

IT Professionals' Summer conference

The IT Professionals' Forum is organising a conference on **24th June**. The one-day event will look at security in computers, data, and networks.

- 9-9:30 Registration + coffee
- 9:30-10:30 David Reid (Lothian and Borders Police): *Computer/Network Forensics – What they do and how they do it*
- 10:30-11:30 David Llamas (St Andrews University): *Network Forensics and Covert Channels Analysis in Internet Protocols*
- 11:30-12 Coffee
- 12-1 Jarod Malestein (University of Michigan): *Cosign – What it is/does and version 3 changes*
- 1-2 Lunch (Please request via MyEd)
- 2-3 Keynote: Kenneth Macdonald (Assistant Data Commissioner Scotland): *What we must be aware of in terms of data law*
- 3-3:20 Coffee
- 3:20-4:20 Wesley Craig (University of Michigan): *Cyrus IMAPd vs 'free' out-sourced email*
- 4:20-4:30 Closing roundup

The venue is the Prestonfield Room of the John McIntyre Centre at Pollock Halls of Residence. Lunch is provided.

There are 100 internal spaces which can be booked through MyEd; the extra places are reserved for commercial guests. There will be the usual extensive opportunities to meet and talk with colleagues.

Details of the Summer conference are on the ITPF website at <http://www.ucs.ed.ac.uk/ucsinfo/cttees/itforum/>

Iain Dobson (IT Professionals' Forum)

Neil Brown is the new Convenor of the IT Forum

In an institution which depends so much on the dedicated efforts of its IT staff to sustain the University's vast online enterprise, it perhaps wasn't surprising that few members of the IT Professionals' Forum have the time to take over from James Jarvis as its convenor. In the end, after some behind-the-scenes negotiations, **Neil Brown** was the only candidate, and will be taking on the role during June without the planned online election.

Neil has been a Computing Officer in the School of Informatics (and its previous Artificial Intelligence and Computer Science Departments) since 1997; his main role now is to support file servers and web, email and printing services.

Neil will be looking to build on the work of James and the ITPF committee to create a strong IT community in the University, as he says at <http://www.ucs.ed.ac.uk/ucsinfo/cttees/itforum/>

Nick Stroud (IS)



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The eAssessment Issue...

Changes to wireless client IP addresses and access to services

Because of the growth in use of the University Wireless Network, the IP addresses issued to wireless and LapLAN clients will be changed from our existing limited range of 'Public' addresses on 129.215.0.0 subnets to a much bigger group of 'Private' IP addresses in the 172.20.0.0 range. These will show up in the new DNS suffix of '.wlan.net.ed.ac.uk' for wireless connections and '.laplan.net.ed.ac.uk' for LapLAN. This is very similar to the way in which commercial ISPs handle connections.

At the same time, access is being widened to be more like an Internet cafe's, with fewer restrictions on access to University services.

The changes will be implemented in two stages, on 3rd June and 26th August, after which no restrictions will be applied for access to University web services on ports 80 and 443, for *guest* wireless and LapLAN users.

Wireless and LapLAN users should not be affected, unless they need to access a service which has not been upgraded to accommodate this change. Service providers who use IP addresses or DNS names to authorise users should be aware that guests will have access; if you wish to restrict your service to authenticated members of the University, the recommended method is to use EASE.

There are full details at <http://www.ucs.ed.ac.uk/nsd/access/privateadds.html>

Bill Byers (IS-IT)

Don't take electronic secrets to US!

A recent court ruling in the United States gives customs and immigration officials the right to demand access to the entire contents of any laptop being brought into the country, whether or not they have reasonable suspicion that it holds offensive or dangerous material. In the worst case, this means they could gain access to a traveller's entire online life. The ruling is being contested by the Electronic Frontier Foundation, but if you're planning to visit the States with a laptop, best remove everything from it that you wouldn't want others to see. There are more details at <http://www.eff.org/cases/us-v-arnold>

Jack McAulay (IS)

IS skills development courses

- June 2 Introduction to Unix
- 2 Excel Introduction: (Part 2)
- 2 PowerPoint Intermediate: Adding Images
- 2 PowerPoint Intermediate: Adding Animation Schemes
- 5 Writing for the Web
- 6 WebCT Vista Fundamentals
- 9 Thinking About Using WebCT for the First Time? (T)
- 10 Using SPSS Commands
- 11 Creating a Database with FileMaker Pro
- 11 Creating Web Pages with HTML
- 11 Formatting Web Pages with Cascading Style Sheets
- 12 Introduction to Access Database Management (Part 1)
- 12 Editing Web Pages with Contribute
- 12 WebCT Vista Fundamentals
- 16 Intermediate Unix
- 16 Managing Bibliographies with EndNote
- 17 Word Introduction: Creating and Formatting Documents
- 17 WebCT Vista Fundamentals
- 17 Managing your photographs with iPhoto (T)
- 18 Using EDINA Digimap
- 18 Introduction to Visualising Data in ArcGIS 9
- 18 Creating and Editing Web Pages with Dreamweaver 8
- 18 Templates and Websites with Dreamweaver 8
- 18 Sharing and Protecting Excel Spreadsheets (T)
- 19 Introduction to Access Database Management (Part 2)
- 23 Introduction to Wikis
- 24 Introduction to Minitab
- 24 Basic Image Manipulation Techniques using PhotoShop
- 26 Writing for the Web
- 30 Adobe Acrobat surgery (T)
- 30 Unix Shell Programming
- 30 Introduction to Sun Grid Engine (for ECDF users)
- 30 Introduction to Basic Shell Scripting (for ECDF users)

