PRACTICAL GUIDANCE ON AUTOMATED ESSAY-TYPE ASSESSMENT FEEDBACK

Quintin Gee
Learning Technologies Group
Electronics and Computer Science
University of Southampton, UK
qg2@ecs.soton.ac.uk

David Argles
Learning Technologies Group
Electronics and Computer Science
University of Southampton, UK
da@ecs.soton.ac.uk

ABSTRACT

We describe our experiences of returning marked material to students over several years. From a purely paper-based process, we progressed through various incarnations of electronic hand in and return, but we are still not satisfied that the facilities available to the typical lecturer are really useful in this context. Workarounds still have to be employed, but recent versions of VLEs have given us a glimmer of hope.

Keywords

Automatic feedback, electronic submission

1. INTRODUCTION

Formative feedback is assessment that provides developmental feedback to the learner about an item to which they relate so that they can adjust their plan for future learning [1]. The objective is to enable the learner to improve their approach to the topic in question, and thus develop a sense of what would achieve a better outcome.

In the field of essay questions, much work has been done on restricted topics [2] and short essays [3]. In specialised disciplines such as Law, some remarkable progress has been reported [4], but this is strongly proscribed by a set of restrictive rules applicable in that field. As regards longer essays and structured documentation in support of program production, there has been little to tempt us.

Our problem is one of receiving documentation from individuals tackling a programming project consisting of a User Guide, Problem Specification, and Problem Design, for marking and formative feedback. We must add that the Testing Regime, programming and operation of the application code is also submitted and graded, but is not yet within our sights for automation.

In their review of computer-assisted assessment, Conole and Warburton [5] display the location of OMR and Portfolio subsystems in the same context, and we should like to add eFeedback to their CAA section, although some may feel that there is better match with computer-based assessment (CBA).

Critical to our operation was timeliness of feedback [6]. In particular, to ensure feedback is made available simultaneously to all students.

2. HISTORICAL PERSPECTIVE

For some years, we have been working in the context of an IT degree designed to widen participation. This has involved working with partner institutions and part-time students. In order to assist these students, we have provided on-line support for all our course modules, initially via the Blackboard VLE, and more recently through our own in-house (password-protected) website and electronic coursework submission system, "C-BASS".

When we first used Blackboard, all coursework was handed in on paper. Once marked, return of work with feedback was performed in the next available contact sessions, but this was problematic, since part-time students might not be taking any modules in the following semester, so this meant posting returned paperwork to them. This was both expensive and time-consuming, and there was a delay in students receiving their feedback.

Switching to electronic hand-in of coursework provided the stimulus to investigate electronic return of feedback. This progressed through several stages. Initial experiments involved using a simple spreadsheet and e-mail client. The student details, including their e-mail address were recorded on the spreadsheet. The work was then marked, with comments and the marks for the individual sections being recorded, together with the total mark. A word processor was then used to compose a general feedback e-mail, and mail-merged with the spreadsheet data to produce the required

Subject Centre for Information and Computer Sciences

personalised e-mails with marks and specific comments.

This worked well, and ensured that all students received their marks and feedback comments at the same time and about a week sooner than happened with paper submission and feedback. Although the approach used only standard applications such as Microsoft Office or OpenOffice, the initial approach involved taking the merged e-mails and directly editing the outbox file of the e-mail client. Also, it did not allow for the return of annotated scripts. Clearly, a simpler approach was needed if the benefits of electronic recording and return of feedback were to be made available to a wider audience.

3. PHASE 1 EARLY PARADIGM

This is a familiar system to all schoolteachers onwards. Here we set course work which the students handed in (2 copies) manually at a designated venue. Security of the documentation was ensured by providing the students with an acknowledgement slip signed by the hand-in staff.

The set of documents were then collected by staff, signed for, and one copy of each submission was then marked.

The marked copy was handed back to the students usually in class, or at individual tutorials, together with written comments within the document itself or on an attached form. Our attitude has always been that comments should aim to point out where improvements could be made, rather than just errors, as recommended by Nicol and Macfarlane-Dick [7]. Thus, if the student were to undertake the same task again, they should be closer to full marks.

The unmarked copy was retained for quality control purposes, and so that a “clean” version was available for an external marker in case of appeals, disputes, etc. Where the student only submitted one copy, that one was retained.

