Catherine Reuben and Steve Swithenby

Centre for Open Learning of Mathematics, Science, Computing and Technology

The COLMSCT Effect: Progress three years on

The Centre for Open Learning of Mathematics, Science, Computing and Technology (COLMSCT) is one of the four Open University (OU) CETLs. From the outset the four CETLs have identified themselves as the Open CETL but within the Open CETL framework, COLMSCT has carved out its own specific identity and areas of focus. These align with the needs of the parent science, mathematics, computing and technology community within which COLMSCT is embedded. The work is organised within four strands;

• assessment,
• learning communities,
• online experimentation, and
• online mathematics.

Each strand includes a number of substantial two-year projects proposed by and led by OU full- and part-time lecturers who are supported by secondments and consultancies and, in their COLMSCT role, are termed Teaching Fellows. The Teaching Fellows work on projects aligned to one or more of the four COLMSCT themes, pushing the boundaries of innovation in teaching and learning and developing their own skills through an action learning methodology and disseminating pedagogical developments through professional networks and journals. The COLMSCT Fellow community is now over 60 strong and is characterised by practitioner support and engagement.

Three years on, and reflecting on our achievements, COLMSCT has found it helpful to evaluate its activities in terms of effects. We have identified three main types of effect, on:

• the student experience,
• personal transformation, and
• policy and strategy.

Rather than providing a comprehensive account (which we’ll save for the final evaluation report to HEFCE!) the following provides a sample of COLMSCT’s effects with illustrative examples.

The student experience

COLMSCT is addressing issues of fundamental importance to the future of open and distance learning. We are trying to enhance the student experience through the creation of effective interactions with an ever more diverse student body. For example, we are improving formative assessment feedback and providing effective
online experimentation opportunities for students, an issue of particular relevance to scientists. A large part of our work has also focused on the creation of e-learning communities and student identities. The areas we are developing include mobile learning, social worlds and social networking tools. Exploration of the technological, educational, psychological and social issues students face is necessary if these are to be of genuine benefit to learning.

One of the biggest challenges for the Open University is helping students feel part of a wide community. COLMSCT has been exploring the potential of MUVEs (Multi User Virtual Environments) and we have made considerable investment in Second Life (SL), arguably the most flexible MUVE for education purposes in supporting teaching and learning. In 2006 COLMSCT funded the pilot of a virtual campus called CETLMENT which was used for teaching students on The Open University course T175 Networked Living: Exploring Information and Communication Technologies. Building on the experience of CETLMENT and observation of what works and doesn’t work in this immersive environment, a new Open University island, Open Life, was created in May 2008. COLMSCT is supporting half a dozen projects within this virtual environment with our Teaching Fellows exploring the pedagogical effectiveness of such MUVEs. Open Life has played host to tutorial groups where Open University students can complete tasks and engage in group activities within the virtual reality environment (Fig 1). As well as looking at how Second Life aids teaching and learning, Fellows are evaluating how it helps create a sense of community. Results so far suggest that Second Life offers great potential for supporting open and distance learners, as COLMSCT Teaching Fellow Anna Peachey says, Second Life allows “… students to interact in real-time, emulating more naturalistic learning situations and creating a rich and supportive learning environment.”

See www.open.ac.uk/colmsct/projects/openlife for further details of these activities.

COLMSCT’s work in MUVEs is a striking example of the wider use of online platforms to enrich conversations with and between students. We are also getting to grips with synchronous conferencing, webcasting and many other potential tools. An exciting example is the work carried out in collaboration with Maths Online team who are exploring the use of Elluminate Live! to provide synchronous tutorial support to mathematics students. The tool allows for students and tutors to collaborate online, with whiteboard and conferencing facilities allowing complex techniques and graphical representation to be taught and explored as they would in the classroom (Fig 2). In an age where students are under pressure, the promise of effective tuition at home in mathematically-based subjects is of great interest. Trials with Elluminate Live! in 2008 were so successful that the Maths faculty are now using online tutorials as standard on their three most popular level 1 courses, with plans to roll them out on all the Maths courses.

Personal transformation

“The Centre aims to recognise, reward and build on excellent teaching demonstrated by staff in the Mathematics and Computing, Science and Technology Faculties by providing these excellent teachers with the time and support to capture, develop and disseminate their own good practice.”

In June 2005 COLMSCT invited proposals from Open University academic staff to be recruited as Teaching Fellows. They were the first group of Fellows to work with us, and they helped to set the operational, strategic and personal agenda for the Centre and its coordinating staff.
In December 2008, over three years later, we have 65 past and present Teaching Fellows. They provide the creative cutting edge to our work. They ensure that our work is embedded within the faculties, that it meets real student needs and is informed by practice. They are required to evaluate rigorously and are encouraged to publish their outputs. Our belief is that this strategically-informed but practitioner-led process is effective in delivering institutional change.

The evidence for personal transformation through COLMSCT is contained in the stories of individuals who have developed considerably and are now leading change at faculty, institutional and sometimes national levels, for example, in areas such as electronic assessment, offender learning, virtual reality teaching environments, mobile learning, online experimentation, and distance learning technologies in mathematically based subjects.

