

Open Research Online

The Open University's repository of research publications and other research outputs

Using open educational resources and Web 2.0 tools to support ethical reasoning in information and computer sciences project-based learning

Other

How to cite:

Wilson, Tina and Ferreira, Giselle Martins dos Santos (2010). Using open educational resources and Web 2.0 tools to support ethical reasoning in information and computer sciences project-based learning. The Higher Education Academy.

For guidance on citations see [FAQs](#).

© 2010 ICS Subject Centre of the Higher Education Academy

Version: Version of Record

Link(s) to article on publisher's website:

http://www.ics.heacademy.ac.uk/projects/development-fund/fund_details.php?id=137

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

HIGHER EDUCATION ACADEMY SUBJECT NETWORK FOR INFORMATION AND COMPUTER SCIENCES

DEVELOPMENT FUND OVERVIEW

PROJECT

Using Open Educational Resources and Web 2.0 Tools to support Ethical Reasoning in Information and Computer Sciences Project-Based Learning

GRANTEES

Dr Tina Wilson
Institute of Educational Technology
The Open University
Walton Hall
Milton Keynes
MK7 6AA

Dr. Giselle Martins dos Santos Ferreira
Department of Communication and Systems
Faculty of Maths, Computing and Technology
The Open University
Walton Hall
Milton Keynes
MK7 6AA

KEYWORDS (6)

Open Educational Resources; ethics; Web 2.0, online communities; collaborative learning; Information and Computer Sciences

ABSTRACT

This project investigated the use of Web 2.0 tools and Open Educational Resources (OER) to support students engaged in project-based learning in ICS. Capitalising on existing environments, tools and learning resources, the project explored the potential of these openly and freely accessible resources to facilitate a space where students can be encouraged to identify, engage with and discuss ethical issues that arise in their project work.

The project consisted of a small-scale investigation into students' views of social networking as a class of tools potentially useful in a project-based course taught entirely at a distance, with a particular focus on the area of ethical reasoning. Ethics is an important part of the course and integral to its assessment, and the work carried out enabled an initial evaluation of the OER in the area of ethics in ICS (Ferreira & Monk, 2009) created with previous support from the HEA Network for ICS.

AIMS

The project has achieved the following aims as originally proposed:

- 1) To explore students' attitudes and preferences regarding the use of Web 2.0 and social networking tools to support project-based learning
- 2) To create learning resources in the area of ethical reasoning that are tailor-made to a project-based course, drawing upon the unit *Introducing Ethics in ICS* (Ferreira & Monk, *op. cit.*);
- 3) To contribute to the evidence base on the practices surrounding design, use and reuse of OER.

OUTCOMES

The project has generated the following outcomes:

- 1) An account of tutor and students' preferences and attitudes regarding the use of Web 2.0 social networking tools to support project-based learning
- 2) A case-study describing the experience from the perspectives of both tutor and students
- 3) Ideas for future work building on the knowledge gained in this project
- 4) Tailor-made resources and a rationale for integrating ethical reasoning more explicitly in the project work required in M450, to be made available as an OER that can be potentially reused in other contexts

Outcomes (1) and (2) take the guise of a conference paper (Wilson & Ferreira (2010a), a journal paper (Wilson & Ferreira, 2010b; currently awaiting reviewers' feedback – please see Appendix 1 for abstract) and a book chapter (Wilson & Ferreira, 2010c; currently being finalised following the successful submission of an initial abstract – please see Appendix 2 for proposal). Outcomes (3) and (4) have been integrated and further developed as a new project proposal that was put forward to the HEA in response to the 2010-2011 Development Fund Call (Ferreira & Wilson, 2010). The bid has been successful and the project will begin in September 2010. This new project will tackle issues identified in the work being reported here.

METHODOLOGY

Research questions

The following questions were tackled:

- 1) Which Web 2.0 tools (and/or combination of these) potentially provide an appropriate platform to support the necessary intense episodes of interaction between supervisor and student that are needed when students are working on a project?
- 2) Can the use of Web 2.0 tools contribute to encourage students and supervisor to reflect on their learning and practice, respectively?
- 3) Which resources or types of resources (including elements from the *Introducing Ethics in ICS* OER) are most appropriate for use in the context of project-based learning, and what is a good rationale to integrate these resources into such a context?

Research approach

This was a small-scale investigation aimed at drawing upon students' views as an essential element to inform teaching practice and course development. As such, the project constituted a pilot study that adopted an action research approach (Somekh, 2006).