3.1 Shortcomings of Phase 1

It is clear that there was a very heavy workload for the hand-in staff. Imagine a School with 80 modules running concurrently, many with up to 3 coursework submissions.

Despite the paper trail, security disputes occurred.

Some submissions included programs, and disks could easily be lost in this process.

An additional concern was that CD-based material could not be annotated, so that we were unable to help students improve their programming technique, for example.

Staff had bundles of documents in their offices in different formats, submitted as paper files in plastics, folders, wallets, ring binders, etc. Storage was a nightmare.

4. PHASE 2 RECENT PARADIGM

The School of Electronics and Computer Science introduced an electronic hand in system called C-BASS (Computer-Based Assignment Submission System) in 1998. This was developed by a member of staff and was helpful to many [8].

4.1 Operation of C-BASS

We assume that an assignment has been set up by the lecturer in the system. This is numbered against each Module.

When the student is ready to submit work, the system prompts them for the Module and Assignment number and then for the files required, and records the user name, and the date and time of the submission. A receipt is printed out which the student keeps.

The lecturer can inspect the submission list at any time, to check on progress. When ready, the lecturer can download a zip (or tar) file of all the submissions. Unpacking this download produces a directory for each user name which contains the file required by the assignment and the log file for that student.

If manual hand-in is required, for example Logbooks for inspection, the system will print a cover sheet to accompany the document, which the student takes to the desk for signature. This cover sheet contains a barcode which is scanned, thus recording date and time.

4.2 Benefits

This system removed the majority of paperwork submissions, and now the hand-in staff handles only a small amount of material.

For those lecturers who cling to paper copies, work could be printed by them and then marked in the traditional manner. For those who are happy to mark on a display screen, suitable facilities are available in each of the popular word processors we use. Thus MS Word has its *Track Changes* mechanism, OpenOffice uses *Change/Record*, while Word Perfect has its *Document Review* process. Each of these allows the reviewer to annotate the text and diagrams so that deletions and additions are marked for the student in some way (underscore, strikethrough, highlighting).

4.3 Shortcomings of Phase 2

However, the real bonus should have come from being able to return both the marks and the scripts

