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Abstract

Feedback has been highlighted as the most powerful influence on student achievement, but students are often less satisfied with feedback than with other aspects of the student experience. It is hence important that ways of offering feedback are found that are useful both for improving learning and for gaining student satisfaction. This ongoing study was designed to explore and to improve feedback in a variety of differing contexts, two of which are reported here: i) audio feedback on a first year undergraduate written assignment in Geography (product-oriented feedback); and ii) video feedback from ongoing laboratory sessions with first-year Biosciences students (process-oriented feedback). These contexts have been selected as offering different ways of working and for highlighting a number of issues and areas for further development. Student and staff views have been gained via surveys, focus groups, individual interviews and 'stimulated recall' sessions. Findings suggest that students have high expectations in relation to feedback; many anticipate the kinds of individual face-to-face interaction they experienced in school and are not easily satisfied by other ways of working. In addition, offering audio or video feedback that is supportive to learning in both affective and cognitive terms is not necessarily easy. In the context of written assignments there is still much to be learned about appropriateness of length, tone, the register of language, the balance between praise and criticism, and the best contexts and timing for audio feedback. In the context of large classes for laboratory sessions, further research is needed on how lecturers and demonstrators can give ongoing feedback that is useful when captured for replay in video form, and also about how effective video taken in class might be then used for training purposes in order to enable student demonstrators to be more effective and knowledgeable when offering feedback to students.

0207 Audio and screen visual feedback to support student learning

Background

There has recently been considerable interest in using audio for feedback in UK higher education (see, for example, Rotherham, 2008). Assessment and in particular feedback, are generally considered key factors in supporting the student learning experience and in gaining student satisfaction, and feedback has been highlighted as the most powerful influence on student achievement (Hattie, 1987; Black & Wiliam, 1998). Yet the UK National Student Survey has outlined over several years that this is an area in which students are often least satisfied. It is hence important that ways of offering feedback are found that are useful both for improving learning and for gaining student satisfaction.

In 1992, Ramsden suggested that technology is changing the nature of university teaching, but time has shown that this does not necessarily happen easily and that technology cannot, of itself, promote enhanced learning. George (2002) considers it 'an enabler, not a solution' and McGettrick et al (2004) believe that e-learning remains one of the 'grand challenges' for education. Laurillard (2002) helpfully argues that any study of new approaches to technology should fit firmly within sound pedagogic principles and practices, and Stiles (undated) suggests that no sustainable change will happen unless traditional pedagogy is adapted for more active approaches to learning.

In the context of audio feedback, rhetoric abounds: how much better to have 'the tone of voice, emphasis on particular words, the effective use of pauses, and the warmth of an encouraging tone when critical comments need to be made' (Race, 2008). The new interest in aural feedback has led to a number of small-scale practitioner studies, and they do suggest that intonation counts; also that digital feedback suits today's student (Denton et al, 2007; Bridge and Appleyard, 2007); that video feedback is preferred; that immediate spoken observations on students' practical sessions can serve as useful feedback (Epstein et al, 2002); that aural feedback tends to be more extensive, easier to access and understand, and with more depth (Merry et al, 2007; Gomez, 2008; Rotherham, 2008); and that it enables students to address their overall learning development (Ribchester et al, 2007). Nortcliffe and Middleton (2007) describe an analogue-recorded feedback study wherein audio impacted on self-reflection and action, was preferred by students, and was less stressful and time consuming for staff; yet their most recent digital work warns that audio feedback does not necessarily support achievement; and Irons (2008) argues that using technology for formative feedback 'is not a cheap or easy option'.

Aims and research design

The research described in this paper emanates from a one year, ongoing, Higher Education Authority funded project exploring the use of existing and emerging technologies to improve feedback and to promote a feed-forward culture wherein students listen and pay attention to feedback so as to improve their performance. The project captured digital audio and screen visual feedback within a number of contexts in three subject

areas—biosciences, geography, and medicine. National and institutional-based surveys all suggested a certain level of dissatisfaction with feedback in these subject areas, especially in relation to other areas of University provision. In addition, these three subject areas offered a range of different contexts in which feedback is important to student learning, from feedback on student products such as written assignments and presentations, to feedback on ongoing processes of learning, such as during laboratory sessions or practical fieldwork, or to promote reflective professional development on learning in the workplace (as in a hospital ward).

