

Project Title

'The Plymouth Student Scientist': An e-journal vehicle to support the research process and promote engagement with science.

Details of Project Team

Karen Gresty (Project lead), School of Biological Sciences; Ken Kingston, School of Earth, Ocean and Environmental Sciences; Tim Auburn, School of Psychology; and Andy Edwards (Research Assistant), Faculty of Science.

Additional support has also been provided by the EDaLT team, Mick Uttley (Associate Dean of Science, Teaching & Learning) and other members of staff in the Faculty of Science.

Background to the Project

A strong research ethos is embedded in the Faculty of Science's undergraduate programmes from the start of our students' careers at the University of Plymouth. However, students often become very assessment driven and goal orientated, so it may not always be evident to them that they are engaged in research activities. This project seeks to make the research process more explicit from Level 1 through to Level 3, by highlighting examples of good practice from across the Faculty and by encouraging both staff and student involvement. The pedagogic vehicle to promote and share these activities will be an e-journal, which will highlight different aspects of the research process and publish actual research findings from both student and collaborative projects.

Summary of the aims of the project

The rationale behind this initiative was to encourage our students to be evidence-based practitioners, both during their undergraduate careers and beyond in future employment. The key aims of the project have been:

- To promote the teaching-research nexus for staff.
- To encourage and facilitate academic staff to develop a more explicit approach to supporting the research process.
- To highlight examples of good research practice from across the Faculty of Science.
- To promote the active engagement of our students in the research process.
- To provide an opportunity for staff and students to reflect on 'doing research', including critical appraisal of students' own research skills as they consider the work of their peers.
- To disseminate the results of student and staff/student collaborative research work.

Methods

Data and Material Required

- E-copies of final year student honours project work, literature reviews, and poster presentations (supported by academic staff following assessment as 1st class)
- Consent forms signed by authors of submitted work, as well as the project advisor or academic involved.
- Survey information from undergraduate science students indicating their current understanding of what research is and how they are involved in it (in relation to their coursework).
- Evaluation feedback from undergraduate science students, providing information on whether the journal provides them with a link between research and their learning.
- Evaluation feedback from undergraduate science students suggesting how the journal could be developed to enhance the link between research and their learning.
- Feedback from student authors of articles published in the journal, giving their views on the perceived and actual benefits of publication (together with their motivations for submitting their work and their observations about the process).
- Interview information from staff exploring how research informs their teaching, what they understand by 'research-informed teaching', and their attitude towards the e-journal.

Methods of Obtaining Data & Material

- This is an action research case study that enables a study of both product (pay-off value) and process (intrinsic value).
- Each School representative of the project team took responsibility for the collection of student research material prior to publication.
- The publication of the online journal provided an output that could be used as a primary source for online data collection e.g. tracking statistics.
- Promotion tactics were employed to enable collection of student work and staff feedback. These included conference presentations (before and after the launch of the journal, both internally and externally) and were supplemented by internal posters, emails, hyperlinks on web sites and by word-of-mouth.
- An online questionnaire survey was conducted, targeting 1st, 2nd and 3rd year Faculty of Science students, using Perseus Survey Solutions software.

- Semi-structured interviews were undertaken with graduate authors of published journal articles, either in person or via the telephone.
- Semi-structured interviews were undertaken with faculty staff, including a balanced representation of those who had explicitly supported the journal, and those who had not.
- The journal features a built-in feedback mechanism that provides an online anonymized opportunity for readers to provide comment and suggestions.
- Decision-making processes regarding methodologies, actions and priorities were recorded via meeting notes, online communications and diary notes.

Methods of Analyzing Data

- The traffic use of the online journal is monitored by a built-in stats package. Quarterly reports of these statistics have been provided by the site hosts, ICO³, although they are also available independently. Data include the number of site hits and visits, the methods by which users access the journal, and the geographical distribution of journal users.
- The journal software (Open Journal Software) also provides figures for individual article viewings.
- The quantitative data resulting from the student survey was collated and graphically presented within the Perseus Software Solutions programme, then edited using Microsoft PowerPoint.
- Content analysis has been applied to all open-ended survey questions and this approach will also be used with the semi-structured interview transcripts, using Nvivo8 software for coding text to specific categories. All categories and coding outcomes will continue to be subjected to a validation exercise by two members of the project team, with inter-observer reliability tested by application of the kappa measure.
- Project evaluation findings will continue to be used to make any iterative changes to the journal.

