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## Feedback mechanisms: efficient and effective use of technology or a waste of time and effort?

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### **Abstract**

This paper compares the efficiency and effectiveness of using typed comments in the Grademark part of the Blackboard (Virtual Learning Environment) with audio feedback using Audacity software. Some 140 students in five tutorial groups completed two separate formative assignments in October and November 2011. For the initial assignment three groups received typed feedback and two audio. The feedback mechanisms were then reversed for the next assignment, three receiving audio and two typed. The time taken by staff to complete the marking and feedback was recorded in order to gauge the efficiency of providing feedback to large cohorts.

As would be expected, the efficiency of using both techniques improved as familiarity increased, the average marking time for each assignment being approximately 8 minutes for audio against 11 minutes for typed comments. This is obviously a potential benefit to staff but feedback is only useful if it is used by the students. The effectiveness of the feedback from the students' perspective was therefore investigated using a questionnaire survey.

Results were obtained from 66 respondents to an initial survey. 76% found audio feedback easy to follow compared with 88% for typed. Typed comments were viewed by 83% as highlighting errors/mistakes against 75% for audio. Both methods scored similar marks for indicating positive aspects 73% (audio) and 72% (typed). Arguably for feedback to be effective it requires an element of feed-forward and audio scored more highly with 70% against 61% for typed comments. The overall preference saw 38% favouring audio against 48% for typed with 14% stating no preference.

Additional information on students' preferred learning styles was also recorded but was found to have no influence on feedback preference.

## **Keywords**

Feedback, audio, mp3, Grademark, learning

### **I. Introduction**

This paper stems from an on-going project examining the use of different methods of providing feedback to undergraduate students on the Year 0 Extended Degree programme at the University of Huddersfield. This paper compares the efficiency and effectiveness of using typed comments in Grademark (part of the Blackboard Virtual Learning Environment) with audio feedback.

The Extended Degree acts as year zero of our science degree programmes including chemistry, Biology, food & nutrition and pharmacy. It is designed to provide a basic understanding of the four main components of science; chemistry, biology, physics and mathematics. The objective is to develop students who will be able to cope with the intellectual demands of studying independently at degree level. The course intake incorporates those who have studied A-levels including non-science subjects and those who have various “vocational” qualifications alongside those with specific work experience. All applicants are subject to an entrance test and an interview.

Feedback is now an integral component of the Higher Education experience and something which when done well can enhance the learning opportunities of participants (Gibbs & Simpson, 2004). However, incorporation within the National Students Survey has arguably elevated its prominence for academics and managers to new heights. The increased prominence of feedback comes at a time of increased student enrolments and in some institutions a reduced Staff Student Ratio (SSR). The net effect is to challenge staff to do more with less! Efficiency and effectiveness are the key principles which underpin many teaching activities especially assessments. Colleagues faced with increasing class size, and limited turn-around times may reassess their assessment strategies by replacing assessments which are time consuming to mark with alternatives including Multiple Choice Questions. There are benefits to such tests including rapid grading and feedback, but they are by no means ideal for certain subjects and are poor vehicles for development of specific writing skills. For those colleagues who wish to retain their current assessment strategies the challenge is to undertake the marking as quickly and as efficiently as possible.

Previous studies, particularly Merry and Orsmond (2008), have examined the use of audio feedback to undergraduates. The mechanisms may vary but the overall aim is to provide meaningful feedback in a format which students can engage with. Merry and Orsmond used Audacity software to deliver feedback to students studying Biological Sciences. The very limited number of participants (n=15) reduced the opportunity for meaningful statistical analysis; however, their findings pointed to potential benefits for both staff and students from using audio feedback mechanisms.

## **2. Methodology**

Students enrolled on the SPX1005 Foundation Maths module were participants in this exercise which was to evaluate the benefits to them of different feedback mechanisms.

Some 140 students in five tutorial groups completed two separate formative assignments in October and November 2011. For the initial assignment, three groups received typed feedback and two audio. The feedback mechanisms were then reversed for the next assignment, three receiving audio and two typed. The time taken by staff to complete the marking and feedback was recorded in order to gauge the efficiency of providing feedback to large cohorts.

The first assignment required the production of a CV in a specific format and a short essay (500 words) on why they were on the course. This provided information on each student's motivation as well as testing their competence in basic word processing. Additional information on those who may have specific learning support needs was also to be identified. The second assignment was a 1000 word data analysis report which centred on data recorded by the students' in-class and required adherence to a specific report format.

Both these formative assignments were uploaded onto Blackboard and run through Turnitin similarity detection software. Assignment 2 was marked anonymously. Feedback comments were typed on scripts using the Grademark software which allows specific comments to be typed onto a script or the facility to use "drag and drop" for more generic comments. Students can also view the specific marking rubric. Audio feedback was recorded after marking the assignment using the Audacity software which was then saved in mp3 format for uploading onto Blackboard's Grade Centre. Students could access the marking rubric on Blackboard but received specific feedback in audio format. Audacity is an open source application and is freely available, but any audio recording software would work well here.

