

## **Using student generated audio to enhance learning**

ROSSITER, Anthony, NORTCLIFFE, Anne <<http://orcid.org/0000-0001-6972-6051>>, GRIFFIN, Alison and MIDDLETON, Andrew

Available from Sheffield Hallam University Research Archive (SHURA) at:

<http://shura.shu.ac.uk/14438/>

---

This document is the author deposited version. You are advised to consult the publisher's version if you wish to cite from it.

### **Published version**

ROSSITER, Anthony, NORTCLIFFE, Anne, GRIFFIN, Alison and MIDDLETON, Andrew (2009). Using student generated audio to enhance learning. *Engineering Education*, 4 (2), 52-61.

---

### **Copyright and re-use policy**

See <http://shura.shu.ac.uk/information.html>

# Using student generated audio to enhance learning

Anthony Rossiter, Anne Nortcliffe, Alison Griffin and Andrew Middleton

## Abstract

**This paper explores the issues surrounding the use of audio in learning and offers an alternative to podcasting. It considers the practicalities of enabling students to generate their own audio recordings and the potential to enhance and personalise learning in a self directed way that suits their individual learning styles. There is some discussion of hardware and its accessibility, cost and ease of use as well as protocols on what audio can/cannot be recorded or shared amongst students. The paper explores different types of scenario where recording can be used beneficially and uses real student case studies to demonstrate its efficacy, as perceived by the students. There is also particular emphasis on the benefits to specific student groups, including those with English as an additional language or students with learning difficulties. In summary the paper gives evidence of how student generated audio can be embedded into the curriculum and the benefits it can bring.**

## Introduction

Research in American higher education institutions and the experience of both Sheffield Hallam University and the University of Sheffield have identified language, culture and learning practices as being barriers to student learning. Initial research by Sheffield Hallam University (Nortcliffe and Middleton, 2008) indicates that international students would benefit from digital audio interventions, a position shared by the University of Sheffield. This paper describes a project which explores the potential for learning technologies to ameliorate these barriers and enhance the learning experience for all students.

The recording and distribution of student-tutor feedback conversations by the tutor has been shown to be an effective, timely and attractive method of encouraging greater personal student control and formative learning engagement (Nortcliffe and Middleton, 2007).

The playback of these formative conversations has been shown to refresh the student's memory and re-engage the learner (Fidler et al., 2006).

Current research on audio feedback has been largely focused on the method of academic generation/recording and distribution (Crocker, 2008; Middleton, 2008a; Middleton and Nortcliffe, 2008b; Nortcliffe and Middleton, 2008; Rotheram, 2007). However, there is a danger that these recordings can be overused to promote teacher centred views of learning. Moreover, this method of academic recording and distribution is difficult to scale to large cohorts (Nortcliffe and Middleton, 2008a).

## Learner-centred audio recording

This paper builds upon the observation that the use of audio in the form of 'audio notes' and 'audio feedback' can result in excellent learning resources and offer alternative means of facilitating rapid learner engagement and enhancing the student experience. Specifically, the approach described here gives students the responsibility for recording and using digital audio to make their own learning interventions. This paper seeks to evaluate the impact of this on their learning experience and engagement and its impact on their peers and tutors. For example, in 2005 Apple Computer and Duke University (USA) distributed iPods to all incoming first year students. This was found to have a positive impact on student engagement and learning (Belanger, 2006), although Belanger's study neglects to separately explore the impact on the learning of disabled and international students.

## Summary of paper contribution

Students were given audio recorders and encouraged to make recordings of both formal and informal interactions with tutors and peers. The project aims to encourage students to record and review conversations wherever they occur (in or outside the classroom) and to evaluate whether this practice enhances their engagement and learning experience. The students are encouraged to play back and

listen to these recordings in order to reflect, refresh their memory, re-engage with their thoughts, deepen their level of learning and otherwise generally enhance their learning experience. Evidence which demonstrates the potential of this approach in promoting learner autonomy will be discussed.

