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The Use of Audio Feedback to Develop Deeper Learning in Business Education

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Abstract

It is widely regarded that providing students with feedback is central to their learning (Biggs & Tang, 2007). Traditionally feedback has been given to students either in person or in writing, however, due to advancements in technology, audio is now employed by a small minority of educators in Higher Education (Ice et al., 2007; Merry & Orsmond, 2007; Middleton, 2007; Nortcliffe & Middleton, 2007). Audio feedback is a feedback mechanism whereby feedback is given to students via mp3. To date, research on audio feedback has focused on students' perceptions of audio as a feedback mechanism, and its ability to increase students' sense of involvement. However this paper adds to this stream of research by exploring the manner in which students engage with audio feedback. Using data gathered from Business students in the Dublin Institute of Technology, Ireland, this paper explores how students evaluate audio feedback as a method through which to improve their academic performance. It extends current research by examining students' overall perceptions of audio feedback while also examining whether gender and course level has an impact on perceptions. Findings indicate that while no differences exist between male and female students, significant differences are found between postgraduate and undergraduate students. Age related differences are also explored as well as the number of times students listened to the audio feedback. Furthermore, qualitative

analysis of a number of open-ended questions is also discussed. The paper concludes by providing recommendations to practitioners on the use of audio feedback.

Introduction

Students are highly adept technologically and it is imperative that we keep up to date with these developments. To many educators, technological advancements are daunting, however, we must overcome these phobias, as technology is a key method through which we can differentiate ourselves from competitors (Benbunan-Fich et al., 2001). More importantly, technology is a means through which we can deepen student's learning and make the experience more enjoyable and varied. It is widely accepted that educational technology enhances learning and provides students with the skills needed for their future careers (Clarke, Flaherty, & Mottner, 2001). The positive outcomes associated with the use of technology in the classroom are numerous and include increased teaching and learning efficiencies (Hunt, Eagle & Kitchen, 2004) improved teamwork and participation (Sweeney & Ingram, 2001). Despite the positive effects seen, students sometimes do not see added benefits associated with technological tools (Brown-McCabe & Meuter, 2011). Furthermore, from a teaching perspective, staff must continually keep up to date with developments which can further burden their already busy schedules (Debuse & Lawley, 2011). However, technology should not be viewed in this way, it should be embraced as it provides countless opportunities to innovate, add variety, create efficiencies and make the learning experience more meaningful to the student. One means through which technology can be used to improve the learning experience is to provide students with feedback in the form of audio.

In recent years audio feedback has gained increased interest as a means through which to disseminate feedback to students. This growth can be attributed to the fact that audio allows

educators to provide feedback in a timely, relevant and meaningful way (Rotheram, 2007). Research on audio feedback is relatively limited, however to date, tentative research has examined audio feedback's effect on student satisfaction, perceived learning, improved instructor interaction (Ice et al., 2007). Preliminary research by Merry and Orsmond (2007) has also explored students' perceptions of it as a feedback mechanism (Merry & Orsmond, 2007). The current study seeks to extend this line of research by examining students' responses to audio feedback while at the same time examining whether differences exist between different types of student. The paper is organized as follows: Firstly, it discusses formative feedback in general which is followed by a discussion of the research to date on audio feedback. The paper then outlines the method and data analyses and concludes with a discussion of the findings and recommendations for future research.

Formative Feedback

Formative feedback is feedback given to students with the intention of improving their performance (Black & William, 2003) and is widely accepted as being key to students' learning (Biggs & Tang, 2007; Carless, 2006; Race, 2007). It typically involves giving detailed information to students on how they can better their grades and differs significantly from summative feedback which is where the student receives a final grade with no indication as to how they may improve their work. The general consensus is that formative feedback is a positive measure (Biggs, 1998) with research in this area focused on its effects, some of which include student achievement gains, increased intrinsic motivation and increased self-efficacy (Yorke, 2003). While many are cognizant of the benefits of formative feedback to students' learning, the actual implementation of feedback varies considerably from one educator to the next. With a greater need for assessment methods that enhance student-centered learning (Nicol & Macfarlane-Dick, 2006), one such means through which to achieve this is to provide students with feedback in the form of audio.