The work has been carried out with the group of students enrolled in the 2010 presentation of a course supported by Tina Wilson, who has acted as participant observer and evaluator, with Giselle Ferreira acting as a collaborator and external evaluator. Semi-structured interviews, surveys and observational techniques have been used to gather data. Data analysis has adopted an approach based on grounded theory (Strauss & Corbin, 1997). The following data has been collected and analysed (please see extracts from the data collection tools in Appendix 3):

- 1) Students' responses to a pre-course survey on their preferences and views on social networking tools
- 2) Students' responses to a survey during course presentation (Post-TMA02) indicating their actual usage of social networking tools as well as the ethics-related materials (provided by the course and the OER on OpenLearn)
- 3) Transcribed data from interviews carried out using videoconferencing
- 4) Emails exchanged between tutor and participating students
- 5) Relevant components of the assignments submitted by participating students
- 6) Researchers' observational notes

Web analytics for the relevant pages within the Learning Club and OER areas were also obtained, but they were not used as part of the core data analysed.

In addition to the data collection carried out with the 2010 cohort, the project also considered the information collected in the post-course reviews carried out by the tutor with the 2008 and 2009 students. One of the purposes of these reviews had been to investigate students' views of Web 2.0, with a view to informing the tutor's introduction of new tools in the 2010 presentation of the course.

The 2010 cohort included 8 students, but only 5 were able to participate in the study due to restrictions imposed by the university. From the 2009 cohort, 4 students participated in the post-course review due to similar restrictions. Finally, the 2008 group of participants included 5 students. Participants' ages followed a bell-shaped distribution ranging between 25 and 75 years, and gender representation equated to a 60% to 40% male/female proportion.

DELIVERABLES

The project has delivered the following items:

- 1) A Learning Club that draws upon the OER *Introducing Ethics in ICS* (Ferreira & Monk, *op.cit*) and offers access to Web 2.0 tools (e.g. video

conferencing, learning journals, mind mapping tools and a dedicated discussion forum): these resources are open for colleagues as well as learners throughout the UK ICS community

- 2) A paper discussing preliminary results, to be presented at the 11th HEA Subject Network for ICS Conference (Wilson & Ferreira, 2010a) and made freely and openly available via the Open University Research Online – ORO – Website <http://oro.open.ac.uk/>)
- 3) A proposal for a follow-on project (Ferreira & Wilson, 2010) that will build upon the knowledge and ideas developed through this work

The following items are currently being finalised (drafts will be made freely and openly available via the Open University Research Online – ORO – Website <http://oro.open.ac.uk/>):

- 4) A journal paper focusing on students' preferences and views of Web 2.0 and social networking tools
- 5) A book chapter presenting the project experience from the perspective of tutor and students

BACKGROUND

The Open University (OU) course M450 *The Computing Project* (<http://www3.open.ac.uk/study/undergraduate/course/m450.htm>) is a level 3, 60 CATs points course taught at a distance over a period of 9 months. Before undertaking their project students need to have studied at least one level-3 course. Indeed, M450 provides opportunities for students to put into practice the knowledge gained in previous courses as well as their professional experience, which equates the course to a final year project in a face-to-face setting.

M450 is centred on a piece of project work in which students are expected to 'gain practical experience of independent learning and reflective practice (...) and apply advanced principles and techniques to solve problems'. The course materials are all presented online on a dedicated, password-protected Web site. Tutorial support is also provided entirely online to groups of 6-8 students, each working in their own chosen topic or area. In addition to prompting and moderating discussions and providing individual, tailor-made support to students, tutors also mark and provide feedback on the 3 pieces of summative assignment completed throughout the course (Tutor-Marked Assignments or TMAs) as well as their examinable component, the project report (End-of-Course Assignment or ECA).

Although the ethical dimension entailed in research and development in ICS is highlighted in course materials and explicitly included in the set of assessment criteria, engagement with ethical issues poses a particular challenge for students in M450. The ethical guidelines provided to students focus almost entirely on issues that arise in respect to participation in developmental testing (with the exception of some commentary on academic collusion and plagiarism).

The issue, therefore, appears to be twofold. On the one hand, the nature of the course materials on ethical issues is such that they provide limited or no coverage of important questions that may arise in real-life work situations. Also, there are few prompts for reflection and no opportunity for the group discussion that is essential to prepare students to tackle issues that may arise in their own projects and professional practice. On the other hand, the existing arrangements that support communication between tutor and students (the course website and tutor group conferences on the university's conferencing system) appear to be insufficient to facilitate the necessarily intense episodes of interaction required for productive supervision.

This project has investigated ways to incorporate social networking to provide further support to students in the course, with a focus on the area of ethical reasoning. The project used community-oriented facilities available through OLnet (<http://olnet.org>), the OER research hub funded by the William and Flora Hewlett Foundation. These facilities include the OpenLearn twin sites LearningSpace (<http://openlearn.open.ac.uk>) and LabSpace (<http://labspace.open.ac.uk>), which provide social networking tools that can be 'described as integrating rather than integrated' (Culwin and Lancaster, 2004, p. 1), e.g. video conferencing, learning journals and mind mapping tools. The sites also offer 'learning clubs', an integrated feature designed as part of the evolving environment to allow users to collect different resources together in one space for discussion.