The paper also focuses specifically on the potential benefits to international and disabled students. International students in the UK are increasingly making up the shortfall in home students (Brady, 2008). However, language, culture and learning practices can be barriers to their effective learning (Hong et al., 2007), language being the primary problem (Galloway and Jenkins, 2005; Amsberry, 2008). This is recognised as true in the authors' institutions. Thus, a secondary aim considers specific benefits to students with English as a second language, as well as those with dyslexia and other disabilities.

It is noted that, although this project has been implemented with engineering students, the authors do not believe that the findings are unique to an engineering context and would expect similar findings in many disciplines.

## **Implementation of projects and background**

### **Summary of project at the University of Sheffield**

This section gives a little more background to the University of Sheffield's project and the main objectives for the evaluation. The project was motivated by transition issues for arriving first year students and the desire to promote and develop the independent learning skills of these students from the moment of arrival. It was felt that the audio project would be able to play a significant part in facilitating this.

In simple terms there was a need to:

- determine whether recording feedback conversations using digital audio enhances international and home students' learning experiences and whether it can provide an easy, accessible and valued method of support;
- develop and evaluate methods, services and guidance to support students in accessing and using audio equipment in support of their learning;

- develop a protocol for when conversations can be recorded appropriately so that students can learn from reviewing them;
- identify and assess the impact of student-made digital audio interventions on their learning experience and engagement and consider any difference between the effect on home and international students;
- identify the potential benefits of further work.

Clearly, there are also implicit objectives, such as developing and promoting good practice (based on evidence) both within and without the authors' institutions. To some extent, the department also sought to emphasise an educational point about what constitutes feedback and how it might be recognised (though this is not the main topic of this paper).

### **Summary of project at Sheffield Hallam University**

The project aimed to research and develop a methodology for audio recording which would promote more autonomous learning in both disabled and non-disabled students (Race, 2001). For example, dyslexic students have highlighted that going over material twice, with and without an academic, helps their learning (Madriaga, 2007) – the provision of audio lecture notes provides opportunities to review topics through re-interpretation, thus deepening understanding and learning (Fidler et al., 2006).

The objectives of the project were to:

- (i) educate and assist disabled and non-disabled students in using audio equipment to support their learning and improve learner autonomy;
- (ii) establish whether audio recording assists students in becoming more autonomous learners;
- (iii) evaluate the impact of audio recording on all stakeholders;
- (iv) identify whether audio equipment should be recommended as an essential tool;
- (v) develop best practice guidelines for the use of audio equipment.

As the project objectives have potentially wide implications for the whole student population, volunteers were recruited via both the Sheffield Hallam University union and Sheffield Hallam University's faculty communication systems. This resulted in participants from across the subject spectrum from computing to nursing.

## Equipment and support

It is necessary to identify equipment that is fit for purpose and that satisfies certain specifications. These are to some extent subjective, but from the authors' perspective certain criteria are essential:

- (i) the audio device should be easy to use with minimal training/familiarisation. Recording should require minimal effort and the recordings should be stored in a logical fashion which makes retrieval straightforward;
- (ii) the device should work easily with standard computing audio software and interfaces;
- (iii) the quality of the recordings should be reasonable at the least;
- (iv) the device should be affordable on a student budget.

Both projects used the same MP3 devices, each costing approximately £30 and having 4GB memory – enough for saving several weeks' lectures (i.e. one hour's audio recording typically uses 16MB). A separate toggle button starts and stops the recording and the recordings are of reasonable quality sufficient for their intended purpose. The device automatically names recordings corresponding to the device, time and date, therefore these need to be set correctly. Users must adhere to good file management practices. Note, however, that many mobile phones, iPods and other such devices may have equivalent functionality; indeed, one student at Sheffield Hallam University preferred to use his phone.

## Protocols at the two Sheffield universities and student guidance

Due to the timing of the funding, the devices were not handed out to the students until week four at the University of Sheffield and week nine at Sheffield Hallam University – the plan had been to do so at the beginning of term. As the concept of student-managed recording was relatively novel, it was important to inform students about the acceptable and unacceptable use of such recordings. A protocol agreement was drawn up at each institution (see Appendix 1). Both agreements note that recordings belong to the University and so cannot be shared beyond it, although students were encouraged to share with each other. Some staff were informed about the project and encouraged to be supportive of students who wished to record them while others were briefed by students directly.

