The potential value of student created podcasts as assessment tools in higher education

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Abstract

Podcasts are seen by many educators as having significant pedagogical potential, especially in higher education. The benefits of students, working in groups, to create their own podcasts, have been described by a number of studies. The podcast creation process is seen as having significant knowledge-creation value and benefits linked to enhanced intellectual engagement with subject matter. This article describes how groups of second year undergraduate students, on an Education and Subject Studies honours degree course at a small university college in the UK, engaged in a podcast creation assignment. The students were able to demonstrate enhanced levels of academic competencies when the podcasts they created and the reflective journals they produced alongside them were assessed as part of their on-going assessment towards the award of the degree classification. The findings indicate that when compared with the marks achieved in six other assignments, marked using comparable criteria, the students' achievement in the podcast creation assignment was significantly better, ANOVA $F=5.378$ $p< 0.001$. Content analysis of the students' reflective journals was used to generate a list of the features of the podcast creation process which may have had an impact on this enhanced student performance and which could be incorporated into other assessment methods.

Key Words: podcasts, assessment, Education Studies, intellectual engagement, performance

Background and Introduction

The characteristics used by O'Reilly (2005) in his adoption of DiNucci's (1999) term web 2.0 offers a new generation of on line tools which can provide novel opportunities for student collaboration, exchange and the harnessing of collective intelligence. Gauntlett (2011:7) argues that digital media has 'fundamentally changed the ways in which we engage' allowing the collective abilities of networked groups to

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create and reshape the ways in which we learn by 'allowing empowered students to transform knowledge for themselves' (Tapscott, 2008:134). This paper investigates and considers the levels of student engagement in the creation of group podcasts as one web 2.0 tool for knowledge creation.

Podcasts and podcasting

Since it emerged in October 2001 as an audio device the iPod, produced by Apple, has become an iconic device that has become popularised amongst a mass market (Sterne, 2006). The popularity of the iPod has been due, in part, to its perceived 'coolness' (Reppell et al., 2006); its ability to control time and space (Chinnery, 2006) and its 'veneer of simplicity' (Beer, 2008). The device looks simple, is easy to use, and yet is masked by back end technology which is highly complex and sophisticated.

Adam Curry (2004) is credited with having first coined the term 'podcast', combining the words 'iPod' and 'broadcast'. Despite the creation of a range of alternative portable audio and video players the term podcasting remains the term used to describe the broadcasting of all audio/video files in digital format, across the internet or distributed automatically to subscribers. Media files downloaded manually from the internet are also generally referred to as podcasts.

Podcasts and higher education

Podcasts are seen by many educators as a useful web 2.0 tool which has significant pedagogical potential especially within higher education. This relatively new tool can be seen as empowering, leading to active, engaged users and allowing sociable and collaborative creativity and consequently new learning styles (Belanger, 2005). The technology can be seen as appealing to 'digital native' (Prensky, 2001) students who expect technology to be used in their higher education. The concept of the 'digital native' is based on the view that students born into a world of technology are naturally adapted to its use, leaving educators as 'digital immigrants' unable to keep up has, however, Prensky's concept has largely been refuted (Bayne and Ross 2007, Helsper and Enyon 2009, White and Le Cornu 2011).

The potential of Podcasts to support learning

In 2004, Duke University in the USA provided all first year undergraduates with iPods to support their studies (Belanger, 2005). Five potential uses were identified for the iPod technology: as a course dissemination tool; a class recording tool; a field recording tool; a study support tool and a file transfer and storage tool. Since 2004 a number of studies have reported the benefits of two of these uses, course dissemination and study support.