In the move from a teacher-centered, autocratic higher educational system towards a student-centered, social constructivist paradigm, there has been an embracement of student-centered teaching methodologies that develop students' self-regulation and intrinsic motivation. The increased emphasis on formative feedback is one such change that is receiving increased attention in the education literature (Higgins, Black and William, 1998; Hartley & Skelton, 2002). Definitions of formative feedback generally emphasize how it provides information about performance (Yorke, 2003) with its primary benefit to accelerate student learning (Nicol & Macfarlane-Dick, 2006). Race (2007, p. 15) elaborates on this, stating it is an element of the "journey of learning" from which students "learn from mistakes, remedy their deficiencies, and advance their learning." Formative feedback differs from summative which is typically used for grading students at the end of a teaching episode (Weaver, 2006).

A widely held view is that students are only motivated by marks; however, numerous studies have demonstrated how students greatly value comments by their teachers, lecturers or professors (Carless, 2006; Higgins, Hartley & Skelton, 2002; Weaver, 2006). Feedback is essential in highlighting for students where they need to improve and is useful in explaining gaps in their knowledge (Weaver, 2006). The quality of the feedback is of the utmost importance. Indeed, students commonly complaining of the irregularity with which they receive feedback, the brevity of comments and its lack of timeliness. One of the key issues for students is that comments do not recommend on how to improve, merely providing comments like "well done" or "more detail required". In definitional terms these types of comments are clearly feedback; however they are of little use to students. This may be partly attributed to the fact that professors/teachers have an implicit assumption that students understand the assessment requirements (Weaver, 2006). To overcome this, educators must first be explicit in communicating what is expected of students and then when providing feedback should relate a students' performance directly to these requirements.

Another common criticism from students is that feedback often concentrates on the negatives with little attention given to the positives. This will ultimately result in a demoralized and unmotivated student, thus negating the very purpose of formative feedback (Higgins, Hartley & Skelton, 2002). Related to this is a situation where teachers vary greatly in the level of detail given to students. This variation can occur from one teacher to the next, but also from student to student with teachers more likely to provide less detail to very poor and very strong students and much greater detail to "salvageable cases" (Higgins, Hartley & Skelton, 2002). Paradoxically, strong students who require feedback the least, are often the ones who seek out feedback, whereas poorer students tend to adopt an almost defeatist attitude assuming that feedback will not benefit them in any way. Ideally feedback should be actionable for all students, with stronger students having their strengths reinforced and weaker students recognizing their mistakes thus knowing how to improve (Gibbs, 2006). Students also complain that feedback is not received in a timely manner, either being too close to the final year exam to do something about it, or at the end of a module when marks have already been allocated (Smith & Gorard, 2005). In order for feedback to be effective, it is imperative that comments are given early to students so they can be incorporated into their future assessments or examinations. In essence, it is essential that feedback communicates to students on how to improve their performance or to better their grade (Nicol & Macfarlane-Dick, 2006). In order for feedback to be most successful it is important that strengths are highlighted, comments are not disparaging, the feedback is relatively detailed and is timely (Kahu, 2008).

Audio Feedback

From the educator's perspective, providing feedback that is comprehensible to students can often be very difficult. Assessment criteria are often tacit which makes it difficult to explain where a student has fallen down (Higgins, Hartley & Skelton, 2002). Furthermore, with increased numbers in higher education, educators often find it very difficult to make time to provide students with feedback. Feedback has traditionally taken the form of written notes,

comments or verbal dialogues with students (Carless, 2006). For the latter, it has been found that students might not recognize casual conversations between themselves and their teacher to be feedback. A way in which feedback can be given which maintains the casualness of conversation while being relatively formal is to provide students with audio feedback.

Providing feedback via audio has been in existence for some time with early use relying on cassette tapes. Due to developments in technology, audio feedback is becoming much more feasible and easier to use. Educators who wish to use audio feedback can relatively easily record themselves with either a digital Dictaphone® or a headset. For the latter, an open source voice recording software such as Audacity can be used (Rotheram, 2007). Alternatively, a very user-friendly option is to use a smartphone. If using a smartphone, the mp3 file can be directly emailed to the recipient from the device further simplifying the process. A similar method using Wimba which can be integrated into Blackboard can be used whereby the audio file can be emailed directly to students from the software.

Research has shown that students can have difficulty in assimilating feedback. However, Merry and Orsmond (2007) found that feedback received via audio resonates more with the recipient, can be clearer to the student and also promotes reflection. Further research by Ice et al. (2007) compared whether students believed text or audio feedback to be more effective. The findings demonstrated that students were overwhelmingly positive about audio feedback. They also found that because audio feedback is less formal in nature, it increases students' feelings of involvement with some respondents reporting a sense of "being there". Audio feedback has also been praised for the level of detail it provides in comparison to written feedback. In fact, students claim that when receiving audio feedback it is often longer than expected. Another advantage of audio feedback is that it allows for more subtle nuances to be communicated to students through inflection or tone of voice (Ice et al., 2007; Merry & Orsmond, 2007). This characteristic of audio feedback means it can be easier for students to

accept, and for educators to give, negative feedback as its starkness can be eased through tone of voice.