(T): lunchtime 'taster' session, 1–2pm in the DHT Conference Room
There is no charge for most University staff and postgraduates.
See our web pages for course descriptions and to book – at <http://www.ucs.ed.ac.uk/usd/cts/courses/>

Jenni Reeves (IS-LUSD)

The 2008 Milner Lecture

Prof. Rajeev Alur, of Computer and Information Science, University of Pennsylvania, will speak on Software Model Checking at 5.15pm on Wednesday 23rd July, in Lecture Theatre 1, Appleton Tower. This will be followed by a reception in the new Informatics Forum. Full details are at <http://www.lfcs.inf.ed.ac.uk/events/milner-lecture/>

Dyane Goodchild (Informatics)

Web Management conference 2008 in Aberdeen

This year's Institutional Web Management Workshop will be held at the University of Aberdeen from 22nd to 24th July, and bookings are now being taken. There is full information at <http://www.ukoln.ac.uk/web-focus/events/workshops/webmaster-2008/>

Marieke Guy (UKOLN)

Welcome to this *BITs* special on eAssessment!

Assessment is the most stressful part of the learning experience for students. It is important because we need to measure knowledge and achievement, but are students learning anything from it? Feedback on the outcome of any assessment is as important, if not more so, as the assessment itself. In life, we learn more from our mistakes, or when things go wrong, than we do from our successes. So constructive, timely feedback that helps students take remedial action is essential to support learning.

In the next few pages, you will find descriptions and experiences using some methods that – as well as providing assessment opportunities – could help deliver more, higher quality feedback to students. This feedback can be:

- General or specific: most computer-aided assessment systems allow for feedback to be given either on the right and wrong answers or for each possible student choice, and it can be given at the time of the assessment.
- Targeted at individual students: for example in the use of audio-visual feedback or the marking of electronic versions of student work.
- Targeted at groups of students: for example in the use of clickers in lectures or tutorials.

The recent event on improving feedback via technology (<http://www.elearn.malts.ed.ac.uk/events/elearnconfo8/>) showed the willingness amongst staff to do more to provide meaningful assessment and feedback. Hopefully the following articles will provide further inspiration. I and other members of the eLearning team would be happy to discuss these or other eAssessment ideas with any individual, School or course team: please email us at ellearnhelp@ed.ac.uk.

For an extended discussion on assessment as a learning opportunity, and how best to achieve it, see ‘Conditions Under Which Assessment Supports Students’ Learning’ by Gibbs and Simpson in *Learning and Teaching in Higher Education* 1. REAP (Re-Engineering Assessment Practices) was a project that used the conditions from this paper to create a set of principles for good assessment design. These were then used to redesign a number of courses, over a range of disciplines, to incorporate assessment as a core learning activity and to empower students to self-direct their learning; see the ‘Redesigns’ section of the REAP website at <http://www.reap.ac.uk/>

Wesley Kerr,

(eAssessment Manager, eLearning and IS Skills Development Team, IS-LUSD)

Reviewing Assessment

Until recently anyone who was looking to introduce a new approach to assessment, whether it involved some form of online or e-assessment or was relatively ‘low-tech’, would have found it difficult to gain a clear picture of current practices across the University’s Schools and Colleges. The advent of CCAMS, the Course Creation and Maintenance System, has changed that situation, for it has opened up opportunities to survey teaching, learning and assessment practices by providing information about courses taught across the University.

The ‘Reviewing Assessment’ project was one attempt to capitalise on this opportunity. A team from the Centre for Teaching, Learning and Assessment (TLA) used the data from CCAMS, supplemented by information from School websites, to log different types of assessment by School and by year of study. These data were checked by each School to ensure that the documented information gave a good representation of actual assessment practices.

Summarising the outcomes of this work is necessarily difficult because a good deal of the interesting data

are in the details of practices at School and College level. What is most noticeable is the wide range of assessment practices being carried out across the University – we logged 23 types of examination and 68 types of coursework. Many types of assessment were widespread (e.g. essays, projects); others were reported less frequently (e.g. audio-essays, reflective logs). Some were specific to particular subject areas (e.g. language translations, music compositions), others were only to be found in certain Schools (e.g. take-home exams, peer-assessment), and some were more common in earlier years of study (e.g. multiple-choice exams) or honours courses (e.g. research diaries). The impact of new technologies was most evident in the use of MCQs and online tests. Other applications, such as assessing students’ contributions to WebBoards or asking students to produce multimedia outputs, were less common.

The findings are reported in ‘Patterns of Assessment at the University of Edinburgh’, which is available from the TLA Centre (email TLA.Centre@ed.ac.uk).

Dai and Jenny Hounsell (TLA Centre)



Computer-aided Assessment

Questionmark Perception

Questionmark Perception is a comprehensive and versatile assessment system which can deliver a range of tests or exams, including 'high stakes' summative assessment, in a secure environment. It is the centrally-supported assessment system in the University.

The system allows for 22 question types, from the standard multiple-choice question to more complex question types including 'drag and drop' and 'flash'. Questions are created using Authoring Manager, a fully-featured Windows-based application that allows for all the question types; there is also a browser-based authoring tool with an easier interface which supports a limited number of question types.

Once questions have been authored and added to the question database, the assessment can be built in a number of ways to include feedback, or to allow students to save answers as they go along; time limits can be set, and the look-and-feel of the assessment can be tailored to meet individual needs.

Assessments can be accessed in a number of ways too, from formative tests directly in a VLE without the need to log in, to fully-secure locked-down computers in a high-stakes exam.

Several reporting tools are available in Perception, some designed to provide feedback for students, others to help academic staff analyse how effective the questions are at testing students. Each report can be set up to individual requirements by the use of templates, so almost any data you may require can be displayed in the format you wish.

