

**HP Technology for Teaching Grant Initiative**

Dr Liz Falconer, University of the West of England, Bristol

7th March 2007

**Technology vision (150)**

Information and communication technologies (ICT) in teaching and learning are seen as part of the overall teaching and learning strategy, but also as part of a wider e-strategy for the institution which embraces ICT needs for research, administration, student support, e-commerce and other purposes. The University strives to bring together current individual initiatives and to facilitate and encourage the sharing of ideas and experiences about the exploitation of appropriate technologies. In particular, the university is aiming to develop a partnership model of teacher and learner and sees the role of technology as a vital part of that aspiration. Developing autonomy in the learner is seen as a fundamental goal; one that is recognised as having institution-wide significance.

**Project name**

Redesigning the research methods curriculum

**Project executive summary**

This project aims to redesign the research methods curriculum for the disciplines of mathematics, statistics and information technology (IT) by integrating online learning support into the classroom. In most online learning environments learning materials are generally provided in one context. Limited customisation is often possible, e.g. changing text colour, but there is little opportunity to change more conceptual elements of the learning context; choosing between graphic, metaphoric or textual modes of navigation, for example. Current research and development work at UWE has created an online e-learning resource, the Research Observatory (RO), which does enable students to choose the context in which they study materials without requiring duplication of the materials themselves.

The RO is currently used in a blended manner to support distant and classroom teaching of the research methods courses across the university. This project focuses upon redesigning the research methods curriculum by enabling the students to design appropriate learning contexts for their subjects and integrating the use of these contexts and the primary curriculum content into classroom sessions. The particular learning impairment focus of the project is on students with diagnosed Autism Spectrum Disorders (ASD), building upon the current research work of the RO development team.

**Focus on learning**

The distinction between content and context is fundamental in understanding effective learning design. It is vital not to underestimate the importance of context, particularly in adult
learners. We all become more reflective and contextual in the way we learn as we mature to adulthood, not just from the point of view of the subject context, but in the wider sense of how what we learn fits into our experience of the world around us. We construct knowledge through the context of our own experiences - content with no context has no meaning. This project concentrates upon the redesign of learning contexts in a course setting; specifically the blending of virtual and classroom contexts.

The completion of a research report or dissertation is one of the most difficult elements of learning to support effectively. Students are required not only to answer questions, but to design appropriate questions in the first place. They work independently and need to understand and evaluate a range of valid methods to carry out their research. Students also bring a range of learning preferences and abilities to their study. The RO has been used to support dissertation students across the university on attended and blended courses for the past year. Up to now, it has only been used individually by MSc IT students to support their studies. We have received positive feedback on the metaphoric context that the RO uses to help the students construct their own meaning for their research studies. However, we recognize that this context will not be suitable for all users, and is likely to present particular difficulties for students with Autistic Spectrum Disorders (ASD) and learning styles that emphasize systemizing and underemphasize empathy. For this reason we have developed a structure for the RO that can now accommodate multiple contexts.

**Goals, objectives and outcomes**

The overall goal is to enable students to take an active part in the redesign of the research methods courses for the BSc in Mathematics and Statistics and the MScs in IT subjects, building upon the university’s vision of developing partnerships between learners and teachers. Specifically the objectives are to:

- introduce tablet computers into existing group teaching sessions as a means of enabling classroom interaction with online contexts and content in the RO – whilst this project concentrates on learning contexts, they are also meaningless without their companion content
- enable students to design, review and refine preferred learning contexts for studying research methods in their own subject fields through the use of the pen-based writing and drawing capabilities of the tablet computers
- individually engage with a number of students with diagnosed ASD in designs for their preferred online learning contexts - this part of the project running alongside the group work.
- facilitate collaboration amongst students on both content and context in the RO by using tablet computers in conjunction with interactive whiteboards and projection technologies in the classroom.
The outcomes are expected to be increased understanding of appropriate research techniques for students in the fields of mathematics, statistics and IT, leading to greater success in the completion of research reports and dissertations. These outcomes will be evaluated by triangulating:

1. Qualitative feedback from student groups and tutors
2. Quantitative findings from dissertation completion rates and marks for the academic year 2007/2008, compared with earlier years
3. Observations of student interactions with the content and contexts in the RO, with each other and with the tutors.