The current paper extends this line of research by investigating whether differences exist between male and female students and also between undergraduate and postgraduate students. Previous research on perceptions of feedback in a general sense (i.e. regardless of format) has found that female students value and place greater emphasis on feedback than their male counterparts (Rowe & Wood, 2008). Whether this translates to audio feedback is unknown, particularly since women tend to find new technologies less useful than men (Gefen & Straub, 1997; Sanchez-Franco, 2006). Research on the effects of student level is also relatively limited, however Rowe and Wood (2008) found that first year undergraduate students were more satisfied with their feedback than fourth year students which seems to suggest that students at less senior levels value it more. Confusingly, there was no difference between postgraduate and undergraduate students which seems to void this theory. This paper seeks to clarify this issue by comparing evaluations between these two types of student. Related to this, whether age has an impact on the number of times that students listened to the feedback is also explored. To gain a deeper understanding of how students interacted with the audio feedback a series of open-ended questions were also included to gain insights into students' perception of the process. The following sections discuss the methods used and findings gleaned.

Method and Analysis

Data was collected from a variety of students on a number of programmes. All students were undertaking a core module in Business Research Methods in a large university in Northern Europe. This module was assessed through the form of a research proposal and consisted of two components. The first component was a draft proposal which was to outline their intended research topic. This was graded and feedback in the form of audio was given to

each student taking the module. This feedback was then used to refine and develop their literature review, research questions and proposed methodology for their final research proposal submission.

An overall a response rate of 61%, or a sample size of n = 48 was achieved. Data was collected both online and through a self-completed questionnaire given to students in class. Students were asked a variety of questions relating to their perceptions of audio feedback. Included in this were a number of questions relating to the number of times they listened to the feedback, and the way in which they listened to the audio, i.e. whether they merely listened and absorbed the feedback or if they were more actively engaged in the feedback through note taking. Demographic questions relating to age, gender and student type (undergraduate/postgraduate) were also included.

The first objective was to determine how students interacted with the feedback. Overall, it was found that students listened on average to the feedback 3.8 times. Whether age had an impact on students' interaction with the feedback was also explored. To achieve this, a Pearson's correlation analysis was run between age and the number of times students listened to the feedback. Prior to this, a scatterplot was generated which allowed for the assessment of the relationship between the two variables. The spread of the data points was reasonable with no evidence of a nonlinear relationship or homoscedasticity. Following this the correlation analysis was run and a medium, negative correlation between the two variables was found (r = -.305, n = 34, $p < .05$), with older students listening to the feedback less than younger students. Age related differences were also explored between how students interacted with the feedback. A Student's t test was run between age and whether students merely listened or whether they took notes while listening to the feedback. Significant differences were found between the two groups with older students (mean = 28.90) more likely not to take notes than students who were slightly younger (mean = 25.66). Further analysis in the form of

crosstabulations and chi square analysis explored whether gender had an impact on students' use of feedback. Significant differences were also found here with female students much more inclined to take notes than their male counterparts ($\chi 2 = 5.668$, df = 1, $p = 0.017$). Detailed results are shown in Table 1 below.

Table 1: Students Interaction with the Feedback – Gender Differences

		Gender		Total
		Male	Female	
Just listened	Count	13	2	15
	% within Gender	59.1%	16.7%	44.1%
Listened and took notes	Count	9	10	19
	% within Gender	40.9%	83.3%	55.9%
Total	Count	22	12	34
	% within Gender	100%	100%	100%

As questions relating to audio feedback are not available within the literature, items were developed specifically by the author. Items included in the scale covered issues such as whether the students believed the feedback was; constructive, encouraging, whether they thought it was an efficient way to receive feedback, its perceived innovativeness and an overall evaluative item. Each item was measured on a seven-point scale anchored with "strongly disagree" and "strongly agree". Mean scores for individual items as well as overall aggregated scores are listed in Table 2 below. On the whole, average responses towards audio feedback were very positive. Internal consistency analysis using Cronbach's alpha was $\alpha = .84$ which is well within accepted levels (Churchil, 1979). Items were then summed to form an aggregate measure so that mean differences between groups could be explored.