Some difficulties were encountered in uploading the feedback for assignment 2 because the option for Anonymous Marking in Turnitin had been applied. With this facility enabled, students' grades are not reported in the Blackboard Grade Centre until the "post date" at which scores and GradeMark feedback is released to students. This meant that the mp3 file containing feedback could not be attached to the student's submission at the time of marking as it was not possible to identify which piece of work it related to.

To overcome this difficulty, a modified workflow was adopted. After recording the feedback in Audacity, it was saved with a filename which reflected the Paper ID which Turnitin had assigned to the student's submission. After the post date, when the identity of the author of each piece of work had been revealed and was available in the Grade Centre, it was possible to go into each submission and attach the relevant file, after manually matching up the Paper ID with the filenames. This was a time consuming task, and this modified workflow was far from satisfactory because of the increased amount of staff time required and the inevitable delay students experienced in being able to receive feedback on their work.

It had not been appropriate to assess assignment 1 anonymously due to the nature of a CV which has identifying information about the student, so this problem had not been encountered for the previous assignment.

In order to ascertain the effectiveness of feedback, three tutorial groups were selected to take part in a questionnaire based survey. The design of the survey focused on identifying which aspects of feedback the students found beneficial and which they preferred. It comprised a very simple series of questions:

- Was it easy to follow?
- Highlighted flaws in my overall approach to the assignment
- Identified specific errors
- Indicated positive aspects to my work
- Provided sufficient information on how to improve my performance in future assignments (feed forward)
- I have not looked at the feedback only the mark

Students also had the opportunity to suggest ways in which the delivery of feedback could be improved.

Additional information on the students' "learning style" was also requested. All students had been subject to exposure to learning styles as part of the SPX1008 Science Skills module which set them the task of evaluating the suitability of learning styles to their academic development in Higher Education. The use of learning styles theory is widely adopted at sub-degree level in schools and colleges but has received less effusive support in Higher Education. In particular Coffield *et al.*, (2004) and Pashler *et al.* (2009) have questioned the appropriateness for study in Higher Education. Work undertaken by Ellis & Allan (2008) established that students on the Extended Degree Route saw little or no relevance of learning styles to their education. Many responded that they used strategies rather than having one single stylistic preference. Despite this, proponents of learning styles argue that greater understanding can be achieved if information is provided in a form which students find most appropriate to their needs.

Results were collated and subject to statistical analysis using chi-square in SPSS.

### 3. Results

The results for the time taken to assess the assignments using Turnitin (Grademark) and Audacity software (Audio) are set out in Table 1 below.

<b>ASSIGNMENT 1</b>	<b>TYPED (MIN)</b>	<b>AUDIO (MIN)</b>
<b>MIN-MAX</b>	<b>6-19</b>	<b>7-10</b>
<b>MEAN (MEDIAN)</b>	<b>11 (11)</b>	<b>8 (8)</b>
<b>ASSIGNMENT 2</b>	<b>TYPED (MIN)</b>	<b>AUDIO (MIN)</b>
<b>MIN-MAX</b>	<b>9-14</b>	<b>7-12</b>
<b>MEAN</b>	<b>12 (12)</b>	<b>10 (10)</b>

**Table 1: Time taken to mark Assignments 1 and 2 SPX1005 Maths & IT module, Extended Degree route**

The results from the evaluation questionnaires which were completed by students is set out in table 2 below.

	TYPED (GRADEMARK)		AUDIO	
	RESPONSES	%	RESPONSES	%
EASY TO FOLLOW	58/66	88	50/66	76
HIGHLIGHTED FLAWS IN MY OVERALL APPROACH TO THE ASSIGNMENT	50/66	76	48/66	73
INDICATED SPECIFIC ERRORS	55/66	83	49/66	75
INDICATED POSITIVE ASPECTS TO MY WORK	47/66	72	48/66	73
FEED FORWARD	40/66	61	46/66	70
I HAVE NOT LOOKED AT THE FEEDBACK, ONLY THE MARK	3/66	-5	5/66	5
OVERALL PREFERENCE	48/66	48	25/66	38

**Table No 2 Results from questionnaire survey comparing student preferences for types of feedback. SPXI005 Maths & IT module, Extended Degree route.**

#### 4. Discussion

The time invested in marking both assignments is considerable. It represents nearly 50 hours of marking or 6 working days. Such investment has to have academic/educational merit.

As would be expected, the efficiency of using both techniques improved as familiarity with the assignments and technology increased, the average marking time for assignment 1 being approximately 8 minutes for audio against 11 minutes for typed comments. Assignment 2 produced averages of ~10 minutes for audio and ~12 minutes for typed. This is obviously a potential benefit to staff, but feedback is only useful if it is used by the students. The effectiveness of the feedback from the students' perspective was therefore investigated using a questionnaire survey.

Results were obtained from 66 respondents from three tutorial groups, representing a response rate of 76% (66/86). Statistical analysis using chi-square did identify comparatively small differences between responses and preferred methods of feedback. There are effectively two groupings or responses which are associated with the types of feedback.