PUTTING IT INTO PRACTICE

Overview of methodology

The work carried out consisted of the following steps:

- 1) Participant recruitment: institutional research procedures required consultation with the Ethics Committee and the Student Research Project Panel (which overviews all data collection carried out with students across the institution for purposes not always linked to academic research)
- 2) Pre-course survey on students' preferences and views of social networking tools: please see Appendix 3(A)
- 3) Preparation and discussion with students of scheduling of activities (including options for synchronous and asynchronous; group or individual working)
- 4) Provision of introductory training materials ('Quick Start Guides') to participants depending on their choice of tools (available through <http://openlearn.open.ac.uk/course/search.php?search=quick+start>)
- 5) Selection of extracts from the *Ethics in ICS* OER and provision of links to students: suggested reading included the 'Introduction' and 'Section 1' (subsections 1.1 to 1.10)
- 6) Tutorial support (throughout the process) via email, FirstClass conferencing and FM Live Communication (one-to-one and one-to-many video conferencing including instant messaging)

- 7) Post-TMA02 survey on students' actual usage of social networking tools and supplementary ethics resources: please see Appendix 3(B)
- 8) Video conferencing interviews (following return of marked TMA02's to students): please see Appendix 3(C)

Up to four videoconferencing sessions were offered to students. They could choose to have these sessions with their tutor only or as a group with the tutor. All videoconferencing sessions were actually conducted one-to-one between tutor and student, predominantly following the students' preference and, in some cases, due to timetabling difficulties (it was not possible for a number of students to be available at the same time for a group session). These video conferencing sessions were in addition to the normal tutorial support of email, an online asynchronous forum and telephone contact.

Ethical issues were discussed with the tutor on a one-to-one basis via email before submission of the first assignment, when the students were developing their initial project ideas. Further discussion on ethical issues (one to one via email in most cases – one student by video conferencing) took place before the second assignment was submitted.

Consistently with the choices made by previous cohorts, all participants from the 2010 group chose HCI-focused projects based in part on the knowledge gained in their previous course choice (normally M364 *Fundamentals of Interaction Design*) and also on previous work experience.

Deliverables (4) and (5) include detailed analyses of the data collected, and an overview of the main points arising from the research are presented in the section 'Issues and Debates' below.

Recommendations

- 1) Video conferencing provides an effective medium for discussion of project ideas as well as for providing support to students trying to develop an understanding of what is expected in a project-based situation. The medium facilitates much quicker resolution of misunderstandings than the use of email or other asynchronous tools, providing a type of swift flexibility that is quite important for students who may feel in need of some urgent reassurance.
- 2) Early familiarisation with tools is very important, whether these tools are new, similar or different to tools that students may already have used. FM Live Communication offers a particularly straightforward interface, but its simplex basis may mean that participants in meetings may have to learn or develop different communication protocols that are consistent with the turn-taking that the environment affords. It is, therefore, worthwhile running an initial familiarisation session with the tool or providing students with the necessary resources to have a preliminary trial

with the system by themselves, prior to running course-oriented discussions. Quick adaptation to or learning of a new tool is expected of students in ICS, and incorporating new tools into the teaching practice should be relevant also to the students' development as critical and reflective professionals in the area.

- 3) The ideal duration of a videoconference is not easy to prescribe, as it depends on system specifications as well as the tutor's and the students' availability. FM, for example, only allows sessions lasting multiples of 30 minutes, but the experience in this project has been that a one-to-one session should last at least between 45 minutes and 1 hour. It is worth noting that the system requires a specific slot of time when a meeting is booked, and it is best to allow for 10 or 15 minutes beyond the expected duration in order to avoid an abrupt end to the discussion.
- 4) In the context of this project, which has involved a distance-learning course that provides students with a 'package' of self-study learning materials, it is vital to consider the time associated with OER-based work. Tutors in this context will normally have their own materials, continuously changed and improved across several presentations of a course, but these materials are directly tailored to the perceived needs of students and the core course content. Extra materials need to be such that their relevance to the actual course work is clearly perceived by students; also, the materials must not add unnecessarily to the workload.
- 5) It is an understatement to claim that embedding ethical reasoning within an ICS context is a difficult task. With M450 students are provided with 'essential' material couched in terms related to risk assessment and stakeholder analysis. Although students clearly make use of this material, as suggested by the discussion they submit as part of TMA02, it appears that it is in discussion with the tutor that potential issues are actually identified. Interaction with others in discussion therefore appears to be essential.
- 6) Although the particular cohort of participants in this study has not directly articulated any concerns with privacy, the lack of student activity in the Learning Club forum suggests that privacy may be an unacknowledged concern. Web analytics support students' statements that the Learning Club has been (and continues to be) utilised, but it has been used mostly as a portal leading to the ethics OER and, more importantly, private areas where students maintained their personal learning journals. Another aspect of privacy, related to identity management in social networking, has not been particularly relevant in this study, which used an environment created specifically for learning. However, the adoption of social networking platforms such as Facebook or Twitter may raise questions for participants, who may already be actively involved in the sites

for personal or professional purposes and may not be interested in carrying out other types of interactions in the same space. Students' previous and ongoing experiences with social networking require careful consideration.

