Engaging remote computing students

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Abstract
The use of a range of technologies is a feature of pedagogies used across higher education provision in the UK. The University of the Highlands and Islands (UHI) provides higher education in the most rural and remote region of the UK, so the use of technologies is at the forefront of approaches to learning and teaching. This reflective article considers how the UHI computing team uses technology to ensure all students have equal access to courses and teaching.

Keywords
Computing; distance learning; remote; rural

Introduction
UHI is the only higher education institution based in the Highlands and Islands of Scotland. It is a partnership of colleges, learning and research centres, working together to provide a student-centred culture and an individual approach to student learning. As stated in the University's Equivalence Policy (UHI 2005), the UHI's mission is to:

> *"…extend opportunities for higher education to people across the Highlands and Islands of Scotland and beyond."*

UHI recognises that students studying a programme at different locations and by different modes may be supported and taught in different ways.

Trowler and Trowler (2010:14) noted that:

> *"…a substantial, robust body of evidence exists to support assertions that individual student engagement in educationally purposive activities leads to more favourable educational outcomes."*

Using appropriate technological tools can, it is hoped, fulfil the needs of the remote learner, keeping them both supported and engaged.

> *'Distance learning and its relationship to emerging computer technologies have together offered many promises to the field of education'* (Valentine 2002:1).

There are difficulties with remote learning, both from a lecturer and student perspective. Valentine (2002: 1) noted that:

> *"…lecturers are concerned about how distance learning will change their role in education."*

Bodain and Robert (2000) identified that both lecturers and students had a moderately positive attitude about distance learning in general, but moderately negative attitudes about their own use of it. As products to support remote learning have matured, attitudes in general have become more positive. However, Hanson (2009: 1–2) found that:

> *"…although there is growing understanding about the impact of e-learning on the student experience, there is less understanding of academics' perceptions of e-learning and its impact on their identities."*

Valentine (2002:1) also noted that students are concerned about their ability to cope with studying autonomously, managing their time and loss of direct immediate feedback. Hardy and Boaz (1997:41) found that:

> *"…compared to most face-to-face learning environments, distance learning requires students to be more focused, better time managers, and to be able to work independently and with group members."*

As well as the standard problems of distance education, the characteristics of each individual field of study introduce unique problems (Jones, 1996). Characteristics of computing that cause problems include the ever-changing nature of computing and the need for students to have access to appropriate computing resources.

The abstract nature of computing can make it difficult to teach in any environment and teaching at a distance introduces additional challenges (Price et al., 2002:1). Aspects of the curriculum such as programming require the students to create, evaluate and analyse conceptual information (Anderson and Krathwohl, 2001: 67–68). This includes traditional languages such as C and Java, web programming languages such as PHP and RUBY and applications programming languages such as VBA. These higher levels of the cognitive domain have historically proved difficult to translate into effective remote learning materials. Aspects of computing that underpin application and comprehension are often easier to apply.

The key issues

This article considers the use of a range of technologies to alleviate the issues discussed above. It is not intended to **compare** technologies of a similar type.

It focuses particularly on the experiences of students on our BSc Computing and the staff team's reflection on these.

The major issues that will be investigated are:

- lecturers' concerns about how distance learning will change their role, and more specifically how they will be able to teach computing remotely; and
- students' concerns about their ability to cope with studying computing autonomously, managing their time and loss of direct, immediate, hands-on feedback.

The technologies

TeamViewer

www.teamviewer.com/index.aspx

TeamViewer allows the lecturer to remotely control any computer as if they were sitting right in front of it – even through firewalls. All the student has to do is start a small application, which does not even require installation or special administrative rights. TeamViewer comes with integrated file transfer, which allows the lecturer and student to copy files and folders to and from the remote partner.

- **Lecturers** can take control of the remote student's computer.
- **Students** can receive immediate, hands-on feedback.
- **Lecturers and students** can copy files and folders to each other.

Blackboard

www.blackboard.com

Blackboard provides a single access point for primary resources and is the recognised UHI networked learning Virtual Learning Environment (VLE). It is acknowledged as one of the leading platforms for delivering learning content, engaging learners, and measuring their performance. Blackboard is becoming universally recognised by most HE institutions.

- **Lecturers** can organise and manage the class in a virtual classroom and give the students a timetabled framework.
- **Students** can manage their time better, and engage with other students on discussion boards.

CamStudio

http://camstudio.org

Jing

www.techsmith.com/jing

CamStudio and Jing allow the user to record video and/or audio files for demonstration of simple application interactions (e.g. how do I FTP php pages to my host server?) and the annotation of captured screen shots to provide feedback. It uses AVI format, but you can also convert movies to Flash (SWF) files. By either entering co-ordinates or dragging the mouse, you can select a region of the screen to be captured or just choose to capture the whole screen. CamStudio also offers sound recording with interleaves capability, and an auto-pan feature enables video recording to follow the mouse cursor. Text annotations are also possible.

- **Lecturers** can send video to the students
- **Students** can replay the demonstration as many times as they wish.