In terms of dissemination podcasts can be used so that students can listen again and effectively 're-attend class' or to support students who study remotely from their instructors (Gribbins, 2007). They can be used to provide supplementary lecture materials (Cocannon et al., 2005; Tysone, 2006 and Copely, 2007) or can be the only medium through which lectures are delivered as in Microbiology lectures at Bradford University (Stothart, 2006). Despite this latter example, and the fear expressed by Berry (2006) that the iPod has the potential to be a disruptive

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technology which can influence the dynamics of the traditional learning environment in higher education, most commentators see podcasts as supporting rather than being a replacement for lectures (Britain et al., 2006; Bongey et al., 2006; Copley, 2007; Hove and Corcoran, 2008).

In relation to study-support podcasts provide students with the opportunity to revise points which have been missed in conventionally delivered lectures (Kumar, 2003) and have been shown to be a more effective revision tool than a text book (Evans, 2008). Evans argued that Podcasts are especially engaging when they are designed to enable students to construct their own understanding of material rather than simply providing a means of committing information to memory, this idea became a catalyst for the research reported in this article.

Podcasts are now an established means of providing introductory ideas prior to lectures as 'orientation' inputs, for example Woodward's research in 2007 in relation to chemistry lectures, and have been used to deliver peer support as exemplified by McLaughlin, et al. (2007) in relation to their Australian teacher education programme. In terms of accommodating to the needs of a wide diversity of learners and their learning style preferences, podcasts have been found to make material more accessible (Cebeci and Tekdal 2006) whilst Honey and Mumford (2006) report that podcasts help auditory and visual learners. Fox and Ronkowski (1997) with their work with political science students argue that podcasts can contribute to accommodating course design needs to a diversity of learning styles.

Podcasts have the potential to be an anytime anywhere medium; research with Australian university students found that students did not use podcasts 'on the go' but saw them as dedicated study time resources which they accessed via their computers usually at home (Chan, 2007). United Kingdom students on an Information and Communications degree course (Evans, 2008) did not multi-task, preferring to study podcasts on their home computers, Copley (2007) also finding this to be the case. Of some concern perhaps is research undertaken in the Unites States by Huntsberger and Stavitsky (2006) who examined students studying journalism and their attitudes towards podcasts. Their findings revealed that 40% of the cohort admitted to using the podcasts as replacements to textbooks rather than as additional revision material.

Evidence of the impact of Podcasts on student learning

Dolowitz (2007) argued that for some students accessing information via podcasts can damage undergraduate research and learning processes. In general, however, podcasts have been shown to enhance the undergraduate student learning experience by providing active learning opportunities (Cooper et al., 2009 and McGarr, 2009, Spencer 2009) which facilitate the needs of the learner. Edirisingh and Salmon (2007) used ten minute podcasts as part of their teaching and learning strategy on a Linguistics and Communication course. They reported that podcasts supported organisational aspects of learning, brought an informality and element of fun to formal learning and developed independent study skills. Performing arts students at Wolverhampton University used iPods and identified flexibility, creativity, sensory, personalised and collaborative learning, as the benefits of this technology (Dale and Pymm, 2008). Research with Music students (Cooper et al., 2009) at the same university identified increased flexibility and significant improvement in active

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learning opportunities which would not ordinarily have been achieved within the traditional lecture based delivery of the programme. Thomas (2006) found that re-listening to podcasts allowed students to develop critical thinking and analytical skills.

Whilst there is substantial evidence of the impact of the use of podcasts on the quality of the learning experience there is a general lack of evidence on the impact on learning outcomes (Lazzari, 2009). Whilst a number of studies have shown a positive impact of the use of podcasts on student learning (Belanger, 2005, Brittain et al., 2006, Lane, 2006, Rudel, 2006, Bell et al., 2007, & Dale, 2007) none of these directly compared the use of podcasts with the same content delivered in another form (e.g. written transcript). Abt and Barry (2007) found no statistically significant evidence that using podcasts provides any quantitative benefit for students over and above written text when learning about exercise physiology.

