

GENERATING AND E-MAILING FEEDBACK TO STUDENTS USING MS OFFICE

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Abstract

An MS-based system for generating and returning feedback to students has been utilised by tutors at Liverpool John Moores University (JMU). The technique uses Office 97 to generate feedback reports that can include the student's mark, position in the class, and a series of statements selected from a bank of comments, inputted by the tutor. In addition to allowing feedback to be printed and distributed via e-mail, the software also reports the frequency with which particular comments were used. This valuable information can be used by students to direct their learning, and by tutors to inform future teaching strategies. The procedure is particularly suited to large classes and can make the process of returning feedback to students considerably less onerous. The operation of Version 8 of the software is described and the responses of staff and students to the procedure are reported.

Introduction

The importance of assessment in learning is well documented (Brown, 1997; Gibbs, 1992). It is generally accepted that if students are to gain the maximum educational benefit from an assessment event, tutors should mark student's work and indicate where they have done well, where their misunderstandings are, and what follow-up work might be required (Gibbs, 1993). Such comments do more to motivate students than ticks or crosses alone. Indeed, research indicates that an absence of feedback is an important contributory cause of student failure (Ramsden, 1993).

Issues relating to the return of feedback to undergraduates have been thrown into considerable focus recently with the remarks of John Randall, Chief Executive of the Quality Assurance Agency (QAA). Summarising the results of 2 years worth of HE inspections he said, "*Overall the picture is one of institutions performing well, but where we do have concerns is weaknesses in academic assessment and feedback, which may lead to higher student dropout rates*" (Major, 2001). One does not need to look far to find reasons that account for this apparent failing. Although educationally sound, returning comprehensive written feedback to students requires a considerable investment of time and effort by the assessor. It is understood, however, that work should be returned as quickly as possible if students are to pay attention to the marker's comments. A few weeks after submitting work, students have moved on to another topic and, "... have neither the time or the interest to take feedback to heart" (Gibbs, 1993).

Clearly, CAA is one mechanism via which tutors can both increase the amount of feedback, and decrease the time taken for it to be returned to students. For example, chemistry students at Liverpool JMU have access to ChemiCal, a series of tutorial programs that require the student to interact creatively with the computer (Nicholls, 1998; Nicholls, 1990). Such approaches are clearly preferable to those in which the student has no way of knowing why they got particular question incorrect (Gibbs, 1986). Indeed, it is evident that computer assessments that provide immediate feedback can have a positive effect on student attainment (Helgeson, 1993).

Despite the widespread used of interactive tutorial type programs, there is an apparent dearth of software for generating feedback to students on traditional type assessment activities, such as essays and laboratory reports. The purpose of this article is to describe Electronic Feedback Version 8, and report the reaction of Liverpool JMU staff and students to previous versions of the software. Details of Version 5 of the program have been published previously (Denton, 2001). Electronic Feedback is an MS-based system that enables tutors to generate and e-mail word-processed feedback reports to students. It consists of two programs: *Feebac8.xls*, an MS Excel 97 workbook, and *Fb8.doc*, an MS Word 97 document.

Method

The reports produced by the Electronic Feedback software, so-called feedback sheets, include the student's name, mark awarded, and a series of comments. Example feedback is shown in Figs. 1 and 2, respectively. For the purposes of the software, these comments are divided into four categories:

Grade Comments These are those remarks that depend on the overall mark awarded to the student for their work. For example, the tutor may wish to allocate the comment, "First class work," to those students with marks above 70%.

General Comments These are those statements that the tutor wants the whole class to receive. Typically, they would relate the marker's overall response to the work submitted by the group. Additionally, general comments can be used to provide students with details on how they can interpret any statistical information on their feedback sheet. Tutors can present three general comments on each report, referred to as top, middle and bottom. These designations refer to where the statements appear on the sheets.