The overall aims of the project are as follows:

- To use existing and emerging technologies to improve feedback between tutor and student.
- To refine understanding of the impact of technology-enhanced feedback methods on staff and students in order to inform future practice.
- To encourage academics to respond to key factors in effective feedback in order to promote a culture of 'feed-forward' and engagement in feedback by students.
- To test out specific research methodologies, such as 'stimulated recall'.
- To provide a collection of resources and items for dissemination that can inform research and practice both locally and within the sector more broadly.

The research methodology in each selected context is slightly different, dictated in part by the constraints of the one year duration of the project, but also specifically due to the differences between contexts and the ways of working of academic staff involved. It was deemed important to the success of the project that each subject area should be supported in gaining data that would be useful to that context and that would enhance what staff want to know and to achieve. Overall data-collection includes student surveys, focus groups, audio and video data, and individual interviews and 'stimulated recall' sessions with academic staff.

This paper provides insights into two of the contexts studied, highlighting differences in ways of working and in the nature of outcomes and recommendations for future practice:

1. Audio feedback on a written assignment offered to a sample of 73 first-year geography undergraduates studying a first-semester introductory module on earth system science (product-oriented feedback).
2. Video providing ongoing feedback from laboratory sessions and made available to 180 first-year Biosciences students (process-oriented feedback).

In geography, hearsay evidence suggested that students do not give consideration to written feedback on assignments, do not carefully read points made, and do not use it for developing their learning. It was anticipated that audio feedback might be more detailed and helpful to learning. In Biosciences, staff similarly suggested that students in laboratory settings do not pay detailed attention to the extensive verbal feedback they gain in this context, and that laboratory feedback is not necessarily remembered or heeded. In particular, academic staff suggested that students lack awareness of when they are receiving feedback, especially because it is transitory and not captured, and that video feedback might support students in recognising the value of class feedback.

Each of these contexts is outlined, in turn, below.

Audio feedback in geography

The context

In geography, there was an interest in using and evaluating audio feedback for written assignments in order to highlight and help students to become aware of the relationship of feedback to future assessed work (i.e. feedback as feed-forward). Each student was required to submit a 1500-word written assignment at the end of the fourth week of degree study, having been given detailed guidelines on assignment writing and on the assessment criteria. Detailed audio feedback was offered via MP3 file, alongside a written feedback form with a grade and brief summary, and short comments were also written on the actual piece of work. Feedback was offered via MP3 audio files. All feedback followed the same format, with the mark for the student being given first along with its relationship to the grade criteria and descriptions; this was followed by general positive feedback comments and then a detailed analysis of the essay with constructive criticism on where it was not so good and exactly what was needed to improve. At the end of each file, a general summary comment was provided. The accompanying written feedback sheet contained a grade, space to comment on three good and three weaker aspects of the essay, and a space for the student to later write about one thing that they have done to improve as a result of the essay feedback (to encourage the concept of 'feed-forward').

After both feedback and assignments had been returned, a short, paper-based, retrospective questionnaire was used to gain quantitative and qualitative data on student views of the process. Two focus group sessions — one with a physical geography group and one with human geographers — allowed for more in-depth discussion about assessment in general. Informal individual interviews with all focus group students enabled deeper discussion. Six months later, all students were asked (via email questions) to reflect back on the experience of gaining audio feedback.

Questionnaire results

Survey results (with a return rate of 71%) highlighted student views.

- The majority of students listened at least once, most students listened to it twice and some up to four or five times.
- In comparing audio with the written feedback, the majority of students considered both audio and written feedback to be either useful or very useful (82% and 84% respectively), although about 20% did not find one or the other, or both, to be helpful.
- The main advantage of audio feedback was considered to be the greater detail and depth (54%), and also that it was clearer and easier to understand. Perceived disadvantages focused in the main on difficulty in finding the point in the assignment to which the feedback related. Only one student reported difficulties with the technology.
- In contrast to the suggestion that students like the 'friendly tone of voice' (*Race, 2008*), some students found it a more negative experience, and were not always attracted to the tone.
- Very few students thought it was an advantage to have an audio format because it was easy to listen to, easy to pause, or easy to access on their computer in future.
- Equally few thought that it could be misheard, or that it would be difficult to listen to regularly, could be deleted by accident, or that it would be difficult to listen to regularly.
- Over half the sample considered the main advantages of feedback written onto their assignments to be that it related to specific parts of the essay, as well as being easy to refer back to. However, one of the main problems with written feedback was in the legibility of handwriting (20%).
- The majority of students thought they would achieve 'somewhat better'

(76%) and 14% 'much better' as an outcome of their feedback. Ten percent suggested that the feedback would not have an impact on their future performance.