The value of Podcast creation by students

Atkinson (2006) found that podcasting has a limited impact when used as a mere method of distributing information. Abt and Barry (2007) support this and found that in terms of the most utilised use of podcasts that of an alternative method of knowledge transmission, there is no statistically significant benefit for students over and above written text. However, when students engage in creating their own podcasts, in activity which involves learning through podcasts rather than from podcasts, the literature suggests that there are significant benefits in terms of the depth of their learning, the depth of their understanding of the subject matter being worked on, as well as the development of collaborative learning skills.

Podcast creation by students, especially as a group activity, for sharing with their peers, is an increasingly used pedagogical tool which has been shown to yield considerable learning benefits. Lee and Chan (2007) asked second year IT students to produce weekly podcasts for first year students. Frydenberg (2006) allowed IT students to work in pairs to create podcasts about a topic in the course to share with the rest of the class. This proved to be a catalyst for motivation, engagement and self-regulated learning in a blended setting. Critical thinking skills were developed through the process and it was apparent that students had to have a comprehensive understanding of the material in order to be able to create their own podcasts. McGarr (2009) identified the Podcast as a tool for the active construction of knowledge. Miller, (2006), Atkinson, (2006) and Lee et al., (2008) all identified podcasts as having knowledge-creation value and as disseminators for learner generated content.

Lazzari (2009) found that when students were tasked to work in small groups to create their own podcasts that they developed reflective learning skills and they were motivated to go deep into the themes they had selected from their course; the process also fostered positive collaborative behaviours which in turn promoted students' skills of collaboration. Lee et al., (2008) reported that students involved in group produced podcasts demonstrated excellent collaborative skills, initiative, self-organisation and time-management. The dissemination of the final podcasts for others to view allowed for a deepening and widening of debate beyond the confines of the usual seminar process. Kemp et al. (2012) in their research into student

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creation of radio podcasts identified increased collaborative group work, the development of IT skills and deeper understanding as impacts on learning.

The Aims of this Study

This study aimed to explore the potential value of learner created podcasts as an assessment tool in higher education. The research questions that framed the study were:

1. Are there any statistically significant benefits for students in engaging in creating small group podcasts in order to demonstrate their achievement of the required outcomes in an end of module assessment?

2. What do students see as the benefits of creating their own podcasts in relation to their own learning and achievement?

Method

The questions were researched by using the end of module assessments produced by 28 students linked to a podcast creation task together with individual interviews which explored the students' reflections on their learning during the course of the module.

The podcast creation task

A group (n=28) of second year under graduate students studying on an Education and Subject Studies three year Honours BA/BSc degree course at a small UK University College were given the opportunity to create multi-media podcasts as part of a six week, ten credit 'Education and the Media' module.

The assessed module assignment required students to undertake a critical study from a range of themes for example, the role of television and children's developing imaginations, social networking and cyber bullying, children's emotional development and video gaming, and media spin and educational reform. Students were assessed through a group multi-media presentation podcast and the production of an individual critical reflective journal which was required to: chart their group journey through the production of the podcast, review the relevant literature they had studied and reflect on the benefits of the podcast creation assignment in terms of supporting their learning connected to their chosen theme. Students were expected to demonstrate that they could use new technology in their own creative education production.

Twenty eight students opted for the six week Education and the Media module in the second semester of 2011. The students formed their own groups of between five and six, most choosing to work with people they already knew although this was not the case for every group. Despite the anticipated sound skill base each brought to their team different levels of knowledge and skill, as well as different sets of backgrounds and experiences. Students were introduced to various aspects of podcasting by an experienced senior lecturer in e-learning as part of their taught sessions and students were provided with timetabled sessions during which they could become

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familiar with the technology, these sessions running alongside the module content alongside their compilation of individual reflective journals

- Area of focus, reading and reporting
- Scriptwriting
- Video recording
- Editing
- Publishing

Area of focus, reading and reporting

The students were self-regulated and proactive in their work most realising that in order to create an effective group podcast there needed to be something valid from each member of the group to record. Groups agreed their area of focus in the second week and individuals were then tasked with a specific area to undertake their own reading research. Students were expected to keep each other informed of their progress and this was done through a variety of. Independent directed task time was also included to allow for students to undertake filming.