Standard Comments These are those statements that experience shows are most likely to be required when marking student work. They do not need to be prepared in advance of marking, and can be inputted as marking proceeds. The nature of these comments depends on the feedback mode that is chosen when inputting data into *Feedbac8.xls*. In normal mode, the standard comments are stand-alone statements that relate to a specific feature of the work e.g. "You have failed to include an appropriate best fit line on your graph." When inputted into the software, such comments are allocated a number, enabling them to be readily distributed to identified groups of students. In criterion mode, the standard comments relate to a specific criterion that the work has been judged against. Each criterion is divided into 11 levels, numbered 0 to 10, and each level has an associated standard comment. The level number can relate to the performance of the student in that criterion. Thus, if the work being marked was an essay, one of the criteria that may be used in marking is "Quality of the introduction". The level 0 comment in this criterion may read, "This appears to be absent," whereas the level 10 comment may read, "This firmly established the scope of your essay and clearly defined the topic of your work."

Personal comments These are statements directed at individual students.

Fig. 1 Example feedback sheet produced in criterion mode. This report has been generated using the data shown in Figs. 3, 4 and 5.

Fig. 2 Example feedback sheet produced in normal mode.

Preparation

The Excel workbook *Feedbac8.xls* is composed of seven visible worksheets; CONFIGURE, HEADER, LIST, COMMENTS, OPTIONS, NUMBERS and REPORT.

Tutors enter the title of the assessment activity and the grade comments into the *HEADER* worksheet, Fig. 3, so-called because this information ultimately appears in the upper portion of the feedback sheets, in bold font. If the software is used in criterion mode, the tutor can enter the title of the criteria that the work is being marked against into the *HEADER* worksheet. Ultimately, the criteria titles appear on the final feedback sheet as subheadings, Fig. 1. The digits to the left of the criterion names on the *HEADER* worksheet, the so-called criterion numbers, are used to identify the criteria in the remainder of the workbook.

Fig. 3 Example *HEADER* worksheet in criterion mode

Tutors enter e-mail addresses, forenames, surnames and registration numbers into the *LIST* worksheet, Fig. 4, although the order in which information is inputted may be amended, if required. Tutors enter general and standard comments into the *COMMENTS* worksheet, Fig. 5. In normal mode, the software can accommodate up to 999 standard comments. Feedback statements that contain superscripts, subscripts, line breaks or tab spaces can be inputted using a series of special characters. Thus, “{” = convert next character to a subscript, “}” = convert next character to a superscript, “^” = insert line break, “-” = insert tab space.

Fig. 4 Example *LIST* Worksheet

Fig. 5 Example *COMMENTS* worksheet in criterion mode

The layout of the *COMMENTS* worksheet shown in Fig. 5 is that which would appear if the software is used in criterion mode. Thus, the standard comments are grouped into a series of criteria, the criterion number being listed in the column labelled ‘Crit’. Each criterion is divided into 11 levels, indicated in the column labelled ‘Lev’. A standard comment can be inputted for each level.

Marking

The *HEADER*, *LIST* and *COMMENTS* worksheets can all be completed before the students have submitted their work. Then, during or after marking, the tutor selects the *NUMBERS* worksheet, Fig. 6, and enters marks, personal comments, and details of which standard comments have been allocated to which students.

Fig. 6 Example *NUMBERS* worksheet in criterion mode

On the *NUMBERS* worksheet shown, student names appear in the second column and the mark that has been awarded to work appears in the fourth column. If the software is in normal feedback mode, the tutor must type this mark in. In criterion mode, however, the marker has the option to switch to automatic marking mode by clicking the button shown on the *HEADER* worksheet, Fig. 3. In this configuration, the software will automatically calculate the mark for each student, based on the weightings entered for each criterion, and the level awarded in each criterion. Since

the maximum level that can be awarded is 10, a student awarded level 6 in each criterion would attain an overall mark of 60%. If work is submitted after the deadline, tutors input the mark awarded after the imposition of any lateness penalty into the third column, labelled "Mark after penalty". The feedback sheet for this student will then include the comment for late work that is specified on the *HEADER* worksheet, Fig. 3, and the reduced mark will appear on the student's feedback sheet.

In the fifth column of the *NUMBERS* worksheet, the tutor can enter personal comments to individual students. As shown in Fig. 6, it is usual to preface such remarks with the student's name. In the remaining columns of the *NUMBERS* worksheet, labelled 1, 2, 3, and 4 in Fig. 6, tutors input the digits that correspond to the standard comments that they wish to allocate to students. The significance of these digits depends on the feedback mode that is used.