Ethical Issues

- Student involvement in the evaluation survey was voluntary, and individuals were advised of their right to terminate involvement at any time during the evaluation process.
- All interview, survey and evaluation data have been anonymised and any files containing names have been password protected.
- Questionnaires took no more than 10 minutes to complete.
- A modest incentive was offered to encourage completion of the student questionnaire (e.g. £5 M&S vouchers)
- Participants were informed of the general nature and purpose of the research in advance of completing interviews and questionnaires.
- Approval for all research methods was granted by the Faculty of Science Human Ethics Committee prior to the commencement of the project.

Number of Students Involved

Total number of graduates that have consented to have their research work published in The Plymouth Student Scientist = 41.

Total number of current students responding to online questionnaire = 158.

Total number of student article authors interviewed = 15.

Promotional and update emails sent to all Faculty students.

Number of Staff Involved

Total number of project advisors submitting student work to the journal = 32.

Total number of staff interviewed = 9.

Promotional and update emails sent to all Faculty staff.

Findings

This project is scheduled to end in September 2009. Further data analysis and dissemination of results will continue to take place within this timescale. Early results indicate that students perceive their courses as being research intensive, but many would like to have been more engaged with actually “doing” research, particularly through research-based teaching methods and activities. Student response was very

positive on the benefits afforded to them by the introduction of a Faculty-based undergraduate research journal, and clear key motivators were revealed by those students aspiring to publish their work within the journal. Nearly three-quarters of respondents reported that the journal content was of relevance to them, with second year students appearing to derive particular benefit from the subject matter. There was strong support for the benefit of the journal's links to other student resources, although comments indicate potential confusion with other university resources, particularly METALIB. Student authors of published articles were explicit in their pleasure at having the opportunity to publish their work, and offered a range of suggestions as to how the journal and decision-making processes could be developed to enhance the publication experience. Graduate authors, as well as staff, contributed their ideas on how the journal could be most effectively utilised as a pedagogic vehicle within course programmes and modules.

Further analysis of data from staff interviews will allow some comparison with students regarding the perception of research-informed teaching and how research is used to inform current teaching in parts of the Faculty. Data from staff and student author interviews will also inform a comparison about motivations for supporting and submitting work to the journal.

Project Outputs

Conference Contributions

Gresty, K. & Kingston, K. (2007) *The Plymouth Student Scientist*. Workshop presentation at the Vice Chancellors Conference, University of Plymouth, Plymouth. 28 June.

Edwards, A, Gresty, K., Kingston, K. & Auburn, T. (2008) *The Plymouth Student Scientist*. Case study paper and poster presentation at The Full 360°: Mapping the Undergraduate Research Inquiry Landscape conference, University of Gloucestershire, Cheltenham. 1 May.

Gresty, K., Auburn, T., Kingston, K. & Edwards, A. (2008) *Using an e-journal to support research-informed teaching*. Paper presentation at the 'Informing Active Engagement in Learning and Teaching for 21st Century Universities' conference, University of Gloucestershire, Cheltenham.

Gresty, K., & Edwards, A. (2008) *The Plymouth Student Scientist e-journal*. Workshop and poster presentation at the Vice Chancellor's Conference, University of Plymouth, Plymouth. 4 July.

Online Works

'The Plymouth Student Scientist' ISSN 1754-2383 [Online] ©University of Plymouth is an online undergraduate research journal, first published on 31 January 2008. There are three issues published to date, showcasing approximately 40 student and student/staff collaborative research articles. The journal site received 2.2 million hits and 220,000 individual visits in its first 12 months. The actual full text PDF articles have been opened nearly 9,000 times. 187 people are currently registered to receive automatic notifications of new issues when published.

Research Databases and Resources

The journal has been included within the HEA Subject Centre for Bioscience and the GEES resource databases. Other similar online journals within the UK provide a reference or link to the journal as a resource provision for readers (*Biolog-e*, University of Leeds; *Diffusion*, University of Central Lancashire). A permanent link to the journal has recently been set up on the University of Plymouth's student portal, TULIP, following consultation with the TLweb development team.