- 7) In this project it was the case that not all students had suitable equipment to take part in the videoconferencing (one student used audio only and another bought a webcam). This may not be an issue in other contexts, but constitutes a point that needs consideration, even though Internet access is fast becoming ubiquitous.

EMBEDDING

The following measures will be incorporated to the tutor's work for the next course presentation:

- 1) Students will be introduced to the specific Web 2.0 tools before the course starts
- 2) Students will be asked to read through the ethics-related materials provided in the course as well as extracts from the OER at the very beginning of the course
- 3) One-to-one video sessions will be organised to take place before the official start of the course, to assist student familiarisation with the technology and to begin discussions about their project proposal as well as potential ethics-related questions.
- 4) One-to-one video sessions with students will be organised to take place before the submission of their first TMA, to assist preparation of the assignment and planning for the whole project.
- 5) One-to-one video sessions with students will be organised to give additional feedback and clarifications after TMA01's have been returned.
- 6) One-to-one video sessions will be organised to take place before students start work on their ECA, partially to discuss each student's proposed contents list as well as what they plan to include in the document
- 7) Pending scheduling issues, group meetings will be organised to discuss ethical questions and generic issues related to research in ICS.
- 8) More use will be made of the discussion forum available in the Learning Club for communication with the group, hopefully fostering more group interaction, with the understanding that participant feedback suggests that students prefer private spaces for discussion focusing on their own particular projects.

There are potential implications to the tutor's workload, but these measures are envisaged as replacement to some of the support that has been, so far, provided using telephone or email.

BENEFITS

The potential of Web 2.0 tools and OER has only just begun to be explored, and it is hoped that this project can provide a modest contribution to support further explorations and experimentation, which the researchers consider essential for pedagogically meaningful ideas to be developed. On the other hand, the teaching of ethics in ICS, although not new, remains an area with open questions of considerable magnitude, making experimentation also essential, together with sharing of experiences and discussion with the community of practitioners in the area.

STUDENTS VIEWS

Details of how students' views have been taken into consideration are provided above in the 'Methodology' section under the 'Research Approach' heading. Arising themes and questions are covered below under 'Issues and Debates'.

IMPACT

Feedback from students has been unanimous in suggesting that the tutorial support and resources provided through this work were not only most welcome but also helpful and useful. It is the tutor's general impression that the overall quality of the ethics-related components of the 2010 submissions have been superior to those of previous years, and the combination of extra tutorial support as well as the availability of supplementary materials may have been an important contributing factor.

ISSUES AND DEBATES

Time

It's probably not unfair to suggest that OU courses generally tend to provide quite a wealth of resources, and adult learners, who fit study around other commitments, need to make strategic decisions on how to tackle the materials. Hence a measure of prioritising is part of planning their studies, and tasks or activities perceived as 'extra' will not normally score highly in this process. Synchronous discussions may also pose practical questions when students follow slightly different timetables and schedule their study sessions differently from one another.

Perceptions of self

Some concern with skills may also be a factor for some students. Some students may have issues (sometimes associated with disabilities) with typing and, hence, prefer video or voice chatting to text messaging and even email; others may prefer asynchronous communication media as this gives them time to think their responses through more carefully. Also, privacy may be a concern, as suggested above in respect to uses made of the Learning Club.

Relevance

Another element perhaps correlated with the lack of group discussion on the Learning Club forum is that of concerns with 'relevance'. In prioritising their work, students tend to assess the relevance of specific tasks, but perhaps the

issue is not only that they have limited time to dedicate to studying, but also that they do not always acknowledge the relevance of the 'social' to their studies. Feedback received in this project suggests that some students' model of learning does not include socialisation with peers as an important component, in which case social networking may offer little or no appeal. Indeed, most participants placed the most value on the tutor's involvement in discussions, giving little importance to working with others. This may not be simply an idiosyncrasy of adult learners or, perhaps, learners engaged in project-based work.

Perceptions of relevance (or lack thereof) also clearly impinge on participants' engagement with ethical reasoning. The selected extracts of the OER provide a brief introduction to ethical reasoning and debate rather than present ethics as a normative area, which appears to be the underlying premise of the course resources. The assumption is that the OER extracts would provide a useful supplement to the course resources in fostering further reflection within a less procedural approach to ethical considerations. Participant feedback on this has been extreme in that an equal proportion of students declared the material either outright 'irrelevant' to their work or indeed 'very useful'.