There is information about Perception on the eLearning website at <http://www.elearn.malts.ed.ac.uk/perception/>

The Questionmark website is at <http://www.questionmark.co.uk/uk/>

To find out more, please email elearnhelp@ed.ac.uk.

Mark Findlay (IS-LUSD)

e-Assessment and Mathematics

Mathematics provides several distinct problems for the learning technologist, especially in the area of eAssessment. The issues are often different when we can relax security: formative assessments are easier to implement than summative ones.

The first issue is often the nature of the output. While we now have a fairly well established web-based XML technology for mathematics – MathML – the support for it in browsers is patchy: Internet Explorer requires a plug-in ('MathPlayer'), Firefox's gecko engine requires proprietary (but free) fonts, and the font support in both is not yet complete. The MathML support in Blackboard/WebCT is patchy at best, and I have often resorted to HTML coding to work around the problems.

Then there is the issue of input, for both authors and users. For authors, there are good utilities for getting MathML or images into web pages, and Word 2007 has good support for Mathematical authoring and can be used as an intermediate tool for generating questions. A more serious issue is user input: the difficulty of typing answers containing mathematical expressions or formulae can be an unfortunate cognitive distraction. One can get around this to some extent by using clever techniques to assess components of a learning outcome, but assessing complete solutions is still not entirely satisfactory.

Another difficulty of particular concern for asynchronous summative assessment is randomisation of questions. There is a very large overhead in authoring questions, especially with computational problems. There is rudimentary support for this in WebCT using the 'calculated' question type, but it is not possible to include computed formulae in the question text, and only one computed answer is possible. This makes it difficult to set problems involving, say, vectors. Giving helpful feedback also involves anticipating a large number of possible responses, and makes authoring time-consuming and difficult.

A number of systems provide ready-made assessment engines; some currently in use in the University are MathTutor, MapleTA and the Prompt system. MathTutor (<http://www.mathtutor.ac.uk/>) is a system of online information sheets backed up with a number of diagnostic and self-assessment tests, but it suffers from lack of support in browsers.

MapleTA and Prompt use the Maple Computer Algebra System to decide whether an answer is correct or not, so is not limited to numerical answers. Both systems have a comprehensive intelligent feedback system which can deal with misconceptions (once programmed).

MapleTA (<http://www.maplesoft.com/Products/MapleTA/>) can also be used in a summative mode. The Prompt system (<http://student.maths.ed.ac.uk/prompt/AutoLogin?context=ph&userId=phuser>) has subject-related material and assessments extending the core material currently in the areas of Physics, Electrical Engineering and Geology.

The current state of the art is not perfect, and authoring assessments – especially summative ones – is still very hard, but the technology is constantly improving, and standards will make it easier year-on-year.

Antony Maciocia (Mathematics)

Another look at MCQs for the Humanities

Generally, humanity-based subjects regard multiple-choice-questions – MCQs – as inappropriate and boring, testing mainly the assimilation of facts. Instead, such subjects rely on essay-based assessment where students are expected to show reasoning and analytical skills, and synthesise arguments. But with ever-increasing pressure to look at more economic means of testing growing student numbers with fewer academic staff, MCQs in the form of “Assertion–Reason” may offer some hope.

These types of MCQs report to measure ‘higher order skills’ by combining multiple choice and true/false methods into questions that require substantial reasoning skills to answer correctly. Students are presented with two statements, an Assertion and a Reason, that may or may not be true. If the student decides both statements are true then the next stage is to assess whether or not they are connected. For example:

Assertion

Multiple spaces should not be used to align columns of text

because

Reason

the width of the spaces varies between different fonts

- The assertion is true and the reason is true and the connection is valid.
- The assertion is true and the reason is true but the connection is invalid.
- The assertion is true but the reason is not true.
- The assertion is false but the reason is true.
- The assertion is false and the reason is false.

(The correct answer is B.)

A very small pilot as part of a postgraduate project tested the suitability of this methodology, in terms of both technical and cultural aspects, with a group of Humanity staff and students. The study concluded that:

- The creation of the Assertion–Reason questions is not simple and requires careful thought.
- While it was difficult to tell from the study how well the method tested higher order skills, generally the testers thought it did test skills beyond memory recall.
- The method was thought to be most applicable at lower undergraduate levels.
- Culturally, students and staff were not totally negative about the methodology or indeed online assessment.

These findings certainly suggest that there is merit in further exploration of this technique in the Humanities. Its place may prove to lie more in student self-testing than in quantitative assessment.

Jessie Paterson (Divinity)

Examining online: improving quality in undergraduate examinations

Over the past two years, the Medical and Veterinary Teaching Organisations have moved forward with their agenda to provide better assessments in their undergraduate curricula. This included delivering a number of computer-assisted exams to large classes of students, and evaluating their usage, in a project funded by the Principal’s eLearning Fund.

Several benefits of using computer-assisted assessment were found:

- Menus offering a preset variety of question types (*e.g.* MCQs, multiple response questions, case-based decision-making, fill-in-the-blanks) increased the variation in types previously used in exams and permitted different levels of knowledge to be tested (such as applying principles to new problems) – as well as making exams more interesting for the students!
- High-quality, high-resolution graphics and videos could be added easily to individual questions.
- Several staff could contribute to the ‘building’ of one exam held in a secure place online, and be able to view the blueprint of an exam as it was being built.
- Question presentation could be computer-randomised, or alternative responses within questions shuffled.
- Objective questions (*e.g.* with alternative responses presented) could be computer-marked instantly (compared to hours of marking over two hundred exams by hand), and essay- or text-based questions could be downloaded or marked online by staff.
- Exam section totals and overall totals were calculated automatically, and improved accuracy.
- Students could handle essay- or text-based questions as they would other forms of writing (for example easily inserting new ideas into previous text), and most felt their overall ability to compose in a time-pressured assessment was improved.
- Students could ‘click’ or keypad their answers, moving through a list of questions easily using page keys or mouse and returning to questions later if they wanted to alter their responses.

