so they could support students more

effectively. This strategy worked well, and feedback from students indicated they were happy with the format.

To support the teaching, I developed a set of procedures and documents for staff and students to use during workshops and whilst undertaking dissertation research. They included SR protocols and checklists following EBP best practice methods, and a range of helpfiles to answer frequently asked questions. Additionally, I provided a range of published systematic review examples. I also supported staff and students with drop-in sessions for technical questions. Retrospectively, I could have managed this better: staff who were uncertain on how a student should proceed advised the student to come see me, instead of the member of staff asking me for advice. I feel this was mainly an issue caused by workload rather than unwillingness to engage, but as most staff supervised more than one student undertaking a systematic review, this meant my workload increased.

To evaluate the effectiveness of this SR programme, I compared results for systematic review dissertations and non-systematic review dissertations using quantitative methods. In addition, I collected feedback on workshops and research experience from students and staff, and I gathered information on impact of systematic review dissertations on the institution.

THE OUTCOME

The final results for the dissertations for students undertaking a systematic review (mean mark 66.2%) were found to be similar to those undertaking lab, clinical or field research (mean mark 60.1%, Student's t-test, $P > 0.05$, $t_{24} = 2.017$, 95% C.I. = -0.14 to 12.24) This shows that students perform equally well in both types of dissertation, and supports findings by Kasch et al. (2017) and (Maggio and Capdarest-Arest, 2017) that undergraduate students are capable of producing good quality SRs. Students reported high levels of satisfaction with the workshops (comments selected are representative of group comments):

"Attendance to these workshops enabled a collaborative approach to supporting me with my systematic review and enabled me to access support from tutors consistently." – Student 1

"The availability for peer-peer support and the opportunity to ask focused questions to the lead tutor enabled the fluid and consistent development of my systematic review. I found this workshop invaluable; it directed my dissertation, supplied support during moments of doubt and allowed me to gain feedback from peers and tutors on my progress." – Student 2

"I feel that the systematic review workshops were really helpful as they clearly specified the process we

had to follow to complete a successful systematic review." – Student 4

Students highlighted the availability of peer-support and opportunities for asking questions. These are key features of small-group workshops (Exley and Dennick, 2004), and confirms my teaching approach was appropriate. Student also suggested improvements to the workshop sessions (comments representative of group comments):

"I think it would be beneficial for the sessions to start earlier before any confusion begins and maybe a few more sessions." – Student 1

"If time allows I think more workshops would be beneficial just to further our understanding." – Student 2

"To improve if more lecturers knew the systematic review process I think it would be more beneficial to us." – Student 5

"I would encourage other members of the faculty to ensure that the information they are giving in their tutorials and dissertation meetings complement that given during these workshops to avoid miscommunication and confusion." – Student 6

The two main areas for improvement were more and earlier sessions, and provision of further staff development for dissertation supervisors. This series of student workshops assumed students would have decided on a research question when they attended the first workshop. However, this was not the case for all students, several students wrote questions which were not appropriate for systematic review research. In response, I have added an earlier session to address this issue. Furthermore, because Writtle has recruited several new staff who will be supervising dissertations, and because not all existing staff could attend the first workshop, a second staff workshop will be organised in line with the second student suggestion.

The staff workshop was well received. Staff reported high satisfaction with support and resources, and positively highlighted the concept of systematic reviews as dissertations (comments representative of all workshop attendees):

"Nicky has held workshops for staff to assist them with supervising students in completing systematic reviews, voluntarily supported staff on a one-one basis when requested and has run extra workshops for students who have chosen this option for their dissertation, which have been well received. Extensive, detailed resources have been placed on Moodle to further support students which has clearly taken considerable thought, time and effort." – Supervisor 1

"[...] particularly in relation to promoting the very valuable use and idea of teaching students (and teaching staff to teach students) how to write/produce systematic reviews for their final year dissertation

projects. He has enhanced the learning experience of students for two key reasons – firstly, for allowing for a range of student ability in providing an alternative for those students who may struggle with statistical aspects of traditional dissertation projects [...] Even more importantly, the systematic review allows students the potential to become highly competent at identifying, searching and critiquing research papers.” – Excerpt from my Teaching and Learning Prize nomination by various academic staff.

The external examiner for the animal science courses at Writtle commented on the use of systematic reviews as dissertations in his annual report:

“Systematic reviews as an acceptable form of final year project: this is innovative and enables students to undertake a rigorous and repeatable review. It provides a valuable opportunity for students to review research in a structured manner and draw sound conclusions. In my view, it is comparable to a project that takes the form of a conventional scientific investigation”

The positive effect of SR dissertations on Writtle University College as an institution is possibly the most difficult to prove. However, if all students who undertook a systematic review dissertation would have chosen a lab, field or clinical research project, which is highly likely due to the previously mentioned issues with narrative literature reviews, Writtle’s laboratories would have seen an increase of required dissertation support of 30%, which would have significant cost implications:

“This year the labs have directly supported approximately 57 dissertation projects, requiring various levels of support. I cannot put a precise figure on a dissertation cost, as it depends greatly on the resources used. However, if the 23 students who did systematic reviews had carried out laboratory supported projects instead there would have been more demand on a finite amount of resources. This would have a cost implication either in terms of student satisfaction in terms of delayed access, or in financial terms in order to increase the amount of available equipment to maintain current levels of availability.” – Writtle University College Laboratories Manager

Although the cost implication would put increased pressure on the institution, to me as a course manager the implications for student satisfaction are even more important. With the Teaching Excellence Framework and National Student Survey benchmarks in mind, student satisfaction is a critical parameter for Writtle as an institution. Considering student feedback and marks awarded, SR dissertations have made an important contribution to keeping our students happy.

THE FUTURE

Overall, the concept of systematic reviews as undergraduate dissertations has been successful in various ways, and will remain an option for students in the future. In addition to improvements to the workshops in response to student feedback, systematic review and evidence-based practice are also being incorporated as taught modules in Writtle’s new Bioveterinary Science courses to highlight the importance of these methods to the development of academic and professional skills, and to the industry as a whole. Furthermore, the staff workshop will be supplemented with an e-learning course on SRs, which will be accessible to all staff to increase staff engagement with this development. Limitations do exist: this was one particular case study in one particular institution, and results are not necessarily transferrable. However, if given appropriate support, the likelihood of undergraduate systematic reviews as dissertations being a successful concept is high. From a personal perspective, I am happy that something that is a personal interest is gaining traction in the institution, is appreciated by students and staff, and is recognised externally as innovative and good practice. What else can one wish for as an individual looking to implement a change initiative?

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