Student feedback also suggests that more explicit links to types of ethical questions addressed in the course materials would be required, but restricting the examples only to procedural issues (e.g. compliance with university's project approval procedures) would be detrimental to students' development of critical and independent thinking about relevant issues. Nevertheless, increasing the granularity and interactivity of the OER would be of great usefulness to the tutor, who would be able to make an entirely different use of the extracts than was possible with the current (fairly linear) presentation. Students are required to include a reflection on ethical issues in the final ECA document, which suggests that some measure of ethical thinking must be done throughout the course; a set of resources with finer granularity would greatly assist the tutor in encouraging and supporting students in this task.

RESOURCES

Primary Resources

M450 Ethics in ICS Learning Club. Freely and openly available online at <http://openlearn.open.ac.uk/course/view.php?id=4277> [accessed 31 July 2010]

(created with the support of previous HEA ICS Network funding) Ferreira, G. M. d. S. & Monk, J. (2009) *Introducing Ethics in Information and Computer Sciences*. Milton Keynes: The Open University. Available online at <http://openlearn.open.ac.uk/course/view.php?id=3990> and <http://labspace.open.ac.uk/course/view.php?id=5076> [Accessed 31 July 2010]

Tools

FM Live Communication (videoconferencing)

<http://openlearn.open.ac.uk/course/view.php?id=3101>

Compendium (Mind mapping)

<http://openlearn.open.ac.uk/course/view.php?id=2824>

Learning Journals (public or private blogging)

<http://openlearn.open.ac.uk/course/view.php?id=2908>

Learning Clubs

<http://openlearn.open.ac.uk/course/view.php?id=3525>

Web-based teaching and learning resources [All have been accessed on 31 July 2010]

British Computer Society (BCS) Code of Conduct - <http://www.bcs.org/upload/pdf/conduct.pdf>

Information Commissioner's Office (2007) 'Data Protection Technical Guidance. Determining what is personal data' - http://www.ico.gov.uk/upload/documents/determining_what_is_personal_data/whatispersonaldata2.htm

MIT OpenCourseWare (OCW) Resources Area for Electrical Engineering and Computer Science - <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/> - a repository of teaching resources contributed by MIT staff

Connexions (Rice University's Open Educational Resources Repository): <http://cnx.org/> - a repository of community-contributed teaching and learning resources for re-use and re-purposing

Open Educational Framework for Computer Science Software Engineering (OpenSE): <http://www.opense.net/> - an open learning hub including downloadable resources

Open Educational Repository in Support of Information and Computer Sciences (in JORUMOPen):

<http://open.jorum.ac.uk/xmlui/browse?value=Open+Educational+Repository+in+Support+of+Computer+Science&type=author>

OpenLearn LabSpace Computing and ICT Topic Area: <http://labspace.open.ac.uk/course/category.php?id=7> - a variety of learning and teaching resources contributed by the LabSpace user community in the area of ICS

OpenLearn LearningSpace Computing and ICT Topic Area: <http://openlearn.open.ac.uk/course/category.php?id=7> - a selection of materials taken from Open University courses and available openly and freely for learners and educators to use online or download (various formats available)

BIBLIOGRAPHY

Armstrong, J. & Franklin, T. (2008) *A review of current and developing international practice in the use of social networking (Web 2.0) in higher education.* Available online at <http://www.franklin->

consulting.co.uk/LinkedDocuments/the%20use%20of%20social%20networking%20in%20HE.doc [Accessed 31 July 2010]

Brown J.S. and Adler R. P. (2009) 'Minds on Fire: Open Education, the Long Tail, and Learning 2.0.' *EDUCAUSE Review* Vol. 43(n. 1): 16–32

Conole, G. (2010) 'Facilitating new forms of discourse for learning and teaching: harnessing the power of Web 2.0 practices.' *Open Learning* 25(2) pp. 141–151

Conole, G., McAndrew, P. & Dimitriadis, Y. (2010). 'The role of CSCL pedagogical patterns as mediating artefacts for repurposing Open Educational Resources'. In F. Pozzi and D. Persico (Eds.) *Techniques for Fostering Collaboration in Online Learning Communities: Theoretical and Practical*. Information Sciences Reference

Culwin, F. & Lancaster, T. (2004) 'An integration suite of tools to assist investigation of non-originality'. In *Proceedings of the Plagiarism: Prevention, Practice & Policy Conference*. St James Park, Newcastle upon Tyne 28-30 June. Newcastle: Northumbria University Press, pp. 49-55. Available online at <http://www.jiscpas.ac.uk/documents/papers/2004Papers06.pdf> [Accessed 31 July 2010]

De Paula, R., Fischer G., Ostwald, J., (2001) 'Courses as Seeds: Expectations and Realities'. In *Proceedings of the European Conference on Computer-Supported Collaborative Learning 2001* (Euro-CSCL 2001), Maastricht, The Netherlands, 22-24 March 2001

