Publishing undergraduate research: creating opportunities to enhance the student learning experience within a research-intensive university

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Abstract

Providing undergraduates with opportunities to showcase and disseminate their work can add value to research activities undertaken as part of a programme of study and contribute to the development of a raft of academic, transferable and employment-related skills. As a recipient of an Annual Fund award to promote undergraduate research within the College of Engineering, Mathematics and Physical Sciences (CEMPS), I discuss growing recognition by UK universities of a need to better value research undertaken by undergraduates who might be given opportunities to disseminate their work beyond the boundaries of traditional assessment practice. Using examples of how CEMPS is promoting undergraduate research as a means of enhancing the student learning experience, I highlight some of the practical issues of embedding these activities within the curriculum. The article concludes by signposting the reader to other examples of undergraduate research publishing and associated opportunities for all undergraduates to disseminate their research work.

Keywords: Undergraduate Research; British Conference of Undergraduate Research; Posters in Parliament; Journal of Undergraduate Science and Technology; JUST Conference

Introduction

In the United States, and more recently in the UK, there is growing recognition of the need to better value research undertaken by undergraduates and to provide them with opportunities to disseminate their work. Walkington and Jenkins (2008) observe:

‘Undergraduate research findings are rarely disseminated or subject to feedback and comment from a broad audience. For example, the UK undergraduate dissertation is often only read by the student, the supervisor and the assessors. This represents a gap in the research cycle (Walkington, 2008) where only limited feedback on research findings is received as part of assessed work and the process of refining and redrafting for dissemination or publication is not embedded in the student experience’.

The gap in the research cycle identified by Walkington concerns how academics disseminate their own research through, for example, journals and conferences. Providing undergraduates with opportunities to publish or to present their work to a wider audience mirrors and completes the research cycle with the additional benefits of developing a raft of academic, transferable and

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employment-related skills. ‘Writing for publication’ can provide an excellent vehicle for developing these skills when included as an aspect of the traditional dissertation or of other pieces of coursework which focus on research investigations and the communication of findings. The ability to write well is regularly cited as a top-ten skill by graduate employers. Interpersonal skills are also highly-valued, particularly the ability to present complex ideas clearly and succinctly as demonstrated in, for example, poster or oral presentations.

Many universities in the USA and UK are beginning to publish undergraduate research journals and are developing coursework which includes a requirement to communicate the results of research investigations to a broader audience who might read or hear about the work in a journal, poster or conference presentation. Walkington and Jenkins recognise the influence of digital technology and particularly a variety of social media on creating informal publishing opportunities, and that students are ‘used to exposing their ideas to unknown audiences, to selectively releasing their publications (sharing) to friends, groups, or the whole world, and to receiving feedback (comments)’. Wikis, blogs and online environments which facilitate discussion and collaborative work can support the dissemination of undergraduate research effectively and create lively inter-disciplinary and inter-institutional communities of enquiry. Providing students with opportunities to publish their work in journals and to present at conferences capitalises on this willingness to let others know about research activities which have been undertaken as a key component of the learning and wider student experience at university.

In 2010 a coalition of over 30 UK universities established The British Conference of Undergraduate Research (BCUR) with the aim of encouraging a national culture of undergraduate research. BCUR organises an annual conference and other events such as ‘Posters in Parliament’ which provide undergraduates with opportunities to showcase their work and to interact with their peers undertaking often cutting-edge research in their respective fields.

This year I have been successful in obtaining monies from the University’s Annual Fund to promote undergraduate research within the College of Engineering, Mathematics and Physical Sciences (CEMPS). The funds have supported the development of an undergraduate research journal (the Journal of Undergraduate Science and Technology, or ‘JUST’), an annual JUST conference and have enabled staff and students to participate in BCUR’s annual conference and ‘Posters in Parliament’ event.

‘JUST’ aims to acknowledge and showcase undergraduate research from all College disciplines, providing students with an opportunity to develop their writing and presentation skills and enabling them to engage with and share intellectual activity with the wider STEM communities within and beyond the University.

The Journal is complemented by an annual undergraduate research ‘JUST’ conference which gives CEMPS students the experience of presenting their work to their peers, an invited audience of academic colleagues and the wider STEM community. The conference also
includes poster presentations which have been produced as assessed components of coursework.

Through membership of BCUR and representation on the Steering Group, Exeter students have also been able to present their work at the annual conference, this year held at the University of Nottingham. The event attracted over 300 students from 30 UK universities who showcased their work over a packed two-day programme.

The Annual Fund monies have also enabled two undergraduate students from CEMPS to present their project work in the form of posters at the annual ‘Posters in Parliament’ event held at the Palace of Westminster.

