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Podcasting by synchronising PowerPoint and voice: What are the pedagogical benefits?

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ABSTRACT

The purpose of this study was to investigate the efficacy of audio–visual synchrony in podcasting and its possible pedagogical benefits. 'Synchrony' in this study refers to the simultaneous playback of audio and video data streams, so that the transitions between presentation slides occur at "lecturer chosen" points in the audio commentary. Manufacturers of lecture recording software (e.g. ProfCast) would have us believe that the synchrony of image and audio should improve the learning experience. We have yet to see in the literature any empirical evidence to support this hypothesis. In our study, 90 participants in two groups undertook two electronic lectures (e-lectures) on two separate topics, the subject matter of neither was familiar to them beforehand. Each group experienced one "synchronous" presentation (e-lecture) of one of the topics, and one "separate" presentation (i.e. PowerPoint and audio files separately presented) of the other topic. Each group therefore experienced both "synchronous" and "separate" delivery and they were then given an MCQ test that assessed five levels of Bloom's taxonomy. Results show no differences in innate ability between the two groups but the evidence supported our primary hypothesis in that statistically significantly higher test scores were seen when participants viewed a synchronous e-lecture; these scores were accounted for by subjects' performance at three of the five levels of Bloom's taxonomy. Qualitative 'attitude' survey results also displayed participant preference towards the synchronous over the asynchronous mode of delivery, and in spite of general acceptance of the proposed benefits of electronic proceedings, a majority preference towards traditional rather than electronic lectures. Despite this conservatism, this paper explores in more detail the potential benefits of podcasting via synchronous PowerPoint and voice.

1. Introduction

Electronic delivery of lecture material (e-lectures), both as an adjunct to traditional teaching and a means of distance learning, presents enormous opportunities for higher education (McKinney, Dyck, & Luber, 2009). De la Sola Pool (1984) argued that computer-based communication is the most fundamental change in communication technology for over a hundred years. The published research upon the topic of e-learning however offers little in the way of empirical evidence to support its efficacy; without this, it could be argued that an in-depth understanding of e-learning in higher education would surely be incomplete (Garrison & Anderson, 2003).

PowerPoint presentations are by far the most common means of delivering lectures (Fisher, 2003) and many lecturers have taken the option of podcasting audio recordings of their lectures, either recorded 'live,' or in the comfort of their offices, in addition to supplying the PowerPoint file online to their students (McGreal, Cheung, Tin, & Schafer, 2005). More recently, specialised lecture recording software has offered lecturers greater opportunities to synchronise their audio recordings to the accompanying PowerPoint slides to create fully navigable 'e-lectures', thus making available an entire lecture experience online. This has led to an increasing number of universities turning to e-lecture recording technologies to tailor their own e-learning solutions (Rui, Gupta, Grudin, & He, 2004).

A variety of studies have endeavoured to make a comparison between e-lectures and traditional methods of learning. Within this field, qualitative studies are most common, and perhaps as a consequence, there is a paucity of empirical evidence of the efficacy of e-lectures (Wofford, Spickard, & Wofford, 2001). Dewhurst and Williams (1998) concluded that the e-learning system they had implemented was as efficient as traditional means at imparting information, although a survey distributed to students found that they preferred traditional approaches to the electronic alternatives. In contrast, Holt et al., (2001) found that students rated e-learning systems as more effective and

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efficient in comparison to traditional means. A further study (Brotherton & Abowd, 2004) found that students used their "eClass" system to take useful lecture notes. When the effectiveness of eClass was evaluated by survey the majority said that they did not think that the program could be a complete replacement for the traditional approach but conceded that it was a very useful supplement, especially for revision purposes, or when a lecture was missed. This accords with the authors' own anecdotal experience of using synchronous lecture recording technology in the classroom (Brotherton & Abowd, 2004) (see Fig. 1).

In addition to studies comparing e-learning techniques to traditional lectures, the work of our own research group (Griffin and colleagues) has specialised in comparing different e-learning techniques against one another. In one quantitative study, we (Evans, Gibbons, Shah, & Griffin, 2004), demonstrated that an e-lecture with enhanced interaction and navigation properties yielded higher test scores on a comprehension test when compared with the same content being delivered as static imagery and text. We suggested that the structure and usability of an e-lecture's interface, along with its navigational properties, are paramount in determining the effectiveness of an e-lecture. In a later study we compared "real" lectures with two different types of e-lecture (one of which involved synchronised PowerPoint and voice) concluding that different types of lecture delivery can differentially promote different types of student learning as measured using the principles of Bloom's taxonomy (Stephenson, Brown, & Griffin, 2008).