- 76% of students wanted face to face feedback from a tutor in addition to other forms of feedback. Over half felt that feedback from peers would be to some degree useful.
- When asked to reflect on the audio feedback at the end of their first year, those students who responded referred to it still as having been a negative or upsetting experience, though all agreed that it had helped them to improve.

Focus group discussion: students

Two focus group sessions, with six students overall, highlighted that experiences of previous class sizes in schools and colleges had varied from between 3 and 20 (hence they were not used to large groups), and essays had always been marked traditionally with the opportunity readily available for students to talk to the teachers should they want further help. None had ever received feedback in the form of an MP3 file before and, although the technology posed no problems, they had found it a shock as they did not know they would be receiving feedback in this way. All students commented that, as it was their first essay, they had not known what to expect in terms of university-style feedback, that it was different from school and that it was a jump to university standards. None had expected to fail or just scrape a pass, especially having achieved good A Level grades. (Many students did not perform well in this assignment: overall grades ranged from 10% to 75%, with a mean of 46%). However, none of the students in the focus group had looked at the marking criteria, despite frequent requests to do so. All considered that their feedback focused on the negative rather than the positive and they did not like some of the terminology used, perceiving it to be very negative, as was the tone of voice. One student stated that it was their first essay at a time when they were trying to adjust to living away from home and making new friends, and that this made any negative feedback more difficult to cope with. All would have preferred face-to-face feedback.

All reported gaining better marks since this first assignment. They had all later found that relating their grade to the marking criteria had helped them to understand what exactly was meant by these criteria. They acknowledged that the lecturer had obviously spent an enormous amount of time giving them detailed feedback and, after the focus group discussion, all stated that they would go and listen to the feedback again to actually learn from it. They also suggested they would be happy to get more audio feedback, as long as they also received written comments.

Teacher reflection: stimulated recall

The stimulated recall session had two main aims:

- To allow the lecturer to explain his thought processes as he had recorded the MP3 files for the students;
- To allow the lecturer to hear himself and reflect on how the students will have responded to his comments, and whether there is room for improvement.

Two examples of audio feedback were used for the stimulated recall exercise—one to highlight feedback on a very poor assignment and one for an average assignment. Several excerpts from the audio feedback were played at intervals and the lecturer was asked to comment reflectively on the rationale and appropriateness of his feedback statements. He stated that the structure of the feedback had '*sort of evolved*' initially, relating to the feedback sheet, giving the mark ('*the thing they are most interested in*') and then the justification. He reported trying to make the link between performance and mark very clear by referring to the marking criteria. He also recognised

that he had felt frustrated that he had told the students exactly what they needed to follow to achieve a good mark and that they had not made use of this information, meaning that the same points continually had to be pointed out as weaknesses in the assignments. He immediately picked up on the use of what he now considered to be inappropriate language and terminology, which he could avoid in future. He explained that he purposely read aloud the comments he had written on students' essays because he knew it is a common criticism that students cannot read lecturer's writing. He felt that reading it out loud reinforced comments to help the student, and he also believed that the audio and the essay need to be gone through together, not studied in isolation.

He considered that he gave a very detailed analysis, and hoped from a student's perspective that the points would have been clear as they related to evidence on the essay. He recognised that some comments might not have been taken in the same way in a podcast as they might have been in the face-to-face context, especially with students direct from school. In some instances words were repeated and emphasized, such as '*not relevant*', to be the equivalent of underlining on the essay text, which may not have come across as intended. The lecturer accepted that his feedback could be perceived as negative, although he reinforced that dealing with realistic feedback is a necessary experience in ensuring that students adapt to the standards required at university. Overall, however, the stimulated recall session persuaded him that he would make changes in the style and organisation of audio feedback in future.

Screen visual feedback in biosciences

The context
As outlined above, the context for the study of feedback in biosciences was very different. In order to gauge student views on feedback within laboratory settings, a questionnaire survey was designed in collaboration with academic staff in microbiology. It was hoped that the survey would enable students to become aware of the different kinds of feedback they receive and the various situations within which they receive it. This latter factor was considered of particular importance given larger classes than in previous years and the importance of ensuring that students feel satisfied with their feedback experiences. In addition, ongoing verbal feedback between the lecturer and students, and demonstrators and students, was videoed during laboratory sessions on a first year undergraduate course with 180 students, 1 lecturer, 10 demonstrators and one graduate teaching assistant. Additionally, 2 workshop sessions with third year undergraduates with a lecturer, assistant and 35 students were videoed within microbiology. This material was then available for creating edited exemplars of practice that could be used in future for training purposes. Two third year undergraduate revision feedback sessions were also produced as film clips, and shown in the laboratory for students to use as a revision aid.