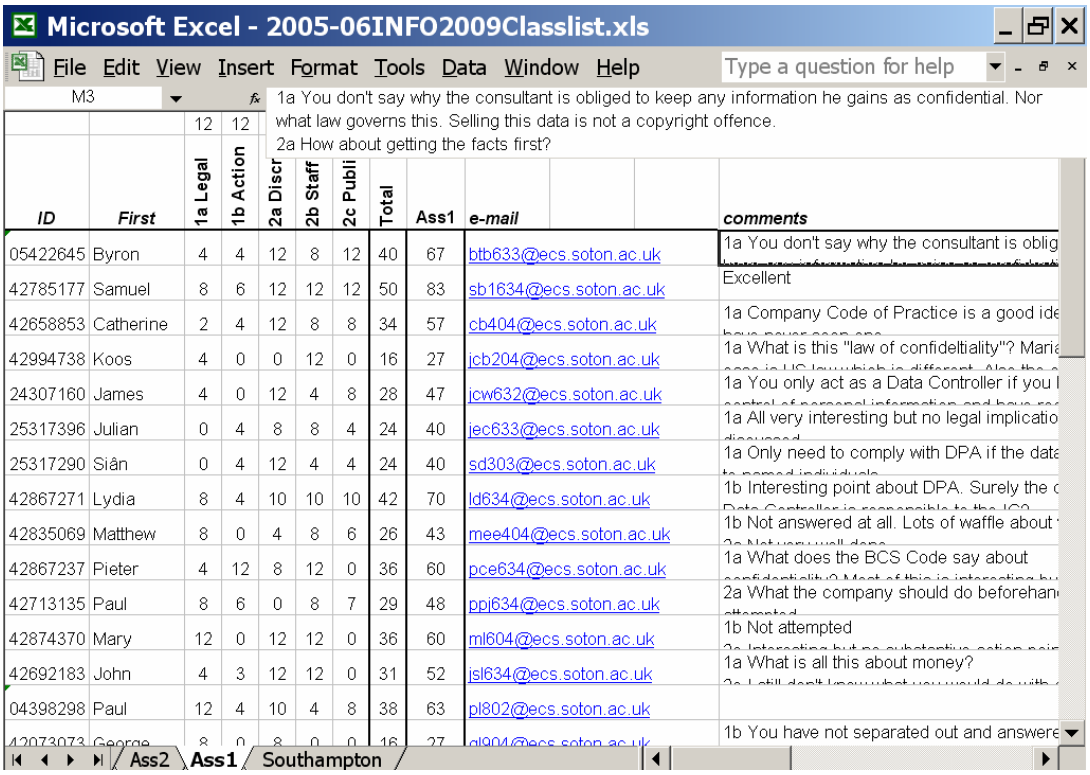


Figure 1: Spreadsheet with students' results and commentary

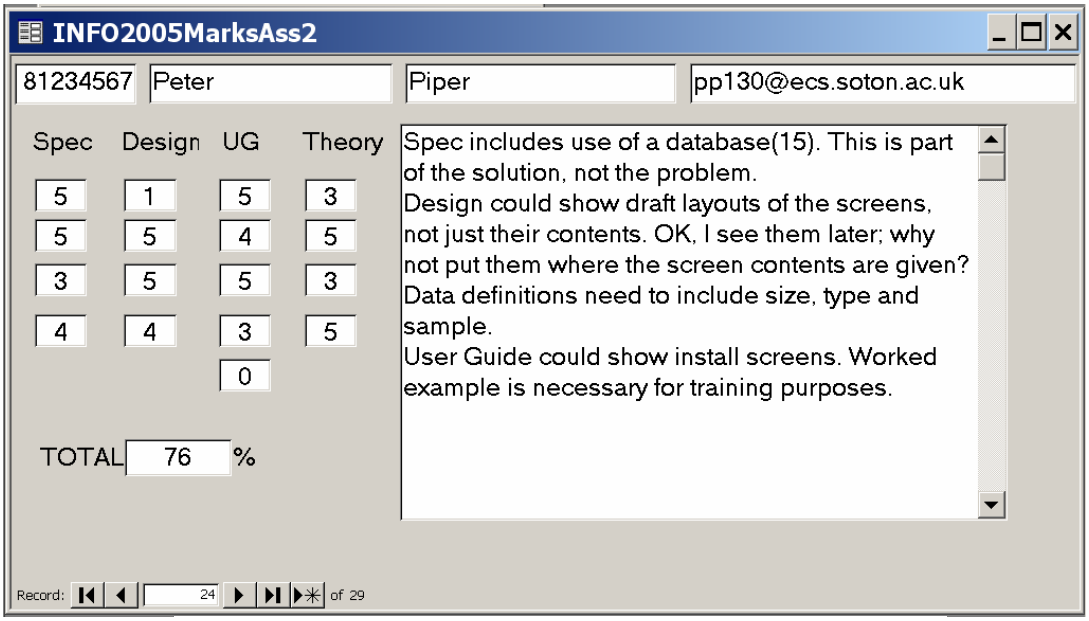


Figure 2: Database capture of results and commentary

automatically, but the system was not set up for this.

Another problem was that only the lecturer can access hand-ins, so if absent, nothing can be done without the emergency intervention of the systems administrator.

During the operation of C-BASS, the University decided to purchase and then implement the Blackboard VLE, but we found the initial version inadequate to perform what we wanted [9].

5. PHASE 3 LATEST DEVELOPMENT

We attacked the problem of returning marks first. Using standard spreadsheet methodology, a lecturer can collect the marks as each script is tackled, and even record an additional commentary on it, although this requires some dexterity (Figure 1). This does not allow good access to a single record (the MS Excel Data Form facility is not amenable to type size changes and other possibilities.) We have lately used an MS Access database because of the greater control such as the display of one student's details at a time, and particularly the provision of a scrollable open area for a commentary (Figure 2). Thus the marks are collected as the scripts are viewed and annotated.

Together with e-mail this enabled automatic personalised mailing with the marks and the comments (Figure 3).