Ferreira, G. M. d. S. (2009) 'New space, new tools, new roles: two case studies on the impact of Open Educational Resources'. *International Journal of Learning* 16(11) pp. 273-286. Abstract available online at <http://ijl.cgpublisher.com/product/pub.30/prod.2529> [Accessed 31 July 2010]

Ferreira, G. M. d. S. & Monk, J. (2009) *Introducing Ethics in Information and Computer Sciences*. Milton Keynes: The Open University. Available online at <http://openlearn.open.ac.uk/course/view.php?id=3990> [Accessed 31 July 2010]

Ferreira, G. M. d. S. & Wilson, T. (2010) *Multimedia and Social Networking for Teaching and Learning Ethics in Information and Computer Sciences: developing a pedagogy of creativity and openness*. HEA Subject Network for ICS Project Proposal (accepted for funding to begin in September 2010 – details available online at

http://www.ics.heacademy.ac.uk/projects/development-fund/fund_details.php?id=142)

Fischer, G. & Sugimoto, M., (2006) 'Supporting Self-Directed Learners and Learning Communities with Sociotechnical Environments'. *International Journal Research and Practice in Technology Enhanced Learning* (RPTEL), 1(1), pp. 31-64. Available online at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.93.688&rep=rep1&type=pdf> [Accessed 31 July 2010]

Gooday, G. (n.d.) 'The Importance of Learning Skills of Critical and Independent Thinking in a Computer Ethics Course'. Discussion paper available online at

http://www.ics.heacademy.ac.uk/events/presentations/446_gg.doc [Accessed 31 July 2010]

Gulati, S. (2004) 'Constructivism and emerging online learning pedagogy: a discussion for formal to acknowledge and promote the informal'. Paper presented at the Annual Conference of the Universities Association for Continuing Education - Regional Futures: Formal and Informal Learning Perspectives. Centre for Lifelong Learning, University of Glamorgan, 5-7 April 2004. Available online at

<http://www.leeds.ac.uk/educol/documents/00003562.htm> [Accessed 31 July 2010]

Jones, C., Ramanau, R., Cross, S., Healing, G. (2010) 'Net generation or Digital Natives: Is there a distinct new generation entering university?' *Computers and Education* 54(3) pp. 722–732

Lane, A., McAndrew, P., Connolly, T., Ferreira, G. M. d. S., Wilson, T. (2010) 'Reusing, reworking and remixing open educational resources'. In Kinuthia, W. & Marshall, S. (eds.) *Cases'n'Places. Global Cases in Educational and Performance Technology* (pp.71-84). Charlotte, NC: IAP-Information Age Publishing.

O'Reilly, T. (2005) 'What Is Web 2.0. Design Patterns and Business Models for the Next Generation of Software. Available online at <http://oreilly.com/web2/archive/what-is-web-20.html> [Accessed 31 July 2010]

Redecker, C. (2009) *Review of learning 2.0 Practices: Study on the Impact of Web 2.0 Innovations on Education and Training in Europe*. Seville: European Commission Joint Research Centre Institute for Prospective Technological Studies. Available online at <http://ftp.jrc.es/EURdoc/JRC49108.pdf> [Accessed 31 July 2010]

Smith, S D., Salaway, G, Borreson Caruso, J (with an Introduction by Katz, R N.) (2009) 'The ECAR Study of Undergraduate Students and Information Technology, 2009'. (Research Study, Vol. 6). Boulder, CO: EDUCAUSE Center for Applied Research, 2009. Available at <http://www.educause.edu/Resources/TheECARStudyofUndergraduateStu/187215> [Accessed 31 July 2010]

Somekh, B. (2006) *Action Research: a methodology for change and development*. Maidenhead: Open University Press

Strauss, A. & Corbin, J. (eds.) (1997) *Grounded Theory in Practice*. Thousand Oaks, California: Sage Publications

Tallent-Runnels, M.K. (2005) 'The relationship between problems with technology and graduate students' evaluations of online teaching'. *Internet and Higher Education* 8(2) pp.167-174

Wilson, T. (2007) 'Transformation for an open education repository: Issues associated with IT and Computing distance learning course materials'.

Proceedings of the International conference, Information Technologies: Theory, Practice, Innovations (pp. 143-147). 6-7 Dec 2007, Alytus College, Alytus, Lithuania.