Findings

All the software discussed above has been trialled with 12 students enrolled on the third year of the BSc Computing course, where the use of the products was deemed beneficial to the learning process. Two staff based at Perth College have been involved in these trials. The use of these technologies arose from the teaching team's desire to ensure that it met the needs of the learner in remote and rural areas. However three local students in the cohort worked full-time and their attendance proved difficult. Traditionally hands-on support was provided to these students through the provision of dedicated evening sessions, but the use of these technologies also allowed us to support these students without the need to attend at a specified time and location.

We set out to answer two research questions:

- How will a lecturer's role change with distance learning and, more specifically, how will they be able to teach computing remotely?
- How will students cope with studying computing autonomously, managing their time and loss of direct, immediate, hands-on feedback?

Lecturer's role

The views of staff were elicited through weekly team meetings, biannual course committee meetings and annual subject network reviews.

TeamViewer

We allowed a remote lecturer to have complete control over the student's PC, a real-time experience that mimicked the support that can be provided in a face-to-face situation. This helped improve the lecturer's effectiveness by:

- allowing them to solve problems quickly and efficiently; and
- by helping them to evaluate student work and progress.

Although the lecturers felt that this was an extremely useful product, it was of limited use on its own. The student and lecturer were still required to interact by phone to discuss the demonstration, so the use of Skype was implemented in conjunction with TeamViewer. This proved even more effective, giving the lecturer an enhanced teaching experience by allowing detailed discussions and interactions to take place.

Blackboard

As a primary source of course materials, interactive tutorials, discussion boards and feedback, Blackboard successfully allowed the lecturer to manage the equivalent of a traditional classroom environment including facilitating weekly study plans, ensuring remediation and encouraging self-study. Although the delivery method of these tasks has changed, the role of the lecturer still remains the same.

CamStudio/Jing

From the lecturer's point of view, describing a practical demonstration through a traditional user guide filled with text and annotated screen shots is both time-consuming and ineffective. The ability to record these demonstrations provided the lecturers with a quick and easy solution and a more natural representation of the process. The students could then play back the demonstrations as often as required and whenever convenient.

Autonomous study and time management

The views of students were elicited through standard evaluation of modules, which fed into formal team meetings and annual course reports.

TeamViewer

The students reported that TeamViewer provided them with an excellent learning environment. This application helped remove their feelings of isolation from the lecturer, by allowing them to experience immediate support and feedback and providing them with the equivalent of face-to-face contact. The additional use of Skype enhanced this experience, since both the lecturer and the student could react to visual feedback if the webcam was used.

Blackboard

The students all gave positive feedback about their use of Blackboard. The week-by-week guides gave a clear indication of the work they had to complete and so aided their time management. The use of discussion boards not only allowed the students to interact with the lecturer but also encouraged virtual peer support networks. Students felt less isolated and were able to find out about common problems and issues.

CamStudio/Jing

Students who were unable to attend either video conferences or face-to-face classes where demonstrations were given found this to be an excellent resource. They found it a much more appropriate tool for this type of activity when compared to traditional methods such as textual guides. It also meant that the student was able to review the materials as often as required, at any location, at their own pace and at a time to suit their individual circumstances.

Conclusions and implications for future practice

There is a perception that young people use e-based social networking extensively, and that higher education should build upon that practice, yet students resist staff access to their Facebook pages and university organised chat rooms, and blogs are underused. Students see a functional distinction between the processes and have different expectations of the academic context (Hanson 2009: 553–564).

However, targeted use of social networking technologies can advance the use of blended learning. For example, when using TeamViewer the student experience was made more effective when it was used in conjunction with Skype.

The technological skills profile of the vast majority of IT students – so called, 'digital natives' Bennett (2008: 775–786) ensures that the ability to use ICT tools is not a major barrier to studying remotely. This, coupled with the widening use of mobile phone technologies and social networking, ensures that some students find remote learning quite natural.

Although it is not possible to give a remote student 'exactly' the same experience as a student who is attending face-to-face classes, it is possible to give a 'similar' or 'equivalent' experience. Thomas (2002:9) argues that:

> *"…each support mechanism is of use to some students and helps reduce the isolation experienced by many students studying at a distance."*

The use of some or all of these tools has ensured that students studying both remotely and face-to-face (f2f) do receive this 'similar' experience.

Gonzalez (2010:61–78) found three common elements of e-learning among staff:

- information and documentation
- communication; and
- networked learning.

In UHI there has been a tendency to concentrate on the first two. The use of the technologies reviewed not only enriches blended learning environments and, therefore, networked delivery, but it can also inform traditional pedagogy to the benefit of the students' learning experience.

The successful use of these tools with remote learners has encouraged the team to introduce these learning technologies using a blended learning format with all students across the UHI network, both at degree and Higher National levels. McNay (2010) states:

> *"The use of 'e-learning tools' leads to basic discoveries about pedagogy and sometimes innovations that should/could have been introduced in a f2f mode."*

When delivering IT to remote students the role of the lecturer does not fundamentally change. However, the mechanisms adopted to support students needs to change. Lecturers, most of whom are 'digital immigrants' Bennett (2008: 775–786), need to be trained in:

- the use of appropriate software tools;
- the benefits of social networking technologies as a learning tool; and
- the learning and teaching skills required to use these technologies to support students.

Although this process is in its infancy, a blended learning format should allow the team to teach more effectively both in face-to-face classes and to a wider audience throughout UHI.

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