In designing the evaluation of this project we have adopted the 8-step approach set out in the HP Guidebook “Measuring Learning”. The fundamental question is whether involving students in the context design of online learning environments demonstrates tangible improvements in research project completion rates and overall achievement. Word count restrictions in this application do not enable a full description of the measurement instruments to be used, but the qualitative instruments will concentrate upon group and individual observations, focus groups and semi-structured interview techniques, analysed by the use of conceptually clustered matrices. The quantitative measures will be analysed using appropriate statistical techniques. The Principal Investigator has 20 years experience of social science and education research and the project team has significant experience in research and evaluation in their fields.

**Technology integration**

The students will actively participate by using the tablet computers to draw and design their own, preferred learning contexts and to use the content of the RO as classroom exercises to stimulate discussion and reflection. Tablet computers are the ideal medium for this as they allow the students to interact through a tactile and intuitive interface, which is both mobile and flexible. In this project we will be working with students with a range of abilities and learning styles, a particular focus being those with the cognitive impairments of ASD. Students with ASD can find working in close physical proximity with others stressful, so these technologies enable them to work individually and then collaborate through a less threatening medium. This integration of technology and learning needs bridges the gap between online and classroom teaching, enabling students to design elements of their own learning environment.

The university is currently investing in interactive technologies in its teaching rooms, from interactive whiteboards to multi-technology lecterns. Online delivery of research methods curricula is also an increasing focus. This project therefore integrates the current development of online learning support for students undertaking research with the potential of mobile and tactile technologies.
Project timeline
The project is planned to begin in summer 2007 and continue until summer 2009.

Summer 2007
Four pilot group sessions of 5-10 MSc dissertation students per session. Begin recruiting ASD students in collaboration with the Disability Advice Centre.

Student groups in the BSc Mathematics and Statistics will take part in design groups and work with the interaction exercises in the RO.

Jan – Mar 2008
MSc cohorts (see courses impacted below) begin classroom sessions and design work. The work with ASD students will run alongside these groups.

April 2008 – June 2008
Project team work on designs drawn from student groups and individual work and deploy these in the RO.

Sept 2008 – Jan 2009
Evaluation of new contexts in the RO by focus groups and individually. ASD students will be given the choice of attending focus groups or undertaking feedback exercises individually. Evaluation of dissertation completion rates and marks for the academic year 2007/2008 and comparison with earlier cohorts.

Feb 2009 – May 2009
Feedback from the context evaluation groups and further redesign of the RO contexts. Continuation of MSc and BSc classroom sessions. Final evaluation of project.

Courses impacted
The BSc in Mathematics and Statistics and the following MSc programmes:

- Information Technology
- Statistics and Management Science
- Systems Administration and Security

All courses currently reside in the Faculty of Computing, Engineering and Mathematical Sciences. This faculty will merge with the Faculty of the Built Environment this year, to form the Faculty of Environment and Technology. As students in the new faculty will undertake common research method modules this has the potential to extend the courses impacted to environmental subjects.
Course redesign

The RO has already influenced the design of the research methods course for MSc students in IT, by making support materials and exercises available for individual study following taught sessions. This project will further redesign research methods courses by integrating the use of the RO into the classroom sessions of the courses impacted. The activities in the RO concentrate upon

1. diagnostic exercises such as research skills self-analysis, reference self-testing and time management planning, and
2. decision aids such as topic selection, choosing positivist or interpretivist methods and survey and interview choices.