The first test conducted sought to determine whether significant differences exist between male and female students. To meet this objective *t*-tests were utilized. Levene's test for equality of variance indicated that the variance for both groups was the same. It was found that no significant difference existed between the male ($M = 28.29$, $SD = 5.89$) and female ($M = 28.50$, $SD = 6.39$; $t(41)$ -.126 , $p = .90$) students with the differences in the means very

small (eta squared = 0.003). A *t*-test was also run to examine differences between undergraduate and postgraduate students and significant differences were found with undergraduates (M = 30.31, SD = 4.24) scoring higher than their postgraduate counterparts (M = 26.80, SD = 6.48; $t(43) = 2.191$, $p = .034$).

Table 2: Mean Scores for Audio Feedback Items

Item	Total Sample	Gender	Mean	Postgraduate/ Undergraduate	Mean
I enjoyed listening to the audio feedback	4.68	Male	4.75	Undergraduate	5.14
		Female	4.47	Postgraduate	4.23
It was a constructive method for giving feedback	5.20	Male	5.00	Undergraduate	5.85
		Female	5.47	Postgraduate	4.69
It was an efficient way to receive feedback	5.26	Male	5.21	Undergraduate	5.52
		Female	5.18	Postgraduate	5.04
I could pay close attention to my audio feedback	5.57	Male	5.32	Undergraduate	6.10
		Female	5.88	Postgraduate	5.15
Receiving feedback is very encouraging	5.94	Male	5.96	Undergraduate	5.90
		Female	6.18	Postgraduate	5.96
It was an innovative way to receive feedback	6.28	Male	6.32	Undergraduate	6.45
		Female	6.19	Postgraduate	6.15
Overall, receiving individualized audio feedback was a good thing	5.31	Male	5.25	Undergraduate	5.76
		Female	5.47	Postgraduate	4.96
Aggregate scores for total measures	28.29	Male	28.29	Undergraduate	35.47
		Female	28.50	Postgraduate	31.03

*Items scored from 1-7, where 1 = strongly disagree and 7 = strongly agree

An open-ended question was also included in the survey asking students what their most preferred feedback format is. This garnered extremely interesting responses, with quite a dichotomy between those who have a preference for audio feedback and those who prefer feedback given on a one-to-one basis. Indeed, of the 24 students who responded to this question there was an exactly equal split of 11:11 (the remaining two students preferred other methods, such as written). The advantages of audio feedback highlighted by students included, greater detail than written methods, the ability for the educator to give honest and frank comments, that it can be followed up by email for clarification if necessary, it allows

the students to gauge non-verbal reactions to their work (through inflection and tone), the ability to listen to it numerous times, that a record could be kept and that they can listen to it in their own time. The following are a selection of quotes from students:

Student 1:

> Up to now it would have been face-to-face. If I had a problem/query with results I would request a meeting. I found the audio feedback very good in that it explained the result and reasons for dropping marks.

The above quote illustrates one of the fundamental benefits of formative feedback, in that it should be used to describe to students where they have fallen down and there is also recognition from the student that audio feedback can be followed up with a meeting with the educator if necessary.

Student 2:

> It clarifies exactly where you lost/gained marks in your personal assignment [...] I feel a lecturer may be able to give more honest/frank feedback in this manner. Any questions etc. that the student may have can easily be raised/answered via a one-to-one discussion. Audio is a quick and efficient form of feedback. You can listen to it repeatedly if you forget any aspects and so you are more likely to take helpful feedback on board.

This quote also sees the benefits inherent in receiving feedback. However, it is interesting that this individual sees audio feedback as a means through which to give more honest answers, whether this is actually the case is unclear. He/She also sees the time efficiencies that can be gained by receiving audio feedback in this way. In addition to this, the student also finds the ability to re-listen to the audio file an advantage.

Student 3:

> I like the audio except I couldn't ask questions. One on one is still better but because of time constraints it is not always possible. Audio makes a good alternative.

While the above student sees the one-sided nature of the audio feedback as negative, they empathize that it is not always possible to meet individually with their professor because of time restrictions.

Student 4:

> I found audio useful, as I could listen to it in my own time. Written feedback can sometimes be difficult to understand, if the writing is not clear! Students and lecturers don't have to be in the same room/location to get the feedback, providing more flexibility for everyone.

The main benefit for this student is the asynchronous nature of the feedback which provides increased flexibility. They also acknowledge that audio feedback can be clearer than written as it overcomes handwriting illegibility.