Questionnaire results
The short, anonymous questionnaire allowed for quantitative and qualitative data collection and was distributed to first and second year Bioscience students during second semester laboratory classes — that is, all students had already experienced one semester of laboratory sessions in their current academic year. A total of 141 students completed the questionnaire (45%), 55% of these being from Year 1. Only six students were over 25. Most are studying for the BSc in Biological Science (59%), with others specialising in biological and medicinal chemistry, human biosciences, molecular biology or biology and animal behaviour.

Responses outlined student perceptions.

- The majority of students perceived they had received verbal feedback in a variety of ways in the laboratory setting, and had gained some kind of feedback within every practical, although one student stated that they had not received any.
- **T**he majority of students considered feedback from lecturers, demonstrators and other students to be a positive experience, although there was the occasional exception.
- 80% stated that they received feedback every practical session from the lecturer to the whole class. However, this leaves 20% of students who do not perceive they gain whole class feedback on a regular basis, or who do not interpret whole class interaction as 'feedback'.
- The lecturer was not considered to give individual feedback on such a frequent basis (understandably, given the large student numbers and the size and layout of the laboratory), with 5% responding that they gained individual feedback every session, 22% every other session, 32% on occasion and 39% stating that they never received individual feedback.
- 86% of students agreed or strongly agreed that lecturer feedback to the whole class was a positive experience, but 19% of students were 'unsure' about the nature of the lecturer feedback when experienced individually, and 12% when with the whole class.
- Demonstrators were also perceived key to feedback, with 84% of students suggesting they were offered individual feedback at least every, or every other, practical; and 79% considering that they receive feedback as part of a group equally frequently. Only 4% claim not to receive individual feedback from demonstrators, and 11% not within their group.
- Demonstrator feedback to the group and to individuals was considered positive (84% and 90% respectively), with 42% strongly agreeing that demonstrator feedback to them as individuals was a positive experience.
- Over 70% of students suggested they gained feedback from their peers on a regular basis, often every session. Seventy three percent thought peer feedback to be positive, although a quarter of the sample were unsure about this.
- Almost all students considered that feedback in the laboratory context included 'questioning to make you think'.
- Negative comments regarding demonstrators covered the perceived lack of available demonstrators, their lack of understanding, and the fact that they did/could not answer student
- There were varying views regarding approachability of lecturers for additional feedback, with first years being concerned at wasting the teacher's time or 'wanting to impress' rather than admit a lack of understanding.
- One third of students reported liking verbal feedback, whereas a third preferred written.
- Most students thought that verbal (recorded audio) feedback might be useful for other forms of work such as essays, although 18% percent specifically did not agree with this.
- A third consider constructive criticism and suggestions for improvement as the most helpful. With others liking '*questions*' or '*support for identifying errors*' or '*being pointed in right direction*' Some students said '*any feedback is helpful*' or '*all feedback*'. Both verbal and written feedback were considered important, but ideally on a one-to-one basis. Twenty percent wanted individual face to face feedback and believed this to be more helpful than anything else.

In relation to the issue of concern—whether students recognise ongoing lab processes as offering feedback—all students agreed to expecting feedback in laboratory settings; the majority felt that feedback was clear and understandable; and most thought that verbal feedback was immediate and

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timely within laboratory sessions, although more first year students (14%) disagreed or strongly disagreed with this compared to second year students (5%). The majority of students agreed to some extent that verbal feedback within laboratory settings is crucial to degree performance although more second year students (30%) disagreed in comparison to first years (20%). Further, the majority (76%) disagreed with the statement 'I do not count verbal feedback in laboratory settings as feedback', indicating that most agree that laboratory settings *do* provide them with feedback.

Focus group discussion: student, demonstrator, and graduate teaching assistant perceptions

Twenty-two students were interviewed about their views on feedback during the laboratory sessions. All felt that feedback during the sessions had been good with responses varying between "*quite good*" and "*excellent*". The feedback was said to be "*helpful*" with "*good explanation*" from both the lecturer and the demonstrators. The students reported the laboratory sessions as being well organised with good instruction sheets, plenty of demonstrators around and clear relevance to the lectures, with demonstrators continually asking questions. At the point of writing this paper, feedback has not been gained on first year responses to having video available, though all this group thought that video clips showing skills and information from the laboratory sessions on the web would be helpful for revision and better understanding. Third year students all reported that video of their feedback for revision sessions had been helpful; for example:

- 'Cannot write everything down in detail'.
- 'Want to be looking and writing at the same time in the laboratory'.
- 'Can get bored just reading notes, more interesting on video with animation and intonation'.
- 'You have time to hear other people's questions and learn from each other'.
- 'It is possible to remember what we hear and see more than just reading something'.