The podcast production process

Most groups of students worked through the following stages of podcast creation which ran

methods of communication ranging from face to face meetings, Twitter, e-mail, text messaging to the creation of a group Face book page.

Scriptwriting

During meetings students' reading informed their scriptwriting and the final format for the podcast was agreed. Their lecturer provided guidance on request but it was made clear to them that there was an expectation that their own interpretation of their research was important. It was hoped that each group would have real ownership of their work through being given 'permission' to be as innovative and original as they wanted to be. Typically one or two from each group were elected to undertake the necessary drafting of the scripts which were then edited and annotated by the rest of the group, sometimes through face to face meetings and sometimes through email attachments using track changes.

Video recording

As with the area of focus and the script writing for the podcast, the casting and creators of the various forms of text which would be required were for most groups, democratic team efforts. At this point in the module (week 4) students were familiar with each student's strengths and these were fully utilised. Students had been issued with cameras from the University College to ensure that each group had access to the same quality of equipment. Some video recording took place out 'in the field' as well as on campus. Informal rehearsals before taking up University College rooms for video recording ensured that when it came for the 'camera to roll' their booked room time was used to maximum effect. Students used their scripts as guide outlines

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having become familiar with the content; this resulted in the presentations appearing professional, unstilted and natural.

Editing

Editing took up more time than both the lecturer and the groups had anticipated; tasks included splicing, removing errors, adding text, voiceovers and decreasing the length of the work as the assessment requirement was a maximum of 15 minutes for each podcast. A film editing package (Movie Maker) together with software presentation packages (Power Point and Prezi) were used as these are freely available on the internet. All groups maintained their commitment to the project having invested so much time and effort in its creation.

Publishing

The completed podcasts were uploaded onto the University College e-learning platform so that they could be used by staff and students.

The assessment process

The assessment of the students' work took place during the examination period at the end of the second semester 2011. Each group of students was required to show their podcast to two senior tutors at the university and to discuss its creation and execution through an informal conversation. Student's individual reflective journals were also handed in during this time. A group mark was awarded to each podcast and this was then added to an individual mark given to each journal. The assessment criteria, linked to the award of marks, were comparable to those used for all other assessed assignments the students undertook in year 2 (Level 5). The criteria required students to demonstrate their competence in relation to four categories: knowledge and understanding; collection, selection and analysis of observations and reading; application of theoretical perspectives and quality of communication.

Answering the research questions

Question 1 Are there any statistically significant benefits for students in engaging in creating small group podcasts in order to demonstrate their achievement of the required outcomes in an end of module assessment?

This question was answered through a statistical analysis of marks achieved through the podcast assignment compared with marks achieved through other assessed assignments. During the second year of the course students submitted seven assignments for assessment. At the end of the academic year the complete set of seven marks achieved by the 28 students who took the Education and the Media module were tabulated an analysed. The analysis aimed to establish if the students had performed better, in relation to the assessment criteria, through the podcast assignment than in the other six assignments.

Question 2 What do students see as the benefits of creating their own podcasts in relation to their own learning and achievement?

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Content analysis (Patton, 1990) was used as a method to analyse the students' reflective journals to derive insights into the perceived benefits of podcast creation on learning and achievement. Content analysis is a generic term for a variety of means of textual analysis that involve comparing and categorising a corpus of data (Schwandt, 2001). In essence the process was as described by Collins (2001:11) below:

> '...an iterative process of looking back and forth, developing ideas, and testing them against the data, revising ideas, building a framework, seeing it break under the weight of evidence, and re-building it again. That process was repeated over and over, until everything hung together in a coherent framework of concepts'.

By reading through a random selection of fourteen of the student journals and coding the ideas they expressed a provisional framework of the benefits of podcast creation and the reasons for these benefits was generated. The framework of provisionally generated categories was then tested and further developed and refined using the remaining fourteen journals. With regard to appropriate ethical considerations the students were told informed of the intention to analysis their journals for the purpose of the research and were given the opportunity to withdraw, in the event all twenty eight students were happy to participate in the research.