In the current study we extend our investigations using previously tried and tested approaches (Evans et al., 2004; Stephenson et al., 2008) to test the hypothesis that synchrony of PowerPoint and voice in podcasts has pedagogical benefits over presentation of the two media as separate files (one podcast and one PowerPoint file). Indeed it has been previously suggested that audio–visual synchronised presentations are of more worth than stand-alone PowerPoint presentations or audio files (Latchman, Salzmann, Gillet, & Kim, 2001) however we have yet to encounter an empirical study that asks the question of whether synchrony *per-se* lends itself to promoting the learning process (despite its obvious popularity). Indeed, an alternative hypothesis might be that keeping the audio and PowerPoint separate forces the learner to remain involved with the information and thus to promote more effective learning.

2. Research design

2.1. The nature of the e-lectures and podcasts used in this study

Two different types of presentation formats were designed for each topic that was presented to the participants: a "synchronised" e-lecture format and a "separate" PowerPoint file with accompanying mp3 audio podcast.

In the first (synchronous) style of presentation, the students were able to view a fully synchronised audio–visual podcast. In practice this meant that the slide transitions throughout the presentation were automatically timed to coincide with the appropriate point in the audio commentary. These e-lectures had full navigability through the use of slide-select drop down menus and a timeline tool bar when viewed in a compatible viewer. Presentations were devised using Microsoft PowerPoint, and audio commentary was studio recorded over the presentation slides using the software ProfCast. The ProfCast program was developed by Humble Daisy Inc. (http://www.humbledaisy.com/). It was designed for use with Macintosh computers only (although, at time of writing, there is a Windows based version under Beta test) and was utilised in the creation of the electronic video lectures and presentations used in this study. ProfCast records lectures by synchronising visual stills and audio commentary, and subsequently outputting the synchronised data into a selected video (.mov) or enhanced audio (.m4a, .m4b) file format. These files can then be played back on any computer with a standard media player, for example, Apple QuickTime

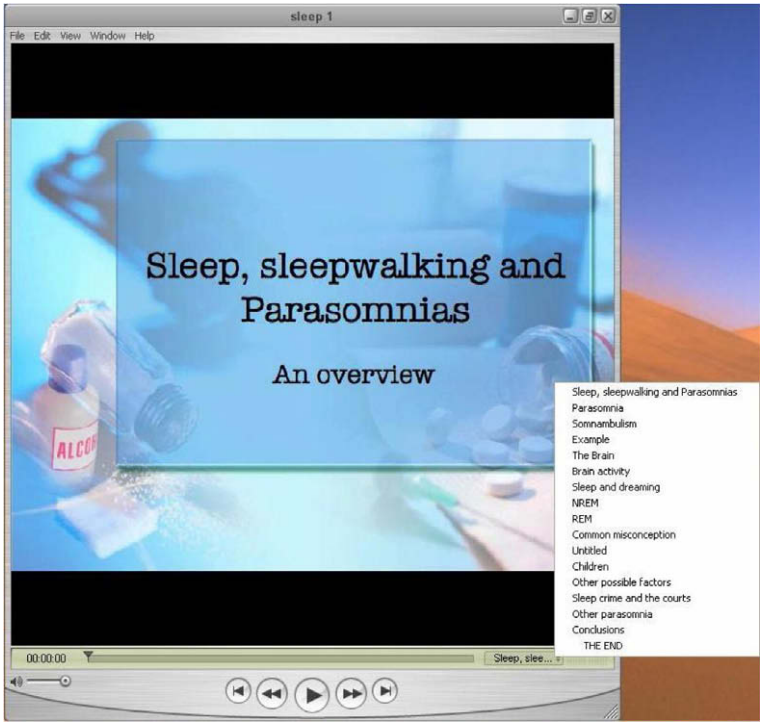

Fig. 1. An example of one of the "synchronised" e-lectures with slide-select menu.