These lend themselves to collaboration, sharing and discussion, all of which can be effectively enhanced by the use of mobile, networked technologies. These activities will form an intrinsic part of the redesigned research methods module. The engagement of students in designing the contexts in which they can study this content, i.e. metalearning, will encourage greater understanding of themselves as learners, a vital requisite for the enterprising, independent and reflective activities of research. Through the university-wide use of the RO this project is likely to significantly raise the awareness of staff and students and have consequential effects on the design of a significant number of courses.

Course discipline

Initially mathematics and science. On faculty merger (see above) we expect to expand the project to include environmental subjects.

Faculty

Three university colleagues, plus the Principal Investigator, will be directly involved in developing and carrying out the project (see team below).

Students

Initial focus - 150 students, including 10 with diagnosed ASD. Expected to extend significantly during and following the project.

Project visibility

The university

The results of this project will be incorporated in the RO, and as such will achieve increasing depth and breadth of impact across the university over the time of the project and beyond. We in the E-learning Development Unit run a number of lunchtime seminars every year and interim findings from the project will form the focus for at least two of these seminars over the term of the project.

The wider context
The project team will create a website for the project as part of the current e-learning development site at the university (see http://www.uwe.ac.uk/elearning). This site will include a blog that records activities on a week by week basis. We intend to hold two open conferences during the duration of the project, which would be funded from the cash grant element of the award. We will write at least two academic papers that report and discuss the findings from the project, as part of our continuing academic output. We already attend and present at a number of national and international conferences (e.g. ALT-C), and this project will form the focus for some of our presentations and demonstrations.

Principal investigator

Dr Liz Falconer
University of the West of England
Coldharbour Lane
Bristol BS16 1QY.
Phone: 0117 328 6356
Fax: 0117 328 1002
Email: Liz.Falconer@uwe.ac.uk

Additional team members

Ms. Deborah Street.
Deborah.Street@uwe.ac.uk

Mr. Manuel Frutos-Perez
Email: Manuel.Frutos-Perez@uwe.ac.uk

Mr. Andrew Warrington
Email: Andrew.Warrington@uwe.ac.uk
Administrator Support and Approval

Mr John Rushforth

University of the West of England
Frenchay Campus
Coldharbour Lane
Bristol
BS16 1QY
UK
Telephone: +44 (0)117 328 2022
Email: John.Rushforth@uwe.ac.uk

Administrator statement

I shall take a personal and active involvement in this project to ensure that it integrates effectively with the university teaching, learning and assessment strategy. If this application is successful I will look to mobilise additional resources in support of the roll out of the project. I will act as sponsor of this project at the highest level of the university and engage with the Governing Body as appropriate.

Approval of terms and conditions: Y
Privacy terms and conditions: Y

Institutional information

Legal Name
The University of the West of England, Bristol

Address
Frenchay Campus
Coldharbour Lane
Bristol
BS16 1QY
UK
Telephone
+44 (0)117 965 6261

Campus Website
http://www.uwe.ac.uk

Institution Mission Statement
Bristol UWE - The Vision
By 2012 we envisage a University that is an internationally acknowledged centre for knowledge exchange, drawing upon its excellent teaching, scholarship and research in order to prepare students for the various needs and challenges of work and society.

This will mean that the University:

- is renowned for supporting students’ learning across a spectrum of activity, offering them lifelong learning, progression pathways and truly excellent standards in learning and teaching which leads to high quality employment outcomes through the relevance and practicality of its curriculum
- is known by employers for its user-led research applicable to real world problems, consultancy, courses, toolkits, events, and employable graduates
- is recognised for its pre-eminence in the field of knowledge exchange
- conducts world-class research in clearly identified areas of strength
- is known for the diversity of its students, its recognition of their differing needs and the value of their active participation and engagement.

Institutional Tax ID number

GB-520137788 (VAT)

Tax exempt?

No

Grant recipient details – Shipping Instructions

Mr Robert Cutler

University of the West of England, Bristol
IT Services
Coldharbour Lane
Bristol
BS16 1QY
UK
Telephone: +44 (0)117 328 1048
Email: Robert.Cutler@uwe.ac.uk