Finding

Table 1 shows the outcomes for each of the seven modules expressed as a percentage. *The marks achieved by students on second year assignments. N=28.*

Module	**Assessment medium**	**Mean mark (%)**	**Mark range (%)**	**Standard Deviation**
1	Essay	54.6	37 - 77	9.464
2	Portfolio of work	54.5	35 - 90	12.158
3	Exam	55.6	30 - 68	9.875
4	Case Study	57.1	40 - 85	10.627
5	**Podcast**	**67.2**	**52 - 82**	**9.468**
6	Multi-media presentation	54.5	26 - 81	12.851
7	Exam	55.0	22 - 70	8.400

Table 1: findings

Twelve of the 28 students achieved their highest mark across the seven modules in the podcast module. The second year module marks were subjected to 'paired t-tests' against the null hypothesis that 'the sets of marks were essentially the same'. When comparing modules other than Module 5 (podcast), the null hypothesis could

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not be discarded, the levels of achievement compared well. When comparing Module 5 with each of the other modules, however, the null hypothesis could be rejected with near certainty - ANOVA $F=5.378$, $p< 0.001$ – indicating that students were generally achieving better on this module than the other six modules.

The content analysis of the students' reflective journals revealed three key benefits of podcast creation tasks which the students considered as significant in enhancing their learning and achievement:

- Deeper intellectual engagement with a topic;
- Recognition of the value of collaborative learning;
- Recognition that practical activity can deepen intellectual understanding.

The students reported that they were more deeply engaged with the topic they were focusing on than they recalled being with other assignments they had undertaken. The deeper engagement was seen as being due to the fact that the work was directed towards a product, the podcast, and that the product was being worked towards collaboratively as a group endeavour.

Deeper intellectual engagement with a topic was seen as being related to the following dimensions:

Focussing down their activity on a specific aspect and linking reading and theoretical perspectives with their own emerging thinking.

> 'We narrowed our research down and found ourselves going into more depth. This was probably something none of us had done before.' (male)
>
> 'Doing all this research I've found out a lot. Research is never fun is it…but working together we laughed a lot. When we got filming we had so much in our heads from our reading that we were surprised at how much we had learnt.' (female)
>
> 'I thoroughly enjoyed it, essays are more theoretical based on knowledge but with this you wanted theory but you also wanted to know our opinions and beliefs.' (male)

The consideration of different points of view which illuminated their topic/aspect.

> 'I became aware of the need to look at a range of points of view.' (female)
>
> 'It really expanded my view.' (male)
>
> 'It was quite interesting to reflect on my different opinions and with research finding out for myself the different criticisms of the theories.' (male)

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The use of a wide range of source materials especially journal articles to provide context and multiple perspectives on their topic/aspect.

> 'I got involved in doing international research using journal articles for the first time. (male)
>
> 'I used the e-portal which I have continued to use with subsequent assignments.' (male)
>
> 'It didn't feel like it but I did a great deal of reading. I was surprised about how much I had read and understood by the end of the module.' (male)
>
> 'I have done a lot of reading. Not forced reading, I've wanted to do it. Then I got a long reference list before I knew it…a lot of reading but it didn't feel like I'd done it at all. We just nipped to the library for half an hour now and again and we got a lot of information. We used our reading to inform our show and characters. It's been great.' (female)

The building of an evidenced argument through evaluating emerging ideas against research findings.

> 'Finding one piece of information naturally led to search for more.' (male)
>
> 'Very few of our initial ideas were worthless as they led on to new ideas and thinking.' (female)
>
> 'It really expanded my view. I think the module pushed me to do more research.' (male)

In response to the question, 'What about reading for the module? A male student replied, 'There's so much reading, including school policies and research into cyber-bullying, I prefer this to essays, there were so many ways to link up your reading in this assignment.'