## Protocol at the University of Sheffield

Students were given guidance in a lecture about possible usages and this was reinforced occasionally in lectures throughout the first term. Latterly it was left to the students to decide the best course of action for themselves, as sustainability has to be based on students taking control. Students were able to use the recordings to enhance, support and personalise their learning in a self-directed way that suited their individual learning styles and needs. As one student commented, "at university, you need to take responsibility for your own learning and so you need to find [out] what works best for you."

## Protocol at Sheffield Hallam University

The project was university-wide and students were invited to participate through both the student union and their faculty. A day was set aside so that students could drop in to an induction session and collect the recorders. They were given guidance on device usage and protocols and particularly encouraged to seek permission from their peers, tutors and supervisors before recording them. Further focussed support was delivered via email and the virtual learning environment (VLE).

## Evaluation of the projects

Evaluation questions were similar for each project but the logistics were necessarily different. The University of Sheffield project involved a single cohort of students in one department (Automatic Control and Systems Engineering, ACSE) and therefore the project team were able to contact and communicate with the students easily. Students were recruited through a call for volunteers with the offer of a free MP3 player. The Sheffield Hallam project focus was student diversity (disabled and non-disabled students). Student participants were drawn from across the university, including some on work placement, and therefore the VLE was used for communication, support and evaluation.

## University of Sheffield

### Organisation of evaluation through focus groups

The aim of the first evaluation, late in the first semester, was to highlight the impact and potential of audio interventions on the general student population and thus discern what further support or guidance the department

might offer. It also gave initial evidence of effective usage which could be disseminated throughout the cohort.

Four focus groups of about ten students each (roughly half the cohort), along with an independent facilitator supplied by Learning and Teaching Services, directed discussions around five main areas: equipment and support, purpose and protocols, making recordings, using recordings and reflections and the future.

The qualitative data was collected entirely in the form of recorded conversations. Some simple evaluation of the initial impact on staff was also conducted through staff interviews.

A second round of focus groups was run towards the end of the academic year to capture a more sustained view of students' experiences. This was organised in a similar fashion to the first.

The first round of focus groups provided strong evidence supporting the recommendation for engineering students to invest in a digital audio device to support their learning. It also gave an insight into the numerous ways in which audio recordings might be made and used, as well as some practical issues.

### **Comments on equipment, protocol and purpose**

Students generally reported that the recorders were easy to use and had a large memory so that recordings could be stored on the device itself. There were minor criticisms from a few, such as:

- (i) it was difficult to tell when the machine was actually recording;
- (ii) they had not discovered the full functionality, such as how to use the fast-forward/skip facility (essential for long recordings unless copied onto a computer);
- (iii) poor sound quality when recording lectures (it was suggested that staff should use microphones);
- (iv) in one-to-one situations it was necessary for the device to remain stationary as the slightest movement would be picked up;
- (v) the lack of a mains-powered charger (currently requires access to a computer).

Students were clear about the purpose of the recorders and had received advice

clarifying situations they could record. They were recommended to use them in one-to-one situations, for example when a tutor is explaining a difficult maths problem. Students had no issues with the protocols and staff had always been happy to be recorded, although it was essential that they were made fully aware of the project in order to eliminate unnecessary delays in recording. Permission to record guest lectures was pre-arranged.

### **Comments on recordings made up to December 2008**

It was clear from the focus groups that the students had identified many different and effective ways of using the recorders and recordings. For example:

Lectures – students found it useful to record lectures, both in terms of pace (not being able to make sufficient notes at the time) and clarity of sound (not picking something up first time round, perhaps due to the volume of speech or a tutor's accent).

Guest lectures – many students had recorded the guest lectures. This was particularly useful since students might not have the opportunity to speak to guest lecturers after the lecture for clarification, etc. Nevertheless, students recommended that guest lectures be recorded by the department in order to ensure a good quality recording which would be readily available to all students.