Analysis indicates that the categories produced a certain element of association. Those who preferred typed feedback found it better than audio for four out of the six responses. There were statistically significant differences for 'Easy to Follow' ( $P < 0.05$ ), 'Forward Feedback' ( $p < 0.01$ ) 'Identification of Flaws' ( $p < 0.01$ ) and 'Identification of Errors' ( $p < 0.05$ ). In contrast, audio feedback was associated by advocates as being better for 'Forward Feedback' ( $p < 0.01$ ) and 'Identifying Errors' ( $p < 0.01$ ). These differences are comparatively small and should only be taken as general indicators of trends.

Additional information on students' preferred learning styles was also recorded and analysis indicated unsurprisingly that 62.5% of those students identifying themselves as audio learners preferred audio feedback. However, 31% of visual learners preferred audio, but in contrast 25% of audio learners preferred typed feedback. There was no statistically significant relationship between learning style and feedback preference. This is partly to do with the students being self-identifying and in some cases using various non-standard classifications of learning style which made any analysis extremely difficult.

The students' preferred method of feedback in terms of being easy to follow was for typed. However, the difference in scores between audio and typed is not statistically significant. The reason for this could be that typed comments are inserted directly where they are required within the text. In contrast, audio feedback needs to be linked to the specific section and is not easy to achieve, especially for the novice user of audio. Staff should be conscious that some students will access the feedback in isolation to their scripts/rubric and therefore fail to see certain connections. This could also distort the findings of any questionnaire survey.

Typed feedback also scored more highly for indicating specific errors. Again, this is not surprising given the traditional nature of typed feedback which in this case was inserted during the marking of a script. In contrast audio was recorded after reading the whole script and may take a more holistic view. Typed comments are also ideal for highlighting errors for example in nomenclature etc. Brown *et al.* (2003) also reported such findings in their study. The experience of this current project suggests that the more fluid nature of audio feedback does not lend itself to highlighting each individual error.

In terms of highlighting positive aspects to student work, both methods of feedback were judged to be equally effective. The ratings at 72% and 73% are very consistent and imply that either method can be used. Obviously the nature of the feedback determines how useful it is and that will be dependent on the individual member of staff's approach.

Arguably the most important aspect of feedback is "feed-forward" which enables students to take stock of comments and enable them to implement the lessons in future work. Merry and Orsmond (2008) highlight the potential for such comments to be largely generic and lacking specific direction. However, if appropriate attention is paid to the marking criteria, students should be able to identify areas where they have either met them to the satisfaction of the assessor or not. It could be argued that comments containing advice going forward (feed-forward) are somewhat generic as they deal with unspecified future activities. The key aspect of this is that students must take responsibility, reflect on the comments and ensure that areas of deficiencies are addressed before submitting further work.



The nature of how Turnitin (which was used for its rubric facility and to mark the work of those groups who were not provided with audio feedback) is integrated with the Blackboard VLE means that difficulties were encountered. The audio feedback was attached to the Blackboard Grade Centre's feedback facility, but this meant that when Turnitin's anonymous marking was enabled it was not possible to upload the feedback to the Blackboard Grade Centre and had to be undertaken post release date. Turnitin have announced to User Group meetings that they have ambitions to add audio feedback capabilities in the near future which should mitigate these problems (Howe, 2011).

A compatibility issue between Internet Explorer and Blackboard 9 has prevented audio feedback being downloaded. Directing students to use an alternative browser such as Mozilla Firefox has proved to be a suitable workaround.

The audio files produced were between 1 and 6MB. It was found that uploading these from a domestic asymmetrical broadband connection was a slow process. Applying compression to the recordings to reduce the upload time and thus the download time for students may be beneficial, but the benefits of this would need to be balanced against the time taken to compress the file and ensuring that the sound quality remained acceptable.

Students identified the tone of voice used as being a potential issue on how they perceived their feedback. Four students made specific comments "sounded cross" and could "hear my disappointment". This represents ~6% of respondents which is low, however, it is something which needs to be considered when using audio-feedback. In this exercise the content/flow of the feedback evolved as experience was gained, progressing from a somewhat disjointed initial delivery, to a much tighter more focused commentary in later pieces.

Suggestions on improvement were sought from students and it transpires that they would like a combination of typed/audio feedback. This has some merit as when marking work using audio the assessor needs some prompts from the text, using typed comments (especially pre-prepared Quick Mark comments) in Grademark can act as an *aide memoire*.

## **5. Recommendations**

- Use a combination of typed (*aide memoire*) and audio commentary
- Follow the marking criteria in the commentary and refer directly to it so that students can identify the link between their work and the marking criteria.
- Take into consideration tone of voice and pace of delivery.

## 6. Overall

This paper has examined the efficiency and effectiveness of providing feedback in audio format compared with the more traditional typed comments in Grademark. The overall findings are that students found both mechanisms, to be effective ways to provide comments on their work. There are issues with both mechanisms, but students have nevertheless engaged with the feedback irrespective of their preference. The fact that students found both forms of feedback beneficial is an important finding. From the staff's perspective, using audio-feedback was quicker which has an obvious benefit when assessing large groups. The other benefit is that the efficiency gains from using new technology can allow current assessment strategies to continue. Assignments which develop higher order writing skills need not be changed or replaced.

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