Wilson, T. & Ferreira, G. M. d. S. (2010a) 'Investigating the use of web 2.0 tools and Open Educational Resources for ICS'. Paper to be presented at the *11th Annual Conference of Higher Education Academy Subject Centre for Information and Computer Science*, Durham UK, 24-26 August 2010

Wilson, T. & Ferreira & G. M. d. S. (2010b). 'Social Computing for Information and Computer Science learning'. Submission to a special issue of the journal *Interactive Technology and Smart Computing - Social Computing for Learning Communities*. Currently awaiting response from reviewers

Wilson, T. & Ferreira & G. M. d. S. (2010c) 'Open Educational Resources and Web 2.0 for learning in Information and Computer Sciences: a case study'. In (forthcoming) Okada, A., Connolly, T., Scott, P. (eds) *Collaborative Learning 2.0. Open Educational Resources*. IGI Global. Details online at <http://books.kmi.open.ac.uk/cl2oer/> [Accessed 31 July 2010]

APPENDIX 1: Journal Paper Abstract (awaiting reviewers' feedback)

Social Computing for Information and Computer Science Learning

T. Wilson & G. M d. S. Ferreira

(Submitted to the *Journal of Interactive Technology and Smart Computing*)

The availability of Web 2.0 tools together with associated Open Educational Resources (OER) enables the creation of new social and collaborative learning spaces. This paper investigates student preferences (across three cohorts) in terms of openly and freely accessible Web 2.0 tools to provide a space where students can interact with each other and their tutor to discuss concerns that arise within their final year project-based learning. This intervention was planned as existing arrangements that support communication between tutor and distance learning students appeared insufficient to facilitate the necessarily intense episodes of interaction required for productive supervision. The findings suggest that different student cohorts are interested in using various Web 2.0 tools and individuals may select between one and six Web 2.0 tools for use in formal learning. This paper gives initial feedback about intended usage of Web 2.0 tools for co-operative and collaborative learning for final year project work.

APPENDIX 2: Book Chapter Proposal (accepted)

Open Educational Resources and Web 2.0 for Learning in Information and Computer Sciences: a case study

Tina Wilson & Giselle M. d. S. Ferreira
The Open University

To appear in: Okada, A., Connolly, T., Scott, P. (eds) *Collaborative Learning 2.0. Open Educational Resources*. IGI Global. Details online at <http://books.kmi.open.ac.uk/cl2oer/>.

ABSTRACT

This chapter explores the use of Web 2.0 tools and Open Educational Resources (OER) to support students engaged in project-based learning in Information and Computer Sciences (ICS). The chapter reports on a practical investigation of the potential of openly and freely accessible resources to provide a space where students can be encouraged to identify, engage with and discuss ethical issues that arise in their project work.

KEYWORDS

Open Educational Resources; OER; Web 2.0; Information and Computer Sciences; ICS; project-based learning; ethics

MAIN BODY OF PROPOSAL

The availability of Web 2.0 tools and OER affords the emergence of novel learning spaces. Ongoing debate on these innovations, however, has predominantly emphasised technical, production and copyrights -related issues. This chapter proposes to look beyond these issues by focusing on pedagogy. By exploring views that lecturers and students hold on social networking tools, as gathered in a piece of action research work (Somekh, 2006), this chapter seeks to contribute to the practical exploration of the potential of such arenas for formal, informal and, perhaps, new and less fragmented models of, learning.

The context for this research has been provided by the Open University (OU) course M450 *The Computing Project* (<http://www3.open.ac.uk/study/undergraduate/course/m450.htm>). This is a level 3, 60 CATs points course taught at a distance over a period of 9 months. M450 provides opportunities for students to put into practice the knowledge gained in previous courses as well as their professional experience, which equates the course to a final year project in a face-to-face setting.

M450 is centred on a piece of project work in which students are expected to gain 'practical experience of independent learning and reflective practice (...) [and] apply advanced principles and techniques to solve problems' (Open University, 2009). The course materials are all presented online on a dedicated, password-protected Web site. Tutorial support is also provided entirely online to groups of 6-8 students, each working in their own chosen topic or area. In addition to prompting and moderating discussions and providing individual, tailor-made support to students, tutors also mark and provide feedback on the 3 pieces of summative assessment completed throughout the course (Tutor-Marked Assignments or TMAs) as well as their examinable component, the project report (End-of-Course Assignment or ECA).

Although the ethical dimension entailed in research and development in ICS is highlighted in course materials and explicitly included in the set of assessment criteria, engagement with ethical issues poses a particular challenge for students in M450. The ethical guidelines provided to students focus almost entirely on issues that arise in respect to participation in developmental testing (with the exception of some commentary on collusion and plagiarism, standard to all ECA-based courses). Most of the issues raised are, therefore, procedural and relatively extensively covered in the various codes of practice brought to students' attention in the course materials. Interestingly, an especially popular choice of previous level-3 course taken by students enrolled in M450 in previous cohorts has been the third level course M364 *Fundamentals of interaction design* (<http://www3.open.ac.uk/study/undergraduate/course/m364.htm>), but only a proportion of submitted project proposals entail the involvement of participants.

The research is, therefore, tackling a twofold issue. On the one hand, the nature of the course materials on ethical issues is such that they provide limited or no coverage of important questions that may arise in real-life work situations. Also, there are few prompts for reflection and no opportunity for the group discussion that is essential to prepare students to tackle issues that may arise in their own projects and professional practice. In particular, the internal contradictions found in most codes of practice, which can potentially generate tangible ethical conundrums (e.g. whistle-blowing) are not explored. On the other hand, the existing arrangements that support communication between tutor and students (the course website and tutor group conferences the university's VLE) appear to be insufficient to facilitate the necessarily intense episodes of interaction required for productive supervision.