In normal feedback mode, the digits inputted into the numbered columns on the *NUMBERS* worksheet are those that correspond to each standard comment. Consequently, they will have values ranging from 1 to 999. The standard comment represented by the digit inputted into column 1 will appear first on the feedback sheet, followed by the standard comment that is represented by the digit inputted into column 2 etc. Up to 50 standard comments can be allocated to each student. Tutors may decide to annotate students' work with the digits that correspond to the standard comments that they want to feedback to students. In this way, the marker can easily identify which statements have been allocated to which students. The feedback sheet in Fig. 2 was generated after this strategy was adopted. A general comment was included on the feedback sheets to draw students' attention to this fact.

In criterion mode, tutors enter level numbers into the columns labelled 1 to 4 on the *CONFIGURE* worksheet shown in Fig. 6. These will have values ranging from 0 to 10. The level awarded for criterion number 1 is inputted in column 1, the level awarded for criterion number 2 is inputted into column 2, etc. The level attained in up to 50 separate criteria may be inputted.

When the *NUMBERS* worksheet is completed, the *COMMENTS* worksheet, Fig.5, displays statistical information relating to the distribution of marks and standard comments. Tutors can decide whether or not to include or omit this information on the feedback sheets. In criterion mode, the *HEADER* worksheet reports the highest, average, and lowest levels awarded in each criterion, under the column headings H, A, and L, respectively, Fig. 3. This information can also be included on the feedback sheets, as shown in Fig. 1.

Generating and Returning Feedback to Students

When a mark for a particular student is inputted into the *NUMBERS* worksheet, the spreadsheet automatically generates the corresponding unformatted feedback sheet. Selecting "Copy Feedback Sheets" from the Tools menu of Excel

automatically copies the reports, activates MS Word, and opens the file *Fb8.doc*. The user then has the option to paste, print and e-mail the reports, by selecting custom toolbar buttons. Feedback sheets are automatically scaled during pasting so that there is one report per page.

Normally, electronic feedback is sent to the student e-mail address indicated on the *LIST* worksheet, Fig. 4. However, on the *CONFIGURE* worksheet (not shown), it is possible to enter alternative e-mail addresses for up to 400 students. This has proved a useful facility for returning feedback to part-time students.

Evaluation of Electronic Feedback

The educational benefits of Electronic Feedback were evaluated by studying the frequency with which selected standard comments were used during marking in normal feedback mode. These comments related to errors made by students in their work. The attitudes of students to the Electronic Feedback strategy was ascertained by their responses to a structured questionnaire that was completed by 58 first year undergraduate students within the JMU School of Pharmacy and Chemistry. This was in addition to three focus groups, each consisting of three first year chemistry students chosen at random. 43 members of staff were also requested to offer their views on the software after it was presented to them during a JMU training session. In addition, a further 80 staff were asked to complete an e-mailed questionnaire on the procedure, after they had received the software through the post.

Results

The Electronic Feedback method has been used by the author to assess both undergraduate physical chemistry laboratory reports and worksheet assignments in normal mode, and essay coursework in criterion mode. The procedure has been found to work well in practice. Ideally, the bank of feedback statements should be written before the assessor receives the students' work. In this way, the marking can be completed as quickly as possible. When marking a worksheet assignment, for example, the standard comments are usually the model answers to each of the questions posed, with a few additional comments.

When marking laboratory reports, the author uses the same initial bank of general feedback comments. These are then edited and augmented so that they are appropriate to each experiment. This is possible because the majority of statements relate to core skills, such as report writing and the graphical representation of experimental data. Typically, about 25 distinct comments are required when assessing a laboratory report. The frequency with which particular comments were used when marking two lab. reports from a class of 46 first year students is shown in Fig. 7. By the time the students came to undertake the second practical, two weeks after the first, they had already received e-mailed feedback. As is evident, the ability

of the students to present their work in an appropriate scientific manner had improved markedly over this period.

Fig. 7: Assessment profiles from two first year undergraduate chemistry practicals.