Teaching staff first needed to overcome their fears that computerised delivery might mean significant risk of problems on exam day. Growing experience with this process eased their doubts, as each of over 60 exams was successfully delivered on the day, and marked without significant problems.

Two software systems were used to support exam authoring, delivering and marking. QuestionMark Perception – a University-wide system – has provided

the greatest flexibility of question types, but requires training to learn question-authoring, and a licence to use the authoring software. This system is available from the IS eLearning team (email elearnhelp@ed.ac.uk). OSCA was developed by the Learning Technology Service (email EEMEC@ed.ac.uk), and has an easier user interface but fewer question types (though it is undergoing further development). Both systems are being developed to permit banking of exam questions, along with data regarding earlier performance characteristics.

Composing exams online has created better teamwork with staff in generating exams, and reduced the 'drudgery' of construction and marking. Course teams find that group effort makes these processes easier, and more enjoyable, and makes staff more aware of other specialisations related to their courses.

Mary Reid (Medical Teaching Organisation)

GLO: Grammar Learning Online

Grammar Learning Online – GLO – is a project funded by the Principal's eLearning Fund to design and deliver a generic online assessment tool to meet the needs of both language learners and teachers in the Division of European Languages and Cultures (DELC).

There are a number of existing programs in use in the Division, but many are DOS-based desktop programs which require students to be physically present in the computing lab. Very few, if any, have the reliable, secure and flexible reporting capabilities required to monitor students' progress. A new, secure, flexible online solution was required, in order to update the provision of CALL (computer-assisted language learning) in the Division.

The most appropriate application to use was QuestionMark Perception, the University's main assessment engine, as it met many of the identified needs. It can be accessed through the web, allowing for greater flexibility in how both formative and summative assessments can be delivered. It is secure, and has very powerful reporting capabilities which would provide staff with a straightforward way of monitoring students' performance.

However, despite the wide range of question types available in Perception, there were some limitations in the way language-specific processing could be integrated. Fuzzy matching, tailored feedback for predicted wrong answers, accessing special character keys, allowing for multiple question attempts, scoring individual question attempts – all these were problematic in Perception.

GLO was designed and developed to meet these very specific needs. It was built using Adobe Flash and sits in the QuestionMark Perception framework, managing both the question content and the results processing before sending all the data back to Perception.

The project is currently at the testing stage; so far results have been very promising.

Jo Spiller (IS-LUSD)

TurnitinUK and student submissions

TurnitinUK is widely known for detecting plagiarism. It can also be used very successfully to *prevent* plagiarism.

Academic practice, acknowledging ideas, and referencing conventions can all be difficult concepts for new students: many struggle to understand what is and isn't acceptable practice. Often plagiarism is not deliberate cheating, but results from confusion and misunderstandings around these ideas.

When an assignment is submitted to *Turnitin* it is compared to an extensive database of sources. An 'Originality Report' is then generated which shows matches between text in the document and sources from the database, to highlight cases of possible plagiarism.

An alternative approach is to ask students to submit their own work to *Turnitin*. Showing the Originality Report to students can provide a graphic illustration of the points that can be difficult for students to understand. You can use this to ask the students questions such as:

- Where has the matching text come from; has this source been cited in the text?
- Has a reference list been included; can you match the citation to the correct reference?
- If long quotes are included, can you say in your own words what the main idea you want to include is; would paraphrasing be useful?

This approach can deepen understanding and allow students to learn to evaluate their own work accurately. Allowing students to submit drafts of assignments before a final deadline and to discuss the reports with academic staff can greatly enhance students' understanding and confidence in these skills. This approach has been used successfully in the Schools of Physics and Education. For further details see http://www.elearn.malts.ed.ac.uk/events/elearnconfo8/download/o6_Daniela_Ruby.pdf

Students can submit work via the *Turnitin* website (<http://submit.ac.uk/>) or through the WebCT PowerLink for *Turnitin*, which makes managing student submission even easier.

For more information see http://www.elearn.malts.ed.ac.uk/services/plagiarism/getting_started.phtml

Susie Beasley (IS-LUSD)

Feedback on Electronic Essay Submissions

Word-based marking tool

In the School of Biology, a large first year class (550 students) and a 3rd year class (90 students) have been marked online for the last three and two years respectively. Essays are downloaded from WebCT as a gang and then distributed amongst tablet PCs for the markers. These machines have the following useful features:

- a) a complete A4 page can be viewed in portrait
- b) comments can be hand-written on screen as if on paper
- c) handwriting can be converted to text.

Furthermore, macros were written so that comments could be preloaded, or created, stored and/or reused (with editing). This has worked well. Feedback that would be too laborious to give for every student is now feasible. Questionnaires and focus groups show that students think the feedback is superior to their previous experience. It is no small issue with students that their feedback is readable: unsurprisingly they prefer type.

Markers were initially disgruntled about having to adopt a new system, but in subsequent years they have got used to it. When a bank of comments, even generic ones, is built up for an essay type, they can be reused for subsequent years. These are available both as a resource for working out best practice, and as a primer for novices so that they see the standard. We notice specifically that typed comments are fuller than handwritten ones. Nevertheless we have to provide the ability to hand-write so that all markers will take part. Rather like the smoking ban, handwriting should become more of a minority activity before course teams decide to outlaw the filthy habit!