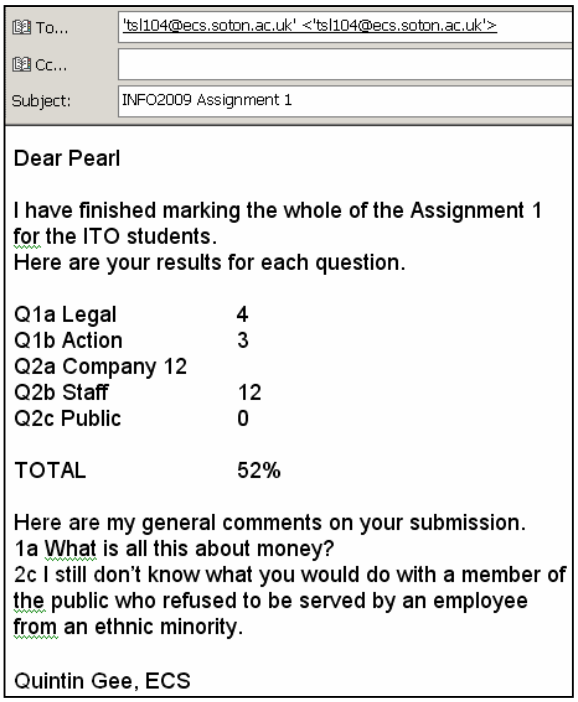


Figure 3: Automated return of results/commentary

5.1 Shortcomings of Phase 3

The major problem still outstanding was how to get their marked scripts back to the students. We could e-mail them one by one but this is tedious for classes of 30 and painful for classes of 160 students. We wanted to do it automatically. So, for example, we would like an additional column in the spreadsheet, or entry in the database table, that contained the address and name of each marked file. The mailing program would then pick that up, in the same way that it picks up all other fields during a merge process, and generate e-mails to the students each with its own attachment.

This is nice in theory, but this feature is prohibited in the Microsoft Windows environment [10], on the grounds that it compromises security.

6. SOLUTION

The current solution (using a Microsoft environment) copies the features listed above and provides the automatic feedback required.

1. The student's script is marked using the review feature, and marks recorded in a spreadsheet or database. This is then the source file with name, results, comments.
2. A file is created containing only a table of e-mail addresses, and filenames with complete paths.
3. Using a MS Word macro [11], these two files are merged to send one e-mail message at a time with the appropriate attachment (MS Outlook).
4. Outlook intercepts this with a warning dialogue, which can be suppressed with another external tool.

Although this procedure was designed for MS Word 2002 and MS Outlook 2002, the process is equally applicable to OpenOffice v 2.0 and WordPerfect v 10.

7. EVALUATION

The two files to be merged must be in the same order, and this was cause for concern the first two times we tried it. There is no easy way to check.

A few students submitted PDF files, but these cannot be annotated as few copies of Adobe Writer are available in the School. It is too expensive to equip all examining staff with this facility.

Another point of caution should be made. Since the university's defences are very strong and kept up-to-date, it is often the case that the students cannot e-mail their executable program files at all!

Lecturer experience using the Phase 3 methodology has been over 1 year and applied to the coursework assignments of 5 modules. Feedback has been positive, but they would prefer a wizard to generate all the relevant question parts on the data capture form, rather than having to modify it themselves.

The student experience was culled from the Student Evaluation Questionnaires completed at the end of each module. They rated the Phase 3 approach as outstanding. Rather than the two lines of summary that was the previous norm, every student has come to expect comments on their original script that help improve their future performance. They

also remarked that they appreciate the certainty of feedback, and for the part-time students particularly, the feedback is aligned with the rest of the class. We have made a rod for our backs!

8. BLACKBOARD VLE

We revisited Blackboard, which is in use by much of the University, and still being updated with new versions. The current implementation we investigated was Release 6.

At first sight, Blackboard seems to satisfy most of the requirements listed in 5.1 above.

The Gradebook facility certainly allows the lecturer to mount the essay question paper, and the student enrolled on the module to read the question. Having answered it using their word processor, they can submit the file (or files) to the system and receive a suitable acknowledgement.