Students reacted positively to the Electronic Feedback procedure when questioned in the focus groups and in responding to the questionnaire. All the interviewed undergraduates felt that the e-mailing of feedback was an efficient way to receive details of their performance in an assessment, as it removed the requirement for them to wait until the next time they met the lecturer. The questionnaire supported this finding, 88% of the undergraduates saying that it was useful to have written feedback e-mailed to them, in advance of receiving their marked script. It became evident that students were comfortable with the principle of receiving feedback when they were at computer terminal on their own.

The focus groups confirmed that were more likely to pay more attention to feedback that is returned quickly and felt that it was appropriate to wait 2-3 weeks for marked coursework to be returned. All surveyed students stated that they found the comments on their feedback sheet useful. Most of the class, 81%, felt that they had received more written feedback than they normally obtained from their tutors. The majority of the questioned students, 91 %, stated that they appreciated knowing the maximum, average and minimum marks for the activity, as well as their position in the class, 88%.

It became clear that the one of the particular advantages of the Electronic Feedback procedure is its ability to return lengthy, detailed comments on a particular aspect of the assessment. The responses of two students were typical, *"It is a helpful method of marking as it enables you to see how and why mistakes were made.."* and, *"It offers (a) more in-depth description of how you have gone wrong."* A number of students also commented that the printed feedback sheets overcame difficulties associated with the legibility of staff handwriting. In response to the question, *"should Electronic Feedback be used more regularly within the School"*, 100% of respondents said "Yes".

After a staff training session in Version 4 of the software, 31 colleagues returned written feedback. Those staff who have a familiarity with Excel reported minimal difficulties using the software. One member of staff commented, *"A fairly complex piece of software which I will feel more confident of using once I've tried it out using my own annotations. Educationally, (a) very sound method."* Other staff acknowledged that the procedure could become second nature with practice. 5 members of staff said they would definitely not use the software in future, either because they had an existing electronic system that they preferred, or because they had experienced difficulties using the software.

The 20 staff who responded to the e-mailed questionnaire had received either Version 6 or 7 of the software after witnessing a demonstrating of the package. All staff said that they were using, or intended to use the software, and wished to

receive a copy of subsequent versions. Staff were also requested to make suggestions for the improvement of Electronic Feedback. This consultative process led to the introduction of criterion mode into Version 8 of the program. In response to the questionnaire, staff from a variety of academic disciplines commented favourably on the existing software, one stating that it *"...definitely helps me both speed up the feedback to the students and improve the quality."*

Discussion

Staff who have used the software have found that the Electronic Feedback approach can make the marking process considerably less onerous, given that it removes the requirement to annotate students' work with repeated hand-written comments. The package would be of particular interest to those teachers of large groups who find that they are unable to return as much feedback as they would wish to using conventional methods.

The two files that comprise Electronic Feedback are password protected to prevent the accidental overwriting of essential code. Thus, there are limited opportunities for customisation. However, as discussed above, the user can have some control over the final appearance of the feedback sheets.

The software has been gradually refined over the last two and half years, in response to comments by both students and staff. It is intended that Version 8 of the Electronic Feedback software will not be upgraded until July 2002, at the earliest. For example, the author is currently working on a subroutine that automatically checks the distribution of standard comments to students, and reports back the names of those students who have been allocated the same comments. This feature will be tested in order to ascertain whether or not it is a reliable means of detecting plagiarism.

Supporting material

The author is available to visit UK HE institutions during the 2001 summer break, in order to run interactive workshop sessions with interested staff. Copies of Version 8 of the software and a user guide are available free of charge by e-mailing the author. Respondents should indicate how they wish their title and name to appear on the feedback sheet, as this information cannot be changed subsequently. This is a security precaution that is included so as to prevent the unauthorised proliferation of the software.

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Fig. 1 Example Feedback Sheet produced in Criterion Mode. This report has been generated using the data shown in Figs. 3, 4 and 5.

FEEDBACK SHEET Created at 13:26 pm on 18/3/2001

Book2

PACCH1010 History of Chemistry Essay

Assessed by Phil Denton

STUDENT: AHMED BASSI

MARK: 52 % (HIGHEST: 70 %, AVERAGE: 56 %, LOWEST: 42 %)

RANK: 4th out of 5

COMMENT: Good Work

I have marked your work against the following criteria and weightings. Your performance out of 10 in each criterion, and the highest, average and lowest marks awarded in each criterion, are reported after the comments.