The robustness and rigour of the students' engagement with the topic theme.

> 'I stumbled upon a radio interview with a media professional who was researching video gaming. This led us to examine the validity and reliability of his claims. It was a real breakthrough for our podcast.' (male)
>
> 'We were confident in what we had found out. We had a lot of evidence from different sources to support the podcast construction.' (female)

The value of collaborative learning was recognised as being related to:

The opportunity for dialogue and debate to generate ideas and develop arguments.

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> ‘We were able to argue the point together, each contributing to the topic as we went along.’ (male)
>
> ‘We had a good debate to get all the ideas out.’ (female)
>
> ‘We listened to what each other had read about and this informed our understanding and allowed us to be selective about what we included in the podcast.’ (female)

The opportunity to hear other views and perspectives to broaden understanding and to recognise multiple perspectives.

> ‘Working as part of a group helped me to look at a range of points of view and a range of different research. I think we all became less biased in our individual thinking. More open to consider alternatives and keen to probe deeper.’ (male)
>
> ‘I learnt that not everyone thinks the same way as I do.’ (male)
>
> ‘I learnt to listen to other views and to be less opinionated before I’d heard other perspectives.’ (male)

The opportunity to work with and benefit from other’s strengths

> ‘We worked to people’s strengths and got the best out of everyone.’ (male)

The value of committing to quality outcomes from a joint endeavour.

> ‘We all had a stake in the project.’ (female)
>
> ‘We got to know each other well as there was a degree of loyalty that built up.’ (female)

Recognition that practical activity can deepen intellectual understanding

The following quotation captures the thoughts of many of the students:

‘The assignment taught me that working collaboratively with other students on a task that has a practical element and a tangible outcome can lead me to deepen my understanding and intellectual grasp of a topic.’ (female)

Discussion

The statistical analyses of the marks achieved by the 28 students through seven assessed assignments indicate that their achievement on the collaborative podcast creation assignment, in relation to comparable assessment criteria, was significantly better. In broad terms the students were able to demonstrate, through the podcasts themselves and through reflective journals, higher levels of competence in relation to the academic criteria than they were able to do through other assessed assignments which use assessment tools such as essay writing, exams and other individually produced products. These findings are, however, from a relatively small sample

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size. They are also from a sample of students who it might be said, having opted to undertake a technology focussed module, were likely to be highly motivated by a media/technology practical related task and thus do well on a technology focussed assessed assignment. Further work would need to be done to establish if the observed effects with the group of 28 students in this study can be replicated across larger groups of students and across a range of areas of content focus. If the claim is to be made that the collaborative creation of podcasts enhances a student's capacity to engage in, and demonstrate to others, a range of accepted academic capacities, then a wide range of students, not only those who are attracted to technology and practical activity need to be involved.

The content analysis of the students' reflective journals generated a set of what the students saw as the features which are the benefits of the collaborative podcast creation task in terms of their own learning and achievement. These findings provide insights that go beyond the broad descriptions of benefits of podcast creation such as 'greater motivation and engagement' (Fryenberg, 2006), and motivation to go deeper into theories (Lazzari, 2009). By reading the quotes from the student interviews used to exemplify each of the features it is possible to get a sense of the students' depth of intellectual and emotional engagement with the content they explored and their drive to achieve, as was noted by Lee et al. (2008:517) in relation to the work of a group of students producing audio podcasts, albeit not for assessment purposes. Lee suggests that this depth of engagement is due to podcast creation tasks requiring 'a commitment to producing tangible objects of shared activity'. The students in the research reported here saw the benefits of collaborative learning as being linked, in part, to 'the commitment to quality outcomes' and saw the podcast creation task as supporting their 'recognition that practical activity can deepen intellectual understanding'. Interestingly no student made any reference about the assessment of the group podcast and the individual literature review in their reflective journals. The group engagement on the podcast creation process appears to have been more important than simply working towards 'getting a good mark', if this is the case then the podcast tool is perhaps a powerful motivator enabling enhanced performance.