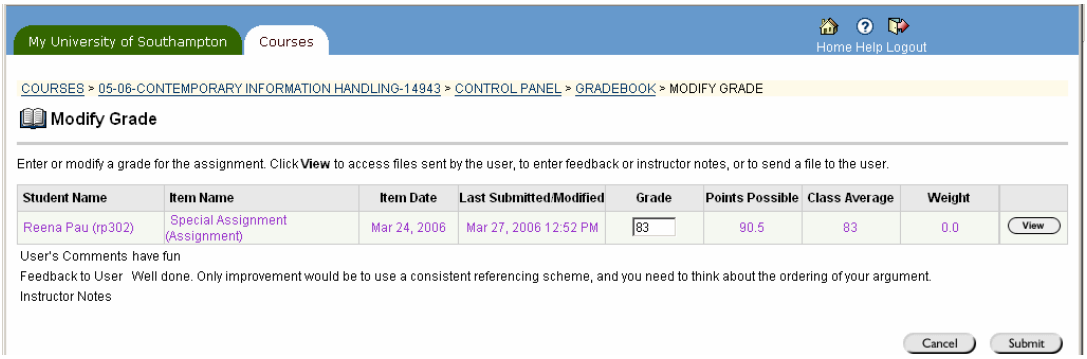
Finally, that marked script can be submitted to Blackboard for return to the student with the revisions included, by adding the files to the return message (Figure 5).

The Gradebook facility then allows the grades for the piece of work to be noted.

The student can inspect their marks at any time, and pick up the marked and revised script.

An improvement we would like to see is to mark *in situ* and thus store the annotated script in the students' own submission area. This may be undesirable, in that the source document is now no longer available.

Another problem is that students can get at the returned script and marks as soon as the lecturer has dealt with them. We would like a facility to release them all at once, so the results and scripts need to be embargoed until the lecturer has finished them all. The result of these two changes would be an admirable solution, and we could move away from personal solutions.



At a suitable juncture, the lecturer can open each file, and read and edit them using standard methods described above (Figure 4).

However, the script edited in this way resides in the client temporary Internet directory, and may be lost on closure. So in reality, the file must be downloaded by the lecturer and stored for the revisions to be recorded and remain available.

In the meantime, sample files and directions for using the method outlined in this paper are available on the web site www.ecs.soton.ac.uk/~qg2.

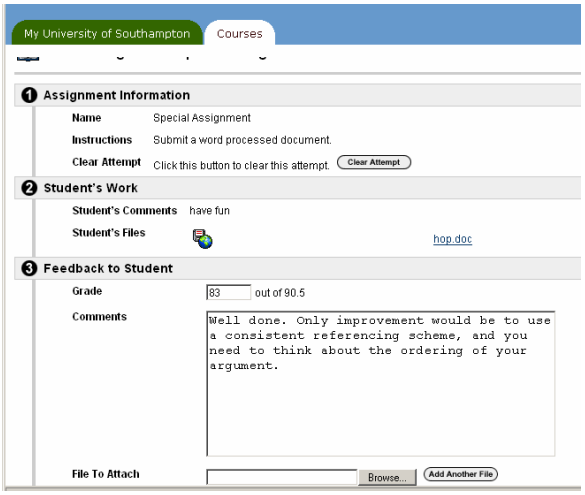


Figure 5: Blackboard® script return

9. REFERENCES

[1] HEFCE (2006). e-Assessment Glossary. Available at www.jisc.ac.uk/uploaded_documents /eAssess-Glossary-Extended-v1-01.pdf

[2] Burstein, J, Leacock, C, Swartz, R (2001). Automated Evaluation of Essays and Short Answers. In Proceedings of the 5th CAA Conference 2001.

[3] Christie, J R (1999). Automated essay marking - for style and content. In Proceedings of the 3rd CAA Conference 1999.

[4] Bampton, K (2004). A Low Technology Computer Assisted Marking Strategy for Law Essays. In Proceedings of the 8th CAA Conference 2004.

[5] Conole, G and Warburton, W (2005) A review of computer-aided assessment. ALT-J 13(1) 2005.

[6] QAA (2006). Available at www.qaa.ac.uk/academicinfrastructure/codeOfPractice/section6/default.asp.

[7] Nicol, D J, and Macfarlane-Dick, D (2004). Rethinking formative assessment in HE: a theoretical model and seven principles of good feedback practice. In, Juwah, C, Macfarlane-Dick, D, Matthew, B, Nicol, D, & Smith, B (2004) Enhancing student learning though effective formative feedback, York, The Higher Education Academy.

[8] Field, J K (2006). personal communication 24 March 2006. Starting point available at www.handin.ecs.soton.ac.uk.

[9] Blackboard (2001). Available at www.imsproject.org/membersexchange/ME_Blackboard.pdf.

[10] Microsoft Article 839372 (2005). Available at support.microsoft.com/kb/839372/en-us.

[11] Robbins, D (2005). Available at word.mvps.org/faqs/MailMerge/MergeWithAttachments.htm.