The study capitalises on the community-oriented facilities available on OpenLearn, the UK Open University's Open Content Initiative, originally funded by the William and Flora Hewlett Foundation. The twin sites LearningSpace (<http://openlearn.open.ac.uk>) and LabSpace (<http://labspace.open.ac.uk>) provide social networking tools that can be 'described as integrating rather than integrated' (Culwin and Lancaster, 2004, p1), e.g. video conferencing, learning journals, instant messaging and mind-mapping tools. The work has also involved the use of 'learning clubs', an integrated feature designed as part of the evolving environment to allow users to collect different resources together in one space for discussion. Finally, the OpenLearn unit *Introducing Ethics in Information and Computer Sciences* (<http://openlearn.open.ac.uk/course/view.php?id=3990>) has been adopted to provide a rationale and source of supplementary materials that were adapted for discussion within the context of the study.

This chapter describes the work carried out within this context, discussing broader questions of relevance to other contexts in which OER and Web 2.0 tools are adopted for formal, institution-based learning in different disciplines.

PRELIMINARY LIST OF REFERENCES

Culwin, F. & Lancaster, T. (2004) 'An integration suite of tools to assist investigation of non-originality'. In *Proceedings of the Plagiarism: Prevention, Practice & Policy Conference*. St James Park, Newcastle upon Tyne 28-30 June. Newcastle: Northumbria University Press, pp 49-55. Available online at <http://www.jiscpas.ac.uk/documents/papers/2004Papers06.pdf> [Accessed 1 June 2010]

Open University, (2009). Course information for M450 - The Computing Project. Available online at <http://www3.open.ac.uk/study/undergraduate/course/m450.htm> [Accessed 1 June 2010]

Somekh, B. (2006) *Action Research: a methodology for change and development*. Maidenhead: Open University Press

APPENDIX 3: Data Collection Tools

A) Pre-course survey – extract

If available, might any of the suggested facilities below help you with your study of M450? It would be really helpful if you could indicate by typing in 'yes' or 'no' next to the following options.

	Y or N
Use of some sort of learning club for students	
Use of video conferencing between yourself and your tutor	
Use of video conferencing between yourself and other students	
Use of video conferencing between yourself, other students and the tutor together	
Use of instant messaging	
Use of a private online diary or blog	
Use of a public online diary or blog	
Use of mind mapping tools	

Also can you suggest anything in the form of support or other tools that you think would help you this year? Please write as much as you like in the box below.

B) Post-TMA02 survey – extract

	Y or N	Unsure
Was the learning club which contained the extra material on Ethics helpful for your study of M450?		
Did you use video conferencing between yourself and your tutor?		
Would you have liked to use video conferencing between yourself and other students?		
Would you have liked to use video conferencing between yourself, other students and the tutor together?		
Did you use instant messaging within the video conference with your tutor?		
Did you use a private online diary or blog?		
Did you use a public online diary or blog?		
Did you use mind mapping tools?		

How has usage of these support tools helped you with your study of M450 this year? Please write as much as you like in the box below.

Did you use the ethics material to help with your submission of the ethics component in TMA02? If yes in what ways was the extra ethics material helpful? Please write as much as you like in the box below.

What changes could be made to these Web 2.0 tools and the extra ethics material that would help you to adopt them more fully? Please write as much as you like in the box below.

C) Guide structure for interviews

[Following welcome, initial thanks and 'Letting-off steam' preliminary questions]

About the Web 2.0 tools (including the learning club):

1. Had you used any of the Web 2.0 tools before taking M450 (learning club, video conferencing, private or public online diary or blog, instant messaging, mind mapping tools)?
2. If yes, were the tool(s) used for professional or personal purposes?
3. How useful did you find each of the Web 2.0 tools (on a scale of 0-5 – 'not useful at all' to 'very useful')?
4. On a scale of 0-5 – 'not so important' to 'very important'. How important is it to have discussions between:
 - You and your tutors
 - You and your peers
 - You and your peers with your tutor
5. How important is privacy to you (specifically, having a 'closed' space to communicate with your tutor and/or peers)?
6. Is there anything else that you would like to add about the use of the Web 2.0 tools or how usage of them could be improved?

About the ethics materials:

7. Did you make use of the extra OER ethics materials?
8. If yes, which parts did you use, specifically?
9. Was the OER ethics material useful (on a scale of 0-5 – 'not so useful' to 'very useful')
10. How important do you think ethics is to project work in Computing (on a scale of 0-5 – 'not so important' to 'very important')?
11. Can you think of ways to improve the OER ethics material?
12. Is there anything else that you would like to add about the extra OER ethics material?