Mike Kimberley presented a poster on ‘Optimising digital displays using organic LEDs and quantum dots’ based on research he undertook as an undergraduate on the MEng Electronic Engineering programme. Angus Laurenson, a third year MPhys student, presented his work on the development of ‘Bio-camera’ which has captured the world’s first colour photographs made from E. coli.
Other opportunities are emerging across the University for undergraduate students to publish their work. A student-led publication, ‘The Undergraduate’, offers bi-annual publishing opportunities in an accessible interdisciplinary format. Another journal, ‘Life’, showcases undergraduate research in the Biosciences alongside features, news and reviews in a magazine format.

The experience of creating an undergraduate research journal within CEMPS has highlighted many issues, not least having to determine what constitutes ‘research’, and concerns surrounding the selection of work for publication. Walkington and Jenkins recognise that ‘standards are governed by the peer review process and scope of each publication type and thus vary widely’. They recognise that the proliferation of undergraduate journals across UK and US universities has led to a range of publications, from the more-formal peer-reviewed by academics and student-led editorial teams which aim to train students in academic publishing, to more informal journals which simply aim to
‘showcase’ work within departments. Some examples can be found in the ‘Resources’ section at the end of this article. JUST adopts a broad definition of research, and whilst some contributions to the journal might represent cutting-edge, even novel work, there is recognition that undergraduate students will have undertaken a wide range of investigations which have real value and which merit publication.

Students on any programme within CEMPS are encouraged to submit abstracts describing their work to a panel of undergraduate volunteers led by a student intern editor and guided by academic colleagues. The ‘best’ submissions (by virtue of the mark awarded) are then re-drafted as short papers for inclusion in the Journal. Whilst this approach has been effective there may be better ways of ensuring that the publication is sustained by a steady feed of submissions from across the disciplines.

Walkington and Jenkins provide suggestions as to how undergraduate research publication might be embedded within the student learning experience. These include building publication into dissertation and honours-level course and programme requirements, including undergraduate students in the publication process (as is the case with JUST and The Undergraduate) and emphasising the employability benefits of undergraduate research.

Whatever the approach, making use of undergraduate research can provide valuable formative experience for postgraduate research and give students a useful insight into how their lecturers disseminate their own research. Undergraduate research publications can provide a useful platform for developing and continuing ideas and research investigations. Rather than dissertations and project work simply being marked, archived and in time more than likely forgotten, a journal can be consulted by a current or future student undertaking similar investigative work and thereby enhancing the continuity of ideas. At this year’s BCUR conference a keynote speaker asked the question... ‘When your students hand in a piece of work such as a dissertation or project, do they feel a sense of achievement or relief?’ Providing our undergraduates with opportunities to publish their work moves beyond writing for the award of a grade, to recognition that the work undertaken is of interest to a wider community with associated value and legacy.

Students at the University of Exeter are immersed in research at the cutting edge of their chosen fields. Journals such as JUST, Life and The Undergraduate and opportunities to present individual and group work to wider audiences such as the annual JUST conference, Posters in Parliament and BCUR’s national conference demonstrates how research-informed teaching, along with opportunities for undergraduates to share the outcomes of their own research activities beyond the confines of assessed coursework, can have a real and lasting impact on the quality of the student experience.
References


Resources:

**British Conference of Undergraduate Research (BCUR):** http://bcur.org/ – an open coalition of UK universities promoting undergraduate research in all disciplines. I represent the University on the BCUR Steering Group. Please get in touch if you would like further details about BCUR events and/or would like to discuss how undergraduate research publication might be embedded within assessment strategies and/or the wider student experience: S.Rose@exeter.ac.uk

**Council on Undergraduate Research (CUR):** http://www.cur.org/about_cur/ – a national organisation of individual and institutional members representing over 900 colleges and universities in the United States.

**Undergraduate Research Journals:**

*Bioscience Horizons* – an open access online journal published by Oxford Journals: http://biohorizons.oxfordjournals.org/

*Reinvention* – an international journal of undergraduate research published jointly by the Warwick and Monash Universities: http://www2.warwick.ac.uk/fac/cross_fac/iatl/reinvention/

*Diffusion* – a multidisciplinary undergraduate research journal published by the University of Central Lancashire: http://atp.uclan.ac.uk/buddypress/diffusion/

*Geoverse* – a pilot undergraduate research journal in Geography at Oxford Brookes University: http://geoverse.brookes.ac.uk/index.html

**Undergraduate Research Journals and publications at the University of Exeter:**

*JUST* – Journal of Undergraduate Science and Technology published by the College of Engineering, Mathematics and Physical Sciences: http://intranet.exeter.ac.uk/emps/studentengagement/justexeter/journal/

*The Undergraduate* – a student-led interdisciplinary bi-annual journal publishing essays from undergraduate students at the University of Exeter: http://www.theundergraduateexeter.com/

*Life* – a student-led student nature magazine showcasing undergraduate research alongside features news and reviews: http://lifesciences.exeter.ac.uk/outreach/cornwall/lifemag/