There are two issues for the future.

Tablet PCs may not be necessary. Many LCD screens are already adequate to show a full A4 page. The only software used is *Microsoft Word* and *Excel*. Allowing the macros to run on Managed Desktops would then be an issue to take up with Information Services.

The second issue is to streamline downloading of student work to the markers. We do this semi-automatically and have dealt with all the issues involved, but a recent meeting on the subject showed that generally in the University the lack of an easy way to control the workflow from student to marker and back again was a barrier to innovation in e-feedback.

There is a will: the way is not difficult, but it will require means.

Paul McLaughlin (Biology)

E-feedback in Economics

We conducted a small-scale trial of essay-marking software on a 4th year option, then used it for essay-marking and feedback on a large (approximately 360) 1st year course – Economics 1A. Students had a choice of eight essay topics, and there were seven primary markers, all graduate Teaching Assistants. Essays were submitted online in *Microsoft Word* format, via WebCT.

The process of transferring the essays into the marking software and, even more so, downloading and collating the graded essays complete with feedback and returning to students was somewhat cumbersome. Despite this, and our lack of familiarity, the process was still preferable to handling 360 hard-copy essays. It would be ideal if submission and return of essays were integrated in a VLE.

The marking itself was done on tablets (which were on loan); these had some novelty value, but most markers made little use of their features and would prefer to use a standard desktop, with essays and software set up on a central server. This would also have made the admin smoother, and would avoid the non-trivial need to buy a sufficient stock of tablets to provide to markers.

Some markers experimented with the writing recognition tool, and were generally impressed by its ability to decipher scrawl, but nobody used it consistently as they found it faster to type comments. The features which were used and liked were marginal comments linked to highlighted text passages – in effect standard features in *Word*; and the automatic recording of the mark in a spreadsheet, avoiding transcription errors.

The pre-stored comments and comment-capture features had a mixed reaction. Inexperienced markers found the pre-stored comments helpful, and the capture of comments from essays already marked was generally valued. Others found the process of searching out and customising comments slower than simply typing in a fresh one, though did find browsing through pre-stored comments helpful as a source of ideas. A common complaint was that uploading an essay for marking or review was slow. This significantly raised the cost of referring back to essays previously marked, and might reduce the consistency of marking.

Was the experiment a success? In broad terms – yes. It noticeably improved the quality of the feedback without adding noticeably to the time taken to mark, though this may owe something to the novelty value. Will we re-use this approach? Yes – at least with some fine-tuning to develop the benefits and reduce the costs outlined above.

Stuart Sayer (Management School & Economics)

Producing audio/video feedback for students

There is some evidence that students ignore written feedback, or that they misconstrue written comments – sometimes reading antipathy or sarcasm into the condensed nature of annotations. One way around this is to give verbal feedback, which might best be done in addition to written comments, replacing a summary paragraph. If the same information were presented in a human voice, students might be less likely to misconstrue, and might engage better with the feedback.

The idea is not new: as early as 1972, audio tapes were being used to deliver feedback to students. There are now several technology or software solutions which allow relatively simple provision of audio feedback, including:

- Hand-held MP3 recorders.
- *Adobe Acrobat* and *Microsoft Word* both have native functionality which allows comments to be recorded and embedded in documents.
- Sound recorder software, such as *Audacity*, on computers.

Audio feedback on its own has a drawback in that the student doesn't directly see the elements of the essay to which the marker is referring. This academic year, the School of Biology has extended this idea by making use of screen-capture software that allows a simultaneous oral commentary to be recorded as the marker moves through an essay creating a video file which can be replayed by students. This brings a visual dimension and immediacy to the feedback because the student hears the marker's comments and simultaneously sees the context. The video file was produced using *Camtasia* and was integrated with a marking tool based on *MS Word* macros, so markers did not have to deal directly with the interface of the third party software.

The use of audio or audio/visual software to produce feedback does not necessarily benefit the markers in terms of the length of time taken to mark an essay, but there is an immediate benefit to students in that the amount of feedback produced during the audio comment is much more than is produced, in the same time, in a written comment. In one extreme example from the School of Engineering, the marker made summarising comments for seven minutes containing 1,192 words in comparison to the average of 40 words when he just typed summary comments. On average an audio comment of two minutes will produce around 300 words (the approximate length of this article from the start to the beginning of this paragraph).

Students who received audio/visual feedback, in the main, engaged more fully with this form of feedback

than they did with written comments alone. However, for students to value this form of feedback it had to:

1. be of a sufficient length – at least two minutes; a sentence or two was not considered worth the effort;
2. complement the written comments, not repeat them.

On the whole the experiment was welcomed by those staff who used the system and the majority of students who received feedback in this way.

Wesley Kerr (IS-LUSD)

Quandary for formative assessment in Engineering and Electronics

or

A quandary for supply chain management

How about trying your hand at running the production line of a small company: do you have the necessary knowledge and skills to steer a company through the intricacies of scheduling and ordering for a high-volume production environment?

This is one of the questions we ask final year students in their Supply Chain Management course. We are creating two online simulations for formative assessment through WebCT. These simulations aim to help students understand the repercussions of individual decisions across a company. In the first case a simple scenario directs students in exploring the main course topics and allows them to gauge their entry level knowledge.

The second, presented in a tutorial towards the end of the course, is a complex scenario, built on the material covered in lectures and tutorials, and encourages students to apply their knowledge and best practice to steer their company to success. On completion of the scenario the students finish with the sterling value of their company, so they can compare and debate strategies with the course team and fellow students.