Group work – some students had used the equipment to record group work, thus precluding the necessity for a group member to take minutes, etc.

Lab sessions – one or two students had managed to record feedback given at lab sessions, but this depended very much on time pressure in the particular lab.

Feedback from tutors – students found it to be a useful way of getting the most from verbal feedback, both in terms of being a mnemonic aid and as a way for them to check their understanding of the feedback given.

### **General usage**

Other general comments are summarised in the following list:

- Presentation preparation – recording and listening back to themselves and modifying their presentation accordingly.
- Small group discussions in tutorials.
- Clarification about assignments that had been shared with peers and using this

information to organise their approach to the assignment.

- The facility to carry the recorders with you all the time so that you can use them whenever you need to. One student commented that *'if you are in a stressful situation you can record a conversation and then replay it later on to help you.'*
- Staff with strong accents – some found their understanding compromised when the speaker had a strong accent.
- Sharing recordings with peers who have missed lectures.
- Listening back to recordings and correcting misconceptions, or realising that one has had the wrong idea about something. *'Sometimes at first you get the idea wrong and when you hear it twice or three times it tells you [that you] have made a mistake and changes what you are thinking.'*
- Making additional notes based on the recordings in a much more focused way, rather than in lectures where the tendency is to write everything down.

#### Ideas for future use

Students felt that *'it is important to try out new ways of learning.'* There seemed to be an enthusiasm for experimenting with different possible uses of the audio devices to enhance learning. The following are examples of how students are using or planning to use the recordings:

Recordings can be used to help non-native speakers with the English language. Students can record a lecture if they are having difficulty understanding and then listen back later and check any difficult words in the dictionary.

*'When you hear it over and over again you know exactly what they are saying. If you miss some words when they are explaining because of the language barrier, then you can hear it again and understand what they are saying.'*

Answers to questions given in a conversation are usually enough to solve a problem, precluding the need for recording. However, some felt that it can still be helpful to record one-to-one discussions:

*'The only thing you might want to listen back to is the solution or explanation for a particular problem that you asked a tutor about.'*

*'Tutorials, someone explaining something so that we can record it and then do the problem again then we can listen to it and see what exactly they said.'*

*'It might be useful to record going through an essay with a tutor about where you went wrong and what you could improve on for next time. In ACSE we do mark several assignments face-to-face so this would be possible.'*

Other planned usages, in addition to those previously mentioned, are:

- (i) Listening to recordings to improve knowledge of a topic. *'For me, my instant recordings are just like references so if I'm not [sure], it does help my learning if I read through my notes on what the lecturer has given me [and] I can hear the recordings back many times. It will give me more insights into what I'm actually reading about.'*
- (ii) Storing the audio on a PC, so when students are working on assignments they can listen back in a targeted way by searching for specific sections.
- (iii) Some students indicated that it was easier to memorise from the spoken word than from written sources. *'I tend to remember things, memorise things, more easily when I am listening to them. So sometimes I am just reading something and when I am playing I'm trying to memorise.'*
- (iv) Producing revision notes in preparation for exams. These could be recorded and listened to at any time and in any location.
- (v) Recording a summary of key points when study of a particular topic has concluded.
- (vi) Recording introductions to new topics/areas of study and creating a spoken glossary of new terminology and concepts.
- (vii) Recording feedback meetings with tutors.
- (viii) Listening to recordings of maths problems whilst working through the same or similar problems.

A summary from one interviewer was that everyone was very positive about the project and has enjoyed using the audio recorders so far. The students would definitely recommend their use by next year's level one students and advised that future students should *'use it as much as possible and have it with them all the time so they can record. Have it in their pockets because sometimes, if it is in your bag and you're having corridor conversations, it's hard to reach in.'*

### Summary of evaluation at the University of Sheffield in May 2009

As before, there were four focus groups of around ten students per group, but this time discussion was preceded with some simple questions using a Likert scale.