INTRODUCTION (Weighting 20%)

I felt that this defined the subject of your work very well and clearly outlined the scope of your essay. 8/10 (H: 8, A: 5.6, L: 2)

MAIN BODY (Weighting 50%)

This presented a satisfactory discussion of the topic, although you failed to address some of the major issues. 4/10 (H: 9, A: 6.0, L: 4)

CONCLUSION (Weighting 20%)

This was a good summary of your work, although you failed to present enough of your own interpretation. 6/10 (H: 7, A: 6.0, L: 3)

DISCRETIONARY (Weighting 10%)

I have awarded some discretionary marks. These are reserved for those essays that, I think, approach the topic in a refreshing and original manner. 4/10 (H: 5, A: 2.4, L: 0)

Ahmed, this was generally a good essay, although you failed to mention Boyle's publication, "The Sceptical Chemist". This manuscript has an important role in the development of chemistry. To many scholars, it is responsible for the rapid decline in the practice of alchemy after the end of the 1600's.

I was pleased with the essays submitted by the group. Many of you had taken much care over the preparation of your work and had produced scripts that were a pleasure to read.

Electronic Feedback 8. Licensed to Phil Denton until 30/06/2002.

Fig. 2 Example Feedback Sheet produced in Normal Mode

FEEDBACK SHEET Created at 13:23 pm on 18/3/2001

Book1

PACCH1004 Determination of a rate constant for the reaction of I^- & $S_2O_8^{2-}$ (aq)

Assessed by Phil Denton

STUDENT: CATHERINE BAKER

MARK: 24 %

COMMENT:

The group generally completed this work to my satisfaction. That said, some of you made some elementary mistakes in your mole calculations.

Catherine, the quality of this work was very much below your usual standard. E-mail me if you need further assistance.

I have annotated your work with numbers and each number represents a particular comment. The numbers on your work have the following meanings.

- 3 Your axis is not numbered correctly. Always select chart type XY SCATTER when using MS Excel. (80%)
- 12 Lab. reports should have the following sub-headings and should be presented in the following order; introduction, method, results, conclusion. (100%)
- 25 Your graph should display the individual data points, in addition to a best fit line. The data points should NOT be joined together by a "dot to dot" type line. (40%)
- 21 When comparing your result with value(s) from the literature, you should state the author, title, year, and publisher of any data sources you refer to. In this experiment $k_2 = 1.0 \times 10^{-2} \text{ mol}^{-1} \text{ dm}^3 \text{ s}^{-1}$ (J. Chem. Ed. 1997, page 972). (40%)
- 4 Incorrect units/units not stated clearly. In this experiment, t in s, V in ml, k_1 in s^{-1} , k_2 in $\text{mol}^{-1} \text{ dm}^3 \text{ s}^{-1}$, $\ln(V_{\text{inf}} - V)$ is unitless. Correct units should be stated in all column headings and on graph axes. (60%)

Note that the numbers in brackets after each comment shows you the percentage of students who required that comment.

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Fig. 3 Example HEADER Worksheet in Criterion Mode

Header

Enter filename

[Click here to Save As this filename](#)

Title of Coursework

Maximum Mark.

[Spell Check the Title and Comments](#)

Minimum % Mark	Grade	Comments
C H A N G E	70	Excellent work.
	60	Very good work.
	50	Good Work.
	40	Satisfactory work.
	30	Unsatisfactory work.
	0	Poor work.

Grade Comments (continued)

Top Mark

Late Work

Settings

Criterion Feedback Mode [Change Feedback Mode](#)

Automatic Marking Mode [Change Marking Mode](#)

[Change Maximum Number of Criteria per Student](#) — 4

Criterion	Weight (%)	Criterion Name	H	A	L
1	20	INTRODUCTION^~	8	5.6	2
2	50	MAIN BODY^~	9	6.0	4
3	20	CONCLUSION^~	7	6.0	3
4	10	DISCRETIONARY^~	5	2.4	0