These formative online activities offer a different approach to visualise confusing concepts, and a further mechanism for giving feedback to students.

The simulation is created in 'Quandary', an inexpensive piece of software designed to develop Action Mazes. (An 'Action Maze' is similar to a 'Choose your own adventure' book, for those who remember these!) The students select paths based on their decisions and see what the consequences are. Feedback is built in, and students can return to revise decisions if appropriate. Scoring can be built in and can track students' activity.

For further information see

<http://www.halfbakedsoftware.com/quandary.php>

Victoria Dishon (Engineering & Electronics)

Traditional essay exams ... on a computer

Work should begin this Autumn to fit out one level of Adam House for computer-based examinations (without affecting its use for traditional paper-based exams and other non-exam functions). It is likely that the desks will need to be slightly bigger than routine desks, and that they will need to be slightly further apart than for exams at present, but it is anticipated that the room should be able to cater for around 60 students, all with access to power and network (if required).

Potentially this space will have many uses; one of the first is likely to be essay exams on computer. A number of trials have already taken place, using software 'Exam4' from a US company (Extegrity, <http://www.extegrity.com/>) and student-owned laptops. The system has been in widespread use in US law schools for many years where it has proved robust and reliable. Students can download the software and familiarise themselves with it well before the exam (the questions are still distributed in the exam hall on paper, not held in the software), and this lead-time is also used to resolve the very few cases where installation problems occur.

The software is basically a very simple word processor, offering functionality such as copy-paste, bold, italic. It locks down the machine so students cannot access USB sticks, the Internet, virtual machines or other devices. It takes regular (encrypted) snapshots of the essay in progress, and the final script can be saved to a variety of locations as pre-determined by the course team. The submitted scripts are decrypted and printed for marking. Both student and institution can retain an encrypted copy of scripts in case of any dispute.

It is intuitively attractive that we might offer students the choice to hand-write or type in an exam – and this would be welcomed by students – but studies to date suggest that text which is otherwise identical, but in typed or handwritten form, is not marked equally: typed scripts are marked down. On the other hand, in general more will be typed than will be handwritten; we are still exploring whether the quality of what is written changes – we all know that quantity does not necessarily equal quality!

If you would like more information about this study, or are interested in exploring the use of essay exams on computer, please email Nora.Mogey@ed.ac.uk. Full details are provided in *The end of handwriting? Using computers in traditional essay examinations*, in the Journal of Computer Assisted Learning, vol 24, no 1, February 2008, pp. 39–46; see <http://www.ingentaconnect.com/content/bsc/jcal>

Nora Mogey (IS-LUSD)

Open Book Exams?

Why not run an Open Internet Exam?

Traditional examinations test memory plus reasoning and argument. Open-book exams allow students to use standard reference works and other familiar tools, to make the examination a test of their ability to find, process and interpret real data. Able students can perform markedly better than weaker students in open-book exams (*Assessing Student Learning in Higher Education*, Brown, Bull & Pendlebury, Routledge, London, 1997).

The Internet is now an important source of information in some disciplines, and for all students – so is it not natural to bring open-book exams into the digital age? Does free access to all the resources of the Internet in an exam really conflict with the aims of the course? Exams can still be invigilated and timed.

Possibilities for an open-Internet exam include:

- Ask students to find/select a reliable source of current data for your discipline, then comment on it – perhaps analysing the trend over the previous three months, years or decades, or to develop a presentation based on it; invite students to justify their choice of data source, as well as using the information retrieved.
- Ask students to review a particular web page, to identify the key points, to discuss whether the website is appropriate for its target market, and maybe contrast it with another website on the same topic.
- Ask students to write on a topic which has not been covered directly in the core curriculum. Specify the audience they are writing for and the level of detail expected. It could be a summary for a manager with a recommendation for action, or a training plan for new colleagues, or a public awareness campaign, or ...
- Give the students a scenario they have to explore and draw some conclusion from. Have a panel of 'experts' available to be consulted by email for students to seek additional information, in addition to Internet access for more general information.
- Tell the students the broad essay topic prior to the exam and ask them to collect images, videos and other digital artefacts that might be useful in that context, then ask them to create a digital essay with links to relevant websites and images (stressing copyright issues).
- Ask the students to identify a website which they consider to be good at illustrating a particular issue or topic, and to argue in support of their choice – perhaps contrasting with other sites they might have chosen but think are less successful.

Nora Mogey (IS-LUSD)

Clickers in Science and Engineering

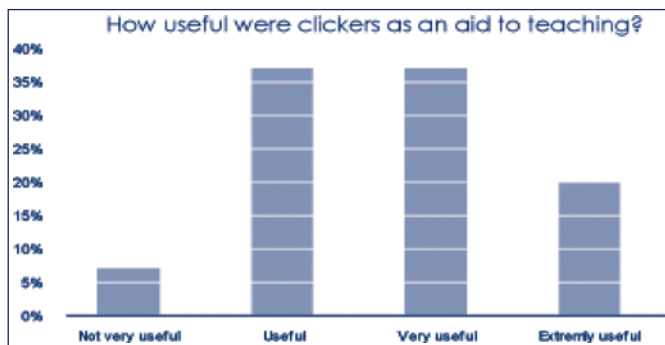
Introduction

Personal response systems, also called ‘clickers’, were introduced in the College of Science and Engineering (CSE) in 2004–2005, with pilots running in the School of Biological Sciences and Physics funded by the Principal’s eLearning Fund. In 2006–2007 the CSE Learning and Teaching Strategy Project provided a major push for the clicker initiative. Currently some 60 lecturers are using clickers, mainly in first and second year courses.