The feelings from the focus group leaders are that, despite the numerous potential opportunities for audio recording, most students have focused on recording lecture-based scenarios and group discussions. Students also re-emphasised that in terms of lectures it would make more sense for a single good quality podcast to be generated by the lecturer, although the facilities to do this systematically are not readily available in most institutions. Of the students who received devices, around 50% have used them across the whole range of scenarios (noted earlier), but generally intermittently. Notable exceptions are lecture recording (most have done this), with claims that the recordings improve knowledge of a topic (80%) and enhance learning (also 80%).

There was evidence that the students making sustained and beneficial use of the recorders were predominantly those for whom English is a second language. They benefit from the opportunity to listen again in order to be sure of understanding the meaning of the lecture/conversation. There was certainly a consensus that, for this cohort, the project had had a positive impact in a number of small ways (such as those discussed in earlier sections).

Despite this observation, it was clear that all the students perceived numerous beneficial usages but, critically, the onus was on each individual to use the device in ways that supported their own learning, with each student having different preferences and needs. The department could support this by providing suitable exemplars for dissemination to students. Also, there was some evidence that the existence of audio recordings was encouraging students to review material in greater depth than they would otherwise.

#### Sheffield Hallam University

From the authors' perspective, although the outcomes are positive, the active usage rate of about 50% (25 out of 50 students) is probably more indicative of the change in learning culture required and this percentage

should increase as the practice becomes more standard.

It is notable that many of the findings here overlap with those from the University of Sheffield.

#### Evaluation

Evaluation was supported by the University's Learning Teaching Institute (LTI). Online questionnaires and small group interviews (organised via email invitations) were used to survey the student participants. The small group interviews were semi-structured conversations (Cohen et al., 2000) between one to two students and the interviewer and focused on the topic of audio feedback. The students were interviewed at the start of the project, to identify their perception of the potential benefits, and again a couple of months later. A final project evaluation is also planned.

#### Initial evidence of efficacy from Sheffield Hallam University

The following is a sample of quotations from students offering their perception of the learning benefits of audio:

*'We have loads of long lectures full of information, so normally I am too busy taking down notes to pay attention [to what has been said]... so it would be good to record and play it back to find out what extra information I have missed.'*  
*'Psychological research has shown that students today have the same level of stress as psychiatric patients in the 1950s ... any invention that lowers stress levels is good!'*

*'English is not my first language, so recording lectures will give me a better chance of understanding and capturing better notes.'*

*'I find it difficult to remember things, but also we have meetings as part of my course [...] when you are talking to someone in an interview you can't rely on taking notes while you are talking.'*

*'I am hopeless at taking notes [hand-written and typed] [...] recording and doing it in my own time, [...] I can reflect more on what has been said.'*

The majority of student volunteers felt that the main potential benefit of using audio equipment

would be to record lectures, providing a learning opportunity to reflect on the lecture later, with the recording acting as an external memory device. The process of taking notes has been found to be an effective external memory aid that itself increases cognitive recall (Intons-Peterson and Fournier, 1986).

### Initial survey evaluation

25 out of 52 students enrolled on the Blackboard project support site and completed the initial online questionnaire three months after the project's launch. The results indicated that the majority of the students intended to use the device for one purpose (i.e. recording lectures).

### Device quality

76% (19 out of 25) of students agreed or strongly agreed that the device quality was satisfactory but with the caveat that it depended on the room acoustics and level of background noise. Students generally recommended placing the devices nearer the academic, although this precludes the opportunity to use the device's functionality to edit the lectures into chunks whilst recording, subsequently making it easier to navigate the audio (Fidler et al., 2006).

### Recording learning conversations

The survey results correlated with the student's initial expectations, showing that 68% (17 out of 25) used the devices in lectures. However, the majority of students also used the devices in a variety of other learning situations. These included recording personal audio notes, peer conversations, group-work, tutor feedback, project supervision, corridor conversations, lab discussions, seminars, tutorials, workshops, laboratory sessions, project supervision, one-to-one meetings, interviews, role play activities, at their place of work or placement and for personal activities.

52% (13 out of 25) of the respondents recorded personal audio notes, despite this approach not being suggested at the project's outset.

