Teaching in Research – an Overlooked Practice?

Abstract

The importance of research-oriented teaching is well-documented in the HE literature but the need for teaching within research is rarely commented upon. This conference paper looked at how much teaching can be used to help embed research skills in undergraduate students and beyond. The paper explored this by considering the design of a research skills workshop presented to Level 2 undergraduates prior to embarking on their final year project work. Analysis of the design offered the opportunity to contest that the amount of teaching that takes place ‘within research’ is very often overlooked. From the first attempts to embed research skills to undergraduates, through to the training of postgraduate students and post-doctoral staff, a constant thread of teaching and learning is apparent within the research environment. The design of the Level 2 workshop gave the opportunity for staff to focus on the desired goals of embedding research skills in students. Such goals included development of self-directed learning, independence, criticality, sense of research identity and a love of lifelong learning.

Keywords

research skills, workshop, teaching in research
Introduction

The importance of building a research base within traditionally teaching-focussed universities is of current interest in the HE climate. In the context of the upcoming Research Excellence Framework (REF) and the strategic importance of research in this University’s corporate plan, approaches which can feed into this goal are clearly of interest. The definition of research and scholarship is summarised in Boyer’s model of discovery/integration/application/teaching (Boyer, 1990) and Glassick’s pathway of scholarship (Glassick, 1997) whilst the link between research and teaching in the educational literature is well-documented. Humbolt’s quote that ‘At University scholarship is about not yet wholly solved problems and hence always in research mode...’ (Humbolt, 1810) can be followed through to present day models with strategies for linking teaching and research as exemplified by Jenkins’ (2005) ‘research-led/research-oriented/research-based/research-informed’, Healey’s (2005) research tutored/research-based/research-oriented/research-led model, and Peters’ (2008) apprenticeship/learning-led/discipline-led/teaching-led model.

As Anglia Ruskin moves to become a research-intensive university, it is timely to explore to what extent the teaching of research skills might be desirable in undergraduate students embarking on final year project work. To do this, the design of a research skills workshop was presented. This was taught to level 2 students in preparation for their research projects undertaken in the Faculty of Science and Technology 2012. The content of the workshop was analysed to elucidate the amount of teaching of skills that would be/was required.

Results

The workshop was designed to address key research skills including: what do we mean by research, the aims of research, the scientific method, an hypothesis making exercise, how to read a paper effectively, experimental procedures, data gathering and storage, data selection and principles of academic writing. Each of these themes was then elaborated on further. For example, on ‘how to read a journal paper effectively’, students were taught the most helpful order of reading articles by encouraging them to concentrate on the abstract first; to look for the author’s claims in the abstract, often in the last sentence; to only then go back and pick out the background; to read the figure legends of the data in the results before reading the results section; only to look further into the paper if they require methodology details, references or ideas for new areas of investigation often found within the discussion. A case study was then presented from the life sciences in which preparation for a literature review on an immunohistochemistry project was presented.

The workshop went on to consider how to plan an essay. This included teaching students with respect to information on signposting within their essays, setting the boundaries of an essay within the introduction, e.g. current approaches to breast cancer treatment within the past twenty years focussing on models used and drug trials completed. The importance of developing criticality in essays was addressed by encouraging students to compare and contrast different sources of evidence and to teach them how to do this by providing appropriate examples.

Another area covered was academic writing for journals. This included looking at the structure of journal articles, how to choose a journal for submission of articles, the order of writing sections and appropriate phraseology. A sheet was provided to students of appropriate phraseology for different sections of papers, e.g. phrases within the Introduction such as, ‘It is well-documented that…’ or ‘Previous studies have shown...; in the results section, ‘A difference was observed...’ or ‘The figure shows that...; and in the discussion, ‘A key finding of these studies is...’ or ‘Combined this evidence suggests that...’. With regard to how to approach the methodology sections of journal papers, reference was made to the research apprenticeship model (Carr-Chellman et al., 2007; Peat and Taylor, 2004) and the current use of databases for protocols including Twitter, which often led to casual peer review (Quinn et al., 2009). The workshop also provided exercises in hypothesis making and data selection and appropriate data display.

Findings

On analysis, it was clear that the design of the research skills workshop involved a large amount of teaching. Designing a workshop on research skills offered the opportunity to contest that the amount of teaching that takes place within research is very often overlooked. From the first attempts to embed research skills to undergraduates, through to the training of postgraduate students and post-doctoral staff, a constant thread of teaching and learning is in fact, apparent within the research environment.
The design of the workshop gave the opportunity for staff to focus on the desired goals of embedding research skills in students. Such goals included development of self-directed learning, independence, criticality, sense of research identity and a love of lifelong learning. With respect to developing a sense of research identity, it was commented that this could be initiated at undergraduate level by encouraging the students to share reagents and information, join informal interest groups, build their profile and ‘get known’. The work of Åkerlind (2009) was cited on the four stages of the development of university researchers: becoming confident; becoming recognised; becoming more productive; becoming more sophisticated; and the cyclical nature of this process as researchers moved across their field of interest was discussed.

The approach to teaching methodologies in research was also considered. In this respect, a ‘critical path’ method was advocated which gave an overview of the area being researched followed by step-wise diagrams. In the life sciences, the practical nature of research is paramount and the importance of teaching about location of equipment and timing of procedures and allowing the opportunity for peer teachback for embedding of skills was mentioned. Feedback from students had been very appreciative of the workshop, which was reflected in the high standard of literature reviews submitted.

Benefits

The benefits to staff in promoting research skills in their undergraduates via the use of such workshops is evident. Firstly, undergraduate peer-reviewed research is now being published within several journals, the University of Warwick’s Reinvention: an International Journal of Undergraduate Research, for example, which is published in concert with Oxford Brookes and their partner institutions abroad. Publication of students’ work in a peer-reviewed journal at undergraduate level is reported to have made a real impact on the student experience at Warwick. As it is often the publication of one’s research that can be a driving force in encouraging students to follow research careers, the possibility of launching an e-journal for undergraduate research at Anglia Ruskin with partner institutions abroad could be a real possibility to impact our student experience in a positive way and to feed well-prepared students into the research arena.

The development of teaching skills in research can also offer a new arena for research-trained staff to utilise their skills. By developing departmental and disciplinary understanding of the terms, review of current practice and culture, developing sets of related curricula interventions (a ‘research’ spine for undergraduates) - already in place in the Biomedical Sciences curriculum at Anglia Ruskin - and developing staffing for research only posts or posts with reduced teaching load, the research strand within Anglia Ruskin can only continue to flourish.

References


Quinn, J. G., King, K., Roberts, D., Carey, L and Mousley, A., 2009. *Computer based learning packages have a role but care needs to be given when they are delivered*. [Online] Available at: http://www.bioscience.heacademy.ac.uk/journal/vol14/beej-14-5.aspx