In 2007–2008 a study was run to collect feedback from staff using clickers in CSE, to gather their perceptions of the current technology and their thoughts on potential improvements. Data were also collected from students over the last few years, in various courses in the College, through course questionnaires and focus group discussions. Some of the findings are presented here.

Benefits of clickers

93% of staff view the clickers as a useful teaching aid.



The main benefits of clickers, according to staff, are (ranked by importance):

1. to increase interaction between lecturers and students.
2. to get feedback on students’ understanding of content.
3. to reveal common misconceptions amongst students.
4. to help students understand difficult concepts better.

These open-ended comments depict staff perception of the usefulness of clickers:

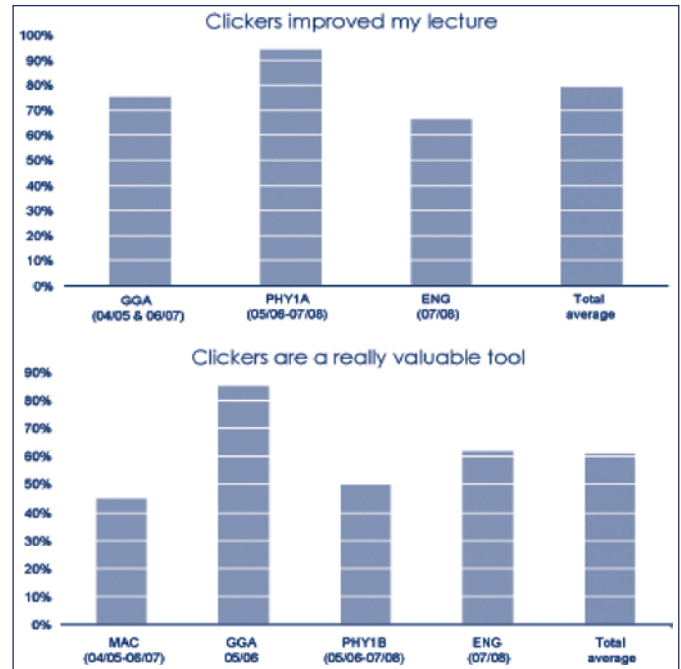
“Students engage better with material if challenged to answer. They then learn the perception of the rest of the class as does the lecturer who can judge whether the issue has been learned or needs to be reinforced.”

“Engagement is the biggest problem I have with some students. The first clicker question I used demonstrated that they hadn’t been engaging, but as we progressed through the material, the students took it seriously and really followed along with what was being said.”

“I think [clickers] encourage students to pay attention, to think, in lectures. They allow you to flesh out what you are doing. They encourage engagement. They encourage discussion about physics between students. They

enthusie just from the use of such gizmos. They break the monotony. They make me, as a lecturer, think a bit more about what I’m doing. All good.”

Students’ feedback on the usefulness of clickers varies widely, the main influencing factor being the way clickers are used in courses, but is in general also rather positive.



Students rank benefits slightly differently from lecturers:

1. to feed back to the lecturer about my understanding.
2. to break up lectures.
3. to compare myself with other students.
4. to improve my own understanding of lecture content.

“Brilliant – kept you involved!” (Biology student)

“I think they are really useful, they let you know when you haven’t quite grasped a certain concept and help to keep me more alert in the lectures!” (Physics student)

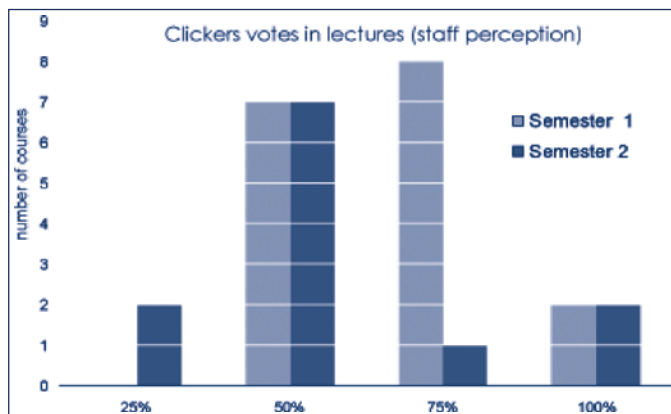
Challenges of clickers

Although staff seem to perceive clickers as a rather simple-to-use tool, there are a number of challenges to using clickers in a way that benefits students’ learning:

1. **Technical issues:** students are very sensitive to any perceived waste of time on technical problems with clickers or regaining control of a class after a vote. “A lot of time spent trying to fix technical difficulties, instead of proceeding with lecture.” (Biology student)
2. **Importance of explaining answers properly:** students feel it is important for lecturers to spend time explaining every possible answer, including the incorrect one(s). “Clickers could have been really useful, but I don’t think the lecturers responded optimally to the results. Questions weren’t gone through if a majority got the right answer. This isn’t

ideal for those getting it wrong – or getting it right by elimination rather than thorough understanding.” (Physics student)

3. **Consistent use:** clickers only work when used consistently over the course of a semester and by the whole course team. “Clickers were not used often in the first part of the course, which meant that it was easy to get out of the habit of bringing them to lectures. Having used them before, I can tell that clickers can be very useful.” (Physics student)
4. **Low response rates:** there is some evidence that students tend to disengage with clickers and lose their initial enthusiasm, if lecturers don’t try to vary and improve the way they use clickers in the lecture.