48% (12 out of 25) said they used the device to record peer conversations and 64% (16 out of 25) said they used it every few days.

### Replay and re-learning opportunities

About half the students listened to all their recordings, while others listened to fewer than this. The listening habits of students varied from 'every few days' to 'once a month'. 84% (21 out

of 25) of students indicated that they listened to the audio at home, typically from their PC. Only a few of the students listened to audio whilst on the move. The students are typically re-listening to recordings to support self-directed study in the evenings in order to aid examination revision, assessment preparation and the understanding of particular topics covered in the syllabus.

The vast majority agreed or strongly agreed that they found the recordings useful and that they improved their learning:

*'The device was brilliant and it has improved my learning dramatically.'*

Over half agreed that it helped them to become more independent in their learning, indicating that the recordings were used by students to assist them in learning and working autonomously:

*'[I] listen to them routinely [...] dig them out whenever I need to refresh my memory, or need to recall something for the assignments.'*

### Follow-up interviews

The first semi-structured interviews involved nine students, interviewed in pairs or alone. Students were deploying the devices in a variety of ways and had a variety of methods for managing and using the audio recordings. In particular, the focus groups revealed that the initial ideas that the students had had for how the device could be used to support their learning had changed and multiplied. There were more creative and constructive ideas for usage than simply recording lectures. In particular, many students indicated that they were now recording feedback and personal notes:

*'[Recording personal thoughts means that I can] listen to remember where I was and what I was doing at the time [...] it enables me to continue with the train [of] thought.'*

*'[...] collecting feedback [by recording it] [...] notes on feedback [...] understand where I went wrong [...] as in an interview you are more stressed. You are not picking up all the information.'*

*'Use it in certain modules [...] I record the lectures or bits I need [...] listen to it [the recording], as opposed to listening to music, as I walk around, [...]*



as a way to try to revise and understand [...] to clarify any information I might have missed [...] it helps me on more scientific subjects that are not as easy to grasp [...] from examination results I think it has paid off.'

'Recording lectures is pointless [...] unless [I am] right at the front I can't hear what the lecturer is saying. [I record] group meetings discussions and random thoughts quite a lot [...] don't listen to them again. Because I have done something I [then] remember.'

'Useful in lectures on essays in last couple weeks [semester 1], but this semester used twice as I forgot about it [...] then I used it in a session one to one [...] something about the essay [feedback] I wanted to clarify and I wanted to have a recording of it and to use again [...] it was quite useful and quite discreet.'

'Mainly used for lectures [...] really great [...] listen to it that night [...] in Audacity [audio editing software] I chop and change bits about [tidying the file] brilliant in assignment workshop [lecturer] goes through each task on the assignment [...] I make [edit] a new file for each assessment task.'

'[recording] in the creative sense [...] brain storming with someone [...] quite useful to record it and look back as it is so easy to forget the different ideas we have had.'

'[As a student film director] I use it [recorder] in group-work [...] recording something interesting in rehearsal [...] I record notes about what I have said to them [team and actors] and what is their reaction.'

'If recording [a lecture] I am more relaxed in lecture. I get more of what lecturer is saying.'

### Combined reflections

The deployment of the audio device by students has certainly been diverse, covering lectures, personal reflections, observations, conversations and so forth. The results indicate that in some cases the mere act of making recordings has resulted in improved cognitive recall without the need to listen back to them.

There were some misconceptions about sharing recordings. Some students had been told that they couldn't share recordings and took this to mean that they couldn't share the recordings with peers. This potential misunderstanding should be addressed by the department.