Student 5:

> Audio feedback from now on, [it] would be extremely helpful as not only is the verbal context good but the non-verbal communication such as a pause etc. is a good indication of your work and gives a genuine response from the lecturer.

The above student seems to value the subtle nuances that can be gauged from the spoken feedback. This is a major advantage to providing feedback in this form as it allows for personalization without being overly formalized.

The major disadvantages cited by students which led many to prefer personal feedback, is that it is entirely one-sided with no possibility for the student to ask questions should they arise. Interestingly, as seen above, one student recognized that educators are often time-poor and as a result cannot meet with every student individually. One individual stated a preference for personal methods, noting that those studying at postgraduate level may prefer to talk to their professor on a one-to-one basis. This is extremely insightful and may explain why postgraduate students scored lower on the audio feedback perception scale discussed above. As postgraduate students are likely to be more intrinsically motivated than undergraduate students they may feel that audio feedback is quite limiting.

Discussion and Recommendations to Practitioners

The findings from this study provide preliminary results on students' perception of audio feedback. They indicate that on the whole students perceive audio feedback to be very efficient, novel and useful. Previous studies on students' perceptions of feedback have found that women value feedback more than men (Rowe & Wood, 2008), however this finding was not replicated here. One could surmise that this could be attributed to the medium through which the feedback was delivered, rather than the content of the audio files themselves. Research on social behavior has shown that women tend to be more sociable and people-centered (Gefen & Staub, 1997), which may have caused the insignificant findings here as audio feedback could have been viewed by the women in the sample as impersonal and remote. In contradiction to Rowe and Wood's (2008) study, it was found here that differences exist between postgraduate and undergraduate students, with postgraduate students giving the audio feedback significantly less favorable ratings than undergraduate students. The divergence in attitudes towards this feedback mechanism could be attributed to the fact that because postgraduate students are likely to be more motivated than undergraduates, they may find receiving feedback in this way to be distant and impersonal.

However, time pressures may make meeting with students individually difficult, therefore, audio feedback may be a viable alternative for today's educators.

The findings from this study provide preliminary results on students' perception of audio feedback. They indicate that on the whole students perceive audio feedback to be very efficient, novel and useful. While the results are tentative, they seem to indicate that older students engage less with audio feedback than younger students. The reasons behind this are unclear. For instance, it is possible that older students may be slightly technophobic which might act as a deterrent in listening to the audio file. Older students were also more likely to just listen to the feedback rather than to take notes. This is surprising, as one would have surmised that older students would be more self-motivated than younger students and as a result would be more conscientious. Gender also had an impact on note taking behavior. Female students were more likely to take notes than males students which might suggest that female students are more conscientious than their male counterparts.

For those wishing to use audio feedback, a variety of software such as Wimba or Audacity can be used. Mastering the process should be relatively easy as the software is very user friendly. The principle behind creating audio feedback using Audacity is very similar to that of creating podcasts and interested users should refer to Mobbs, Salmon and Edirisingha (2008) who provide a detailed step-by-step guide to creating audiofiles. I use my iPhone within which there is an audio recorder which allows me to email the audio file directly to the student. The only downside to this is that one would need to either have students' email addresses on their smartphone or a list readily available. The file type the iPhone creates is .aac which is now regarded as the successor to the mp3 format and is compatible with most software media players. Thus far I have encountered no problems, however if in the event that an individual could not listen to the file I have an open source .aac to mp3 file type converter. With regards to non-technical issues, it is essential that the feedback given

possesses all the qualities of good feedback (Nicol and Macfarlane-Dick, 2006). I also believe it is necessary to stress to students that if they wish to discuss the assessment or grade in more detail that they can follow up either by email or to request a meeting in person.

Recommendations for Future Research

As audio feedback is still in its early stages of development, further research is needed to clarify a number of issues. Firstly, the small sample used here makes it difficult to extrapolate the findings thus requiring additional research to explore whether students in other institutions provide similar responses. Secondly, the open-ended questions employed here did not elicit the depth of information that a semi-structured interview could provide. Therefore, further research taking a qualitative approach in the form of in-depth interviews or focus groups could generate further insights into students' views on audio feedback. Finally, further research is also needed on educators' attitudes towards this feedback process. From my personal experience with audio feedback, it is unclear whether it can save an educator time, however with increased use, time efficiencies are likely to occur (Rotheram, 2007; Merry & Orsmond, 2007). One student believed that the educator could be more honest using audio feedback, further research involving interviews with educators could elucidate this matter.

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