Case Studies

The Plymouth Student Scientist e-journal has already been selected as a case study of good practice by a National Teaching Fellowship project at the University of Gloucestershire. The case study is shortly to be published on their website.

As part of the LTHE551 Teaching Research module (on the Postgraduate Certificate in Learning and Teaching in Higher Education course) several case study presentations regarding this project have been delivered to course participants within the research-informed teaching workshops (2007 K. Gresty; 2008 A. Edwards and 2009 K. Gresty).

Institution/Faculty Practices

The Plymouth Student Scientist was commended by the British Psychological Society accreditation committee during the School of Psychology's accreditation visit in April 2008. Psychology was commended on how it supports research skills in its students and The Plymouth Student Scientist was part of the package that drew praise.

The journal will also shortly be added to the E-Journals A-Z list on the University's Metalib database.

Dissemination

Promotional leaflets were distributed at the HEA Centre for Bioscience Event: Research-Teaching Linkages: Enhancing Life Scientists' Graduate Attributes, Glasgow Caledonian University, Scotland, 28 February 2008.

Posters were distributed around strategic learning points within the University of Plymouth following the launch of the journal and again after the publication of the second issue.

A promotional poster was produced and displayed by the EDaLT resource centre in 2008.

The project is cited in Walkington, H and Jenkins, A (2008) Embedding undergraduate research publication in the student learning experience: ten suggested strategies. Brookes E-journal of *Learning and Teaching*, 3(1), <http://bejlt.brookes.ac.uk/>.

The journal has been added to the resource list database on the HEA Subject Centre for Bioscience website.

Continuation/Dissemination Plans

Planned Further Conference Contributions

UPC Joint Subject Forum Day: Teaching Research, Doing Research, University of Plymouth, 26 May. Paper presentation to be delivered entitled "Using an undergraduate e-journal to support research-informed teaching".

Abstract submitted for iPED 2009, 4th International Inquiring Pedagogies Conference: 'Researching Beyond Boundaries', Academic Communities without Borders, Coventry University, September.

Case Studies

The University of Gloucestershire has confirmed that it wants to use The Plymouth Student Scientist case study (as per above) as one of the 'good practice' case studies in a three part guide to undergraduate research that it will be developing during 2009.

Suggested Further Research or Development Work

Develop editorial policies to take evaluation research findings into consideration

Examine options for alternative submission processes

Embed the pedagogy of the journal within specific programmes and modules

Increase awareness of the journal among students at the University and Partner Colleges

Ongoing evaluation to obtain evidence of additional benefits of the journal to students

How does the project meet the TQEF funding aims?

1. *Ensuring that students are made aware of the most up-to-date knowledge in their field:* the journal provides an explicit opportunity for current research work carried out by students (including staff/student collaborations) to be disseminated to peers. The journal has been well promoted to Faculty of Science students, and access has been enhanced by the inclusion of a permanent link to the journal on the main student portal.

2. *Ensuring that staff are aware of developments if they were not previously:* the journal (and research-informed teaching) has been heavily promoted to staff within the Faculty of Science via e-mails, leaflets, posters, internal workshops and conferences and by word of mouth. Staff have been invited to collaborate at many stages and the final results of the project evaluation will also be disseminated to all staff.

3. *Familiarising students with some of the research being undertaken in their institution:* the journal encourages students to discuss topics of interest to them with staff associated with published articles (especially those looking to choose final year project areas). Much of the research content of the published articles has emanated from staff research interests and all published articles have hyperlinks to staff PPPs enabling readers to identify staff research interests.

4. *Embedding RiT into institutional structures and policies (including HR and quality assurance processes):* the e-journal was commended by a visiting external accrediting body (the British Psychological Society) during a validation visit in 2008 for its role in supporting research skills on the Psychology programme. The journal initiative has recently been expanded across several faculties and disciplines, enabling many other students (and staff) to benefit from similar resources. The journal has become a very well-accessed resource globally, with over 2 million hits on its site within its first year. Evidence from staff interviews indicates that within some sections of the Faculty, the journal is used explicitly as a teaching aid for critical discussion and research methods eg. In Psychology.

5. *Exposing students to a research-informed learning environment at all levels (stages) in higher education:* the journal provides an explicit vehicle for 3rd year students to experience aspects of the research publication process, and visualises the research process for level 1 and 2 students.