The students reported that their intellectual engagement with the subject matter of their podcast was deeper than was usually the case with other assignments. They characterised this deepened level of engagement as involving: focusing down; considering different points of view; using a wide range of source materials, including academic literature; building evidenced argument and the general robustness of their approach to the development of the content of their podcast. These features can be seen as being linked to the collaborative nature of the assignment which allowed for argument and debate, hearing other views and perspectives and sharing the work in terms of reading journal articles and other source materials, together with generally working with the strengths of the people in the group. It could also be suggested that the research group of students may have had a degree of cultural commitment to using Web 2 tools and this may have played a part in their enthusiasm as well as the shared social context and the focus on a common goal as being key factors that ensured on-going exploratory dialogue, and a commitment to sharing ideas and learning. Further research into this idea will need to be explored beyond the confines of this article.

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With respect to the credibility of the findings from the content analysis it is recognised that the categories/reasons generated are subjective in two senses. Firstly it is precisely the students' subjectivity that is being depicted rather than the 'reality' of the learning engagement. In this sense subjectivity is the object of the research. Secondly, the method used for dealing with the research object was subjective in itself. The categories described are outcomes of a process of discovery and it is at least possible that another researcher analysing the same material would have arrived at different categories. The categories derived from the journals were not presented back to the students as a validity check which would have enhanced the credibility of the findings of the student journals

Notwithstanding the methodological limitations of the research the findings have potential significance in influencing how podcasting can be used beneficially in higher education. Many of the beneficial features of the podcast creation activity derived from the analysis of the students' reflective journals were related to knowledge- creation (Miller, 2006, Lee et al., 2008, McCarr, 2009).

In knowledge-creation activities:

> 'They (learners) are there not to simply participate in activity and acquire skills, but also to produce shared outcomes and advance the intellectual capital of the group.'
> (Lee et al., 2008:510).

Lee et al. (2008) found that a high proportion of the discourse contained evidence of knowledge-building principles, as proposed by Scardamalia (2002:511) such as 'improvable ideas' – a form of progressive problem solving when a group dialogue focuses on developing and refining ideas, and 'epistemic agency' ' whereby students expressed their ideas, listened to divergent opinions and maintained a focus on improving the outcome' In contrast to Lee's findings the students in this research did demonstrate significant evidence linked to the knowledge building principle of 'constructing uses of authoritative sources'. The students made extensive use of journal articles and other source materials and were able to adopt a critical stance towards them.

In higher education podcasting technology is mostly used as a content distribution mechanism and as such positions the student as a passive recipient of knowledge as Lee et al., (2008), Miller (2006) and Atkinson (2006) all contend, however, as this small scale research indicates the potential of podcasting technology could have a serious role to play in its knowledge creation value and its use as a vehicle for dissemination of learner –generated content, put simply, learning through creating podcasts rather than learning from podcasts. The study reported here demonstrates that by engaging in knowledge – creation activity using podcast technology the depth of students' intellectual and emotional engagement with subject matter can be significantly enhanced and that this depth of engagement can be recognised through formal assessment processes.

Conclusion

The findings indicate that when compared with the marks achieved in six other assignments, marked using comparable criteria, the students' achievement in the

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podcast creation assignment was significantly better. Content analysis of the students' reflective journals generated a list of the features of the podcast creation process which may have had an impact on this enhanced student performance and which could be incorporated into other assessment methods. The research suggests that there may be some potential value in using learner created podcasts as an assessment tool in higher education in conjunction with appropriate strategies. Given the increased use and application in higher education of Web 2.0 tools by under graduates there may be scope for devising other learning activities which involve groups of students in knowledge-creation endeavours the product of which, when accompanied with academic writing e.g. reflective journals, which incorporate a review of literature, can be used as an engaging assessment tool which may enable students to enhance their academic performance.

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