When asked if recording lectures might lead to a reduction in note-taking skills, students clearly understood that recording lectures was not a substitute for note-taking as they would still take notes when listening back to lectures. In fact, students emphasised that note-taking would become more focused and targeted than in a lecture situation where there is a tendency to write everything down. Taking notes retrospectively allowed students to consider the entirety of the lecture first. It seems unlikely that traditional note-taking skills will be replaced by audio recordings. If anything, the project interviews indicated that audio recording is considered a means of enhancing this skill as students used the recordings later to annotate/amend/re-write their written lecture notes:

*'I just go through the audio and pick out selected bits that I wanted and maybe touch up my notes.'*

When asked what they had enjoyed about using the recorders one student commented:

*'Being able to listen to lectures and verbal feedback again and therefore gain a greater understanding from these learning situations.'*

Some students also said they would definitely recommend that next year's level one students use the recorders and some have found them to be absolutely indispensable:

*'There was a time when I thought I had lost it and I felt like some part of myself was missing because I was so used to using it. When I found it I was really happy.'*

### Conclusions, benefits and recommendations

The authors hope that this paper has:

- shown that recording and listening back to a variety of learning interactions using digital audio can enhance the learning experience of any student in any discipline and that it is an accessible and valued learning technology;

- listed formal and informal learning situations where recording may be beneficial and ways that audio recordings can be used;
- identified protocols and guidance for the recording of conversations and other learning situations, and for their subsequent use.

Although different student cohorts were involved in each institution, the conclusions are very similar for both.

All participants were positive about the project and have enjoyed using the audio recorders and the resultant recordings. The audio recorders were being widely used by all students who found they were able to tailor the use of the recordings to support their individual learning needs. They recommended that other students should be encouraged to use them in subsequent years.

Students recognised that this was a tool to supplement and enhance their learning and was not a substitute for note-taking or other resources. They were sharing their recordings with peers. It was noted that there were additional benefits for students with English as a second language and that listening back to the recordings helped them to clear up misconceptions.

Some specific recommendations have emerged from the project:

- (i) Ensure recorders are available from the beginning of semester one so that students can start to use them from the outset as an integral part of their learning within the departmental culture.
- (ii) Lecture theatres, seminar rooms and other social learning spaces should be equipped so that better quality, centralised recording can be organised as appropriate.
- (iii) Ensure that recording devices are easy to use.
- (iv) Students should keep the recorders fully charged and ready for both planned and impromptu situations.
- (v) Where possible, staff and students should be adequately briefed about the practice of students making audio recordings in order to make obtaining permission to record more straightforward.

A key conclusion is that, by encouraging students to choose what and when to record,

an alternative and rich form of note-taking is enabled, leading to better self-reflection that is supported by more personalised learning resources. The project has highlighted the potential of student audio recording to improve learning in a variety of ways and students should be encouraged to be creative in thinking about the potential benefits to them.

### **Acknowledgements**

The University of Sheffield project was part funded through an Engineering Subject Centre special interest group and was also supported by staff in Learning Teaching Services (University of Sheffield) and funding from the University's overall Inclusive Learning and Teaching project. The Sheffield Hallam University project is supported by the CETL for Promoting Learner Autonomy.

### **Appendix 1.**

#### **Extracts from the protocol for using audio equipment and the agreement with the University (Autumn 2008)**

I understand that the audio equipment (ZEN V) has been supplied to me, free of charge, for educational purposes. I will use it in a considerate and respectful manner.

I understand that legally these recordings are the property of the University and as such I am forbidden from sharing them beyond my class mates and via MOLE. There is a definite embargo on disseminating them on sites such as YouTube, FaceBook, other Web 2.0 technologies, etc and any student who takes this action is in breach of their enrolment and University code of conduct and will be disciplined accordingly.

### **Appendix 2.**

#### **Extracts from guidance sheet for students on how to get the most from the audio recordings**

There is a perception amongst all universities that many students do not recognise the multiple sources and richness of the feedback they receive. [...] This project is part of a bigger initiative to help students learn better by recognising, recording and using the feedback they are given. [...] The audio project aims to encourage students to record the audio parts of key interactions with staff as these are rich in feedback. By recording the interactions,

students can then re-listen later on and reflect on the key information and feedback provided. [...] The students themselves will discern effective ways of using the equipment to learn. [...] Specific examples we would encourage you to record (not exclusive): All conversations with demonstrators/tutors, [...] snippets of lectures, [...] group discussions. ■