All Teaching Fellows have been encouraged to become informed reflective practitioners with a wider understanding of the importance of evidence-based practice. Using action learning approaches to their projects, they have been able to influence colleagues – to act as ‘change agents’. Many of our Fellows have presented at national and international conferences. Some are publishing in peer-reviewed educational journals. There are a number of remarkable contributions from Teaching Fellows and whilst it can be invidious to identify specific individuals, in commenting on personal transformation, it is worth pointing to one contribution chosen by the Fellows as COLMSCT’s first successful nominee for an OU Teaching Award.

Anne Pike has been awarded an Open University Teaching Award for her outstanding work in supporting offender learners through her project ‘Breaking down the digital divide in prisons’. An existing mathematics Associate Lecturer with knowledge of offender learning, Anne was alarmed by the growing difficulties that prisoners were experiencing as education moved online. She organised events that produced a dialogue between those engaged in offender learner education with a view to improving the quality of the learning experience. Despite the challenges in doing so, she has succeeded in motivating and assembling a wide range of people, including policy makers, prison training officers, educationalists and providers of technical solutions. She has drafted institutional strategies and represented the UK in international debates. One outcome is the promise of a ‘VLE on a stick’ that will ease issues of access by eliminating some of the security concerns associated with having prisoners working online. Anne is optimistic about the future and changing attitudes towards higher education in the prison service. “Three years ago, no-one was listening. These days, I am pushing at open doors.”

Anne Pike has acquired prominence in a very short time, and driven a relatively unfashionable area of OU work to the point where it has a real chance to improve the experience and retention of a hitherto poorly represented group of OU students.

**OU policy and strategy**

Although COLMSCT collaborates widely, we can reasonably claim to have been the dominant contributor to OU policy development in several areas of strategic importance such as learner communities, online learning environments, online experimentation, online and formative assessment. Indeed, one of our most successful initiatives has been in developing interactive computer marked assessments (iCMAs).

The importance of feedback for learning has been highlighted by a number of authors. In distance education, where students work remotely from both peers and tutors, the practicalities of providing rapid, detailed and regular feedback on performance are vital issues. Fundamental pedagogical insights into formative feedback were applied in 2007 when COLMSCT initiated the E-Assessment for Learning Initiative, which led to the development of interactive computer marked assessments (iCMAs). The initiative by COLMSCT Teaching Fellow Phil Butcher. In each project, academic staff undertake innovative e-assessment implementation projects within their own course module context. Examples range from textual analysis of English to a clinical decision making maze as well as basic formative assessment of science and maths. In all cases, the interactive CMAs attempt to draw students into a learning experience that is richer and better informed by individualised feedback than the more traditional and common check on progress. A full list of iCMAs is available via [http://www.open.ac.uk/colmsct/activities](http://www.open.ac.uk/colmsct/activities).

An example of the impact of the iCMA initiative on OU policy and strategy is the work from one of the iCMAs already finding its way into the new Science course S104 Exploring science. S104 is using iCMAs developed as part of the initiative by COLMSCT Teaching Fellows Sally Jordan and Barbara Brockbank. Unlike conventional CMAs, the iCMAs in S104 do not just use multiple choice questions. They also include questions requiring free text responses (Fig 3). As Sally reports, “It becomes a fundamentally different proposition if a student is just picking an answer than if they’re having to think about it and write the answer for themselves.”

The evaluation of the free text response questions is ongoing but it is already clear that students engage well with the question. Crucially, the computer is proving to be more accurate and consistent than some of the human markers. However, considerable training is required before staff are confident in the use of the authoring tool and
there may be some cultural barriers to wider take-up of assessment tasks of this type.

S104 iCMAs are offered to students via the OpenMark system (http://www.open.ac.uk/openmarkexamples). Students are allowed three attempts at each question with increasing feedback. To guard against plagiarism, each student is given a subtly different set of questions. A sample of questions is available at https://students.open.ac.uk/openmark/omdemo.iat/

Feedback has shown that students take iCMAs much more seriously if they carry marks, even a few, than if they are purely formative. The data from the iCMAs can also reveal valuable insights into student thinking, both about the way the question is working and about student misunderstandings.

The future

The key achievement of COLMSCT has been to encourage teaching staff to take responsibility for developing themselves and their university. Vision and strategy are represented in the CETL plans but the COLMSCT stance has been not to direct staff but to work alongside them, offering advice and support and, where necessary, resource. Because they have strong reputations with their peers, Teaching Fellows become effective agents of change.

We have evidence to support a number of effects on the student experience, on individual members of staff, and on the wider University. There is no doubt that the University has enjoyed the CETL presence, the energy, networking, empowerment and scholarship. The vitality of the CETLs has been infectious. COLMSCT has particularly enjoyed the council and collaboration of a number of Subject Centres and CETLs over the last few years. However, as the funding period draws to a close we, like the other CETLs, are now in a position where we need to consider our future. If we are to become sustainable beyond the HEFCE funding period, any future we have must involve working alongside partner CETLs and the HEA.

Fig 3 – A question showing the feedback provided to a student who has given an incomplete answer.