Demonstrators in laboratory sessions suggested they had learnt a number of skills, including listening properly to students, problem solving, being helpful, patience, making students think and having confidence in what they are doing: "*You have to be really good at explanation and have really good knowledge.* All demonstrators thought that the quality of feedback within the sessions was good for the students, made easier by the fact that it is a topic which tends to be well known about and understood by demonstrators. Three demonstrators felt that they would have appreciated briefing sessions before the day and that they are "*a little bit thrown in at the deep end, which then makes it frustrating when students say negative things….and you want to provide and do a good job.*"

The Graduate teaching assistant suggested that standards were rising in the first year and that students were motivated and interested in practicals. However, she was concerned regarding both her own and the demonstrator's training and that what she received was not particularly helpful and that she had learnt the most from helping to teach students. She highlights: '*demonstrator briefing sessions take place prior to the practical, sometimes just half an hour before the practical session begins, which can cause problems if the subject area is very different to a demonstrator's background, so a bit more time to gain some understanding with the help of the practical co-ordinator would help, rather than in some cases learning new techniques, etc, just before we're supposed to teach … I know last year there were some problems with people saying the demonstrators weren't very good and I know some of us felt like we weren't given a good enough briefing so it is like we were getting the blame but really we didn't understand the practical.*' The School had in fact already recognised this as an issue, and it is anticipated that video from the project will be drawn into a more detailed training package for demonstrators in future. The idea of

putting videos of laboratory skills such as pipetting onto the Virtual Learning Environment for both demonstrators and students to access was thought of as extremely helpful, even "*a brilliant idea*" by all demonstrators.

Discussion and recommendations

Overall, it seems that there is considerable potential in using audio and screen visual feedback to support learning in different ways in the two different contexts described. A major benefit of any kind of audio and video feedback is that students report not needing to struggle with illegible handwriting, at least suggesting that forms of technology-supported feedback should become a priority. In general terms, students strongly value individual, face-to-face feedback—especially those who come directly from the highly supportive contexts whereby feedback is offered in secondary schooling. The change from school to university seemed to create difficulties for some students and it may be that audio-feedback on the first assignment was somewhat difficult for some students to deal with, especially as they seemed unprepared for this. Equally, some students seemed unprepared for the need to work without constant attention and feedback in large laboratories, More research is needed into whether, for example, a first assignment is a good time for setting different expectations and new ways of working, and to what extent—and how—students can best be prepared for new experiences. Both cases described above suggest that ensuring that students have realistic expectations of mass higher education is a crucial factor, and both suggested that students are better equipped to deal with this as they move through their first year and into the second year. Students are certainly not averse to audio and video feedback: indeed they might enjoy and value it if the content and circumstances are appropriate to their needs. However, the fact that some Biosciences students (even if a small percentage) report not receiving whole class or group feedback is of concern, and continues to beg the question: 'what do students perceive to be feedback?'

A number of factors highlighted by this study are worthy of evaluation and further research. For example, there needs to be further work on what might be the optimum time length for this kind of feedback, whether listened to or watched; on the style that students appreciate, and on the balance of negative to positive feedback—so as to ensure affective as well as cognitive benefits. To accompany this, academics may need to explore the register of language that is most appropriate to spoken feedback, especially as this is an area wherein they are not well rehearsed. It may be that audio feedback is different in style both to written feedback and to the more colloquial language often used in face-to-face interaction. The question of what is appropriate, or high-quality, feedback is not always easy, but practical outputs from the project, such as a good practice guide to assignment feedback, or video clips showing examples of good practice between the lecturer, demonstrators and students, may enable development of feedback skills and enhanced practice. More research would be useful on whether listening to feedback supports learning, or is better attended to, or better remembered, than reading written comments, and whether this applies to some students more than others

Overall, students did think that audio or screen visual feedback would enable them to improve future performance, but i) it is not clear whether this performance is supported better by audio feedback than by written; ii) whether students will regularly listen more readily and more repeatedly to audio and video feedback than they would written; and iii) any feedback will not improve future performance unless students are asked to attend to it and to specifically draw on that feedback in future activity.

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