Fig. 4 Example LIST Worksheet

List	Max. number of students = 8		<u>Change the max. number of students</u>			
	<u>Fit and Paste Class List</u>					
Delete Row	Insert Row	Column 1 E-mail	Column 2	Column 3 Forename	Column 4 Surname	Column 5 Regno
		1 PACCBAKE	MISS	CATHERINE	BAKER	00066329
		2 PACJBALE	MR	JOANNE	BALEED	00206268
		3 PACABASS	MISS	AHMED	BASSI	00046619
		4 PACRBERA	MR	RAMANDEE	BERAHNEG	00283583
		5 PACABULL	MISS	AMIR	BULLOCK	00125129
		6 PACJCAME	MR	JULIE	CAMERON	00328347
		7 PACACAVE	MR	ALASTAIR	CAVE	00133860
		8 PACBCHAK	MR	BENJAMIN	CHAKRABO	00134647

Fig. 5 Example COMMENTS Worksheet in Criterion Mode

Comments

PACCH1010 Alchemy to Ecstasy Essays
Phil Denton

Number of scripts marked (to date)	5
Highest Mark (%)	70
Average Mark (%)	56
Lowest Mark (%)	42
Standard Deviation (%)	10

Preview comments

Spell check comments

General Comments

Top I have marked your work against the following criteria and weightings. Your performance out of 10 in each criterion, and the highest, average and lowest marks awarded in each criterion, are reported after the comments.

Middle

Bottom I was pleased with the essays submitted by the group. Many of you had taken much care over the preparation of your work and had produced scripts that were a pleasure to read.

4 Change the maximum number of comments/criteria that can be entered on this sheet

Crit. Lev.	Standard Comments (CRITERION Mode)	%
1 0	This appears to be missing!	-
1 1	I felt that this failed to define the subject of your work and did not clearly outline the scope of your essay.	-
1 2	I felt that this failed to define the subject of your work and did not clearly outline the scope of your essay.	20
1 3	I felt that this failed to define the subject of your work and did not clearly outline the scope of your essay.	-
1 4	I felt that this satisfactorily defined the subject of your work and, to a limited extent, outlined the scope of your essay.	20
1 5	I felt that this defined the subject of your work to some extent, and went some way to outlining the scope of your essay.	-
1 6	I felt that this defined the subject of your work well and offered an outline of the scope of your essay.	20
1 7	I felt that this defined the subject of your work very well and clearly outlined the scope of your essay.	-
1 8	I felt that this defined the subject of your work very well and clearly outlined the scope of your essay.	40
1 9	I felt that this defined the subject of your work very well and clearly outlined the scope of your essay.	-
1 10	I felt that this defined the subject of your work very well and clearly outlined the scope of your essay.	-
2 0	This appears to be absent!	-
	There are some major issues that you have not addressed.	-

Fig. 6 Example NUMBERS Worksheet in Criterion Mode

Numbers		Mark after penalty /100	Auto Mark /100	Change Max. Number of Criteria Per Student	4			
%	Name			Personal Comments	1	2	3	4
24	CATHERINE BAKER JOANNE BALEED	24	42		2	6	3	0
52	AHMED BASSI		52	Ahmed, this was generally a good essay, although you failed to mention Boyle's publication, "The Sceptical Chemist". This manuscript has an important role in the development of chemistry. To many scholars, it is responsible for the rapid decline in the practice of alchemy after the end of the 1600's.	8	4	6	4
61	RAMANDEEP BERAH AMIR BULLOCK		61		6	7	7	0
64	JULIE CAMERON ALASTAIR CAVE	64	70		4	9	7	3
55	MIN CHAKRABOTHY		55		8	4	7	5

Fig. 7: Assessment profiles from two first year undergraduate chemistry practicals.

Standard Comment (abridged)	% of students with this standard comment (7/10/99)	% of students with this standard comment (23/9/99)
Lab. reports should be presented in the following order; introduction, method, results, conclusion.	60	36
Your graph axis is not numbered correctly. Always select chart type XY SCATTER when using MS Excel.	36	2
Incorrect units/units not stated clearly.	98	74
Your graph should display the individual data points, in addition to a line.	34	2
Your best fit line is incorrect and/or absent.	91	31
Your graph title is unclear/incorrect or absent.	57	7
Your graph axis is not labelled correctly or is not labelled at all.	21	0