5. **Reduced content in lectures:** clicker questions need time. 53% of lecturers felt they had to reduce the content covered in a lecture. However, this does not necessarily impact negatively on the course quality, as the following quotes show: “By focusing more on the essentials ... it meant that [contents] were being better taught (in my opinion) as more of the class seemed to follow the material”, “It kind of changes [the content]. Less formal content (syllabus), but more examples and hopefully deeper knowledge” (staff feedback).

Future plans

We are currently selecting a supplier for a University-wide upgrade to RadioFrequency (RF) technology for the Academic Year 2008–2009. A decision is expected by the end of June, to give us time to implement the upgrade and retrain lecturers over the Summer. RF technology has various benefits, such as simple installation with a single USB wireless receiver, no line-of-sight issues, and confirmation for students that their response is received.

For more information on clickers please contact Daniela Gachago (email Daniela.gachago@ed.ac.uk) or Jon Jack (email jon.jack@ed.ac.uk), or visit our website at <http://www.scieng.ed.ac.uk/LTStrategy/clickers.html>

Daniela Gachago (CSE)

Marking laboratory reports

In a large biology class, feedback on lab reports used to be given by six demonstrators who sat writing furiously, with their backs to the students.

The logistics were complicated, and we had no easy way to reflect on the quality of the feedback. We changed the report to a *Microsoft Word* proforma. Each student’s answers were parsed into a marking ‘harness’ (only *Microsoft Excel* and *Word* are needed). Each copied answer is then followed by a drop-down list, specific for the context. From this, preassembled feedback may be selected (and optionally may be further edited). Now two demonstrators are able to return feedback within a week of submission as promised. Students easily handled the demands made of them, making graphs online and inserting them into the proforma, for example. In return, the feedback they get is richer.

Preassembled feedback may contain links to remedial exercises, and contain images and longer explanations than there is usually time to give. Additionally, macros have been used to analyse all the answers to each question. For example, numerical answers were shown as a histogram, which revealed misconceptions, unanticipated in the original preassembled feedback, and subsequently improved.

Paul McLaughlin (Biology)

Does eLearning work?

A report entitled *Exploring Tangible Benefits of e-Learning: Does investment yield interest?* presents evidence that technology-enhanced learning delivers tangible benefits for learners, teachers and institutions.

The report, briefing paper and 37 case studies survey the range of practices in Higher Education and the ways in which technology-enhanced learning adds value.

The broad conclusion is that eLearning makes a tangible difference: the appropriate use of technology leads to significant improvements in learning, thereby increasing satisfaction, retention and achievement. The high quality, diverse, accessible, expanding higher education system desired by government and funders is no longer possible without eLearning. Continued investment and innovation in eLearning are essential if the UK is to remain a world leader in education.

We have some hard copies of the report (contact **Wilma Alexander** at Wilma.Alexander@ed.ac.uk or **Nora Mogey** at Nora.Mogey@ed.ac.uk if you’d like one), or you can find the report and related information at <http://www.jiscinfonet.ac.uk/publications/publications/info/tangible-benefits-publication>

Wilma Alexander (IS-LUSD)

Ockham's Razor and the Pathologist's Knife: simplifying complex assignments

What do forensic pathologists do? Well, they dissect people and take samples and peer down tubes, then issue a death certificate on which they state the "cause of death".

So, an obvious assignment for an online course in forensic medicine is to present a case study (the equivalent of the "slicing'n'dicing", the observations and results of the investigations) and ask the student to determine the cause of death. This certainly tests students' understanding and ability to analyse information and reach a conclusion. It also simulates a task that pathologists actually do in the real world – filling in forms.

Case-based assignments were implemented in forensic WebCT courses in Edinburgh. To some extent they worked, but collating student assignments was tricky. It would be so much easier if the process could be automated and simplified. This is when it becomes useful to know someone who can tweak the inner workings of WebCT – someone like Stephen Vickers of Information Services...

Assignments can now be presented to the student as a web form – which can, essentially, do anything; it can certainly simulate a death certificate. The click on the 'submit' button can be used as a portal to new content or activities and can, of course, include a specimen solution with images, or any web page element. This adds immediate value for the student.

Meanwhile the course instructor receives a mail message containing a formatted answer from a clearly identified student, with a meaningful subject line and date and time stamps. The student receives a copy of exactly the same message, so the ability to format its appearance becomes an *extremely* powerful tool: it is a way of sending the student a model answer, explanatory text, new material, references, additional tasks and activities – anything which can be reduced to text. Unlike the web page which is lost once the student navigates away from it, the content of the mail message is permanent, and it facilitates further discussion amongst the students. There are, therefore, pedagogical advantages to using the form submission tool.

Overall, this approach engages the student with complex assignments, focusing 'thinking-time' on the academic issues while making the physical process of completion and submission as straightforward as possible.

The web form is now being used to reproduce real-world scenarios such as grant and funding application forms, reviewing papers for journals and other 'form' type assignments, as well as death certificates. Interestingly, incorporating a text box in which the students are required to list references seems to be encouraging better use of the existing literature (and anecdotal evidence suggests

that students are less likely to plagiarise from that literature).

This tool is currently used on the Forensic Medicine & Science and International Animal Health online distance programmes. It is hoped that it will be used sufficiently widely across the University to justify further development. Web forms (image-based MCQs) specifically designed for mobile technology such as the Apple iPhone have also been developed.

The FormSubmission PowerLink is active in WebCT; full details can be found at http://www.elearn.malts.ed.ac.uk/webct/formsub_pl.shtml

If you'd like to find out more, and perhaps see a demonstration, please email t.squires@ed.ac.uk.

Tim Squires (Forensic Medicine)

(The full version of this article is available in the online issue of BITS.)

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Contributions to BITS are welcomed.

Copy deadline for July BITS:

Friday 13th June

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