## References

- Amsberry, D. (2008) Talking the talk: library classroom communication and international students. *Journal of Academic Librarianship*, **34** (4), 354-357.
- Belanger, Y. (2006) *Duke University iPod first year experience final evaluation report*. Duke University, USA. Available from [http://cit.duke.edu/pdf/reports/ipod\\_initiative\\_04\\_05.pdf](http://cit.duke.edu/pdf/reports/ipod_initiative_04_05.pdf) [accessed 14 September 2009].
- Brady, P. (2008) If the students won't go out into the world, bring the world to them. *Times Higher Education*, 15 May 2008.
- Cohen, L., Manion, L., and Morrison, K. (2000) *Research methods in education*. Fifth edition. London and New York: Routledge and Falmer.
- Crocker, K. (2008) *Giving feedback via audio files*. Special Interest Group on Assessment (SIGA) meeting, Higher Education Academy, June 2008.
- Fidler, A., Middleton, A. and Nortcliffe, A., (2006) Providing added value to lecture materials to an iPod generation. *6th Conference of the International Consortium for Educational Development*, 11-14 June 2006, Sheffield, UK.
- Galloway, F. and Jenkins, J. R. (2005) The adjustment problems faced by international students in the United States: a comparison of international students and administrative perceptions at two private, religiously affiliated universities. *NASPA: Journal for Student Affairs Administrators in Higher Education*, **42** (2), 175-187.
- Goodley, D. (2007) Towards socially just pedagogies: Deleuzoguattarian critical disability studies. *International Journal of Inclusive Education*, **11** (3), 317-334.
- Hong, L., Fox, R. and Almarza, D. J. (2007) Strangers in stranger lands: language, learning, culture. *International Journal of Progressive Education*, **3** (1), 1-28.
- Intons-Peterson, M. J. and Fournier, J. (1986) External and internal memory aids: when and how often do we use them? *Journal of Experimental Psychology: General*, **115** (3), 267-280.
- Madriaga, M. (2007) Enduring disablism: students with dyslexia and their pathways into UK higher education and beyond. *Disability & Society*, **22** (4), 399-412.
- Middleton, A. (2008) Audio feedback: timely media interventions. *Blended Learning Conference 2008*, 18-19 June 2008, Hertfordshire, UK.
- Middleton, A. and Nortcliffe, A. L. (2008) Understanding effective models of audio feedback. In Roy, R. (ed.) *Engineering Education* (forthcoming).
- Nortcliffe, A. L. and Middleton, A. (2007) Audio feedback for the iPod generation. *International Conference on Engineering Education*, 3-7 September 2007, Coimbra, Portugal.
- Nortcliffe, A. L. and Middleton, A. (2008) Blending the engineer's learning environment through the use of audio. *Engineering Education 2008 Conference*, 14-16 July 2008, Loughborough, UK.
- Race, P. (2001) A briefing on self, peer and group assessment. In *LTSN Generic Centre Assessment Series No 9*, York: LTSN.
- Race, P. (2006) *The lecturer's toolkit*. Third edition. London: Routledge.
- Rotheram, B. (2007) Using an MP3 recorder to give feedback on student assignments. *Educational Developments: Magazine of the Staff and Educational Development Association*, Issue 8.2, 7-10.

## Contact details

**J.A. Rossiter** Department of Automatic Control and Systems Engineering (ACSE), University of Sheffield, Mappin Street, Sheffield, UK. Email: [j.a.rossiter@shef.ac.uk](mailto:j.a.rossiter@shef.ac.uk)

**A. Nortcliffe** Faculty of Art, Computing, Engineering and Science (ACES), Sheffield Hallam University, Sheffield, UK. Email: [a.nortcliffe@shu.ac.uk](mailto:a.nortcliffe@shu.ac.uk)

**A. Griffin** LeTs, University of Sheffield, 5 Favell Road, Sheffield, UK.

**A. Middleton** Learning Teaching Institute, Sheffield Hallam University, Sheffield, UK. Email: [a.j.middleton@shu.ac.uk](mailto:a.j.middleton@shu.ac.uk)