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# An evaluation of the use of voice boards, e-book readers and virtual worlds in a postgraduate distance learning applied linguistics and TESOL programme

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We researched the incorporation of three learning technologies (voice boards, i.e. voice-based discussion boards, e-book readers, and Second Life virtual world), into the Master's Programme in Applied Linguistics and Teaching English to Speakers of Other Languages offered by distance learning at the University of Leicester. This small-scale study was conducted as part of a JISC-funded research project called DUCKLING (Delivery University Curricula: Knowledge, Learning and INnovation Gains). The project focused on the impact of learning technology innovations on the design and delivery of distance-based postgraduate curricula. Digital audio technologies such as voice boards, used in conjunction with online activities ('e-tivities'), constitute a low-cost innovation that offered high value to the distance learners who participated in this research. Benefits included a perceived reduction in learner isolation, increased personalisation and further opportunities for tutor and peer feedback. E-book readers, preloaded with course materials, afforded moderate benefits to learners, especially in relation to flexibility and access, at a relatively low cost. Virtual worlds such as Second Life required a steep learning curve for learners and tutors alike and incurred higher development costs, with a lesser impact on the learner experience.

**Keywords:** distance learning; new technologies; digital audio; voice boards; e-books; virtual worlds; Second Life

## Introduction

The rapid growth of online distance education worldwide has prompted the need to revise delivery structures and re-think pedagogical approaches. Many educational institutions are looking for ways to improve their current practices with regard to technology integration and how it might enhance the distance learning experience (Dabbagh & Bannan-Ritland, 2005; Rogerson-Revell, 2007). Although emerging technologies potentially offer a vast range of opportunities to support programme delivery and facilitate interactive and collaborative learning environments, distance programme educators need to weigh up the potential costs versus benefits of such innovations.

The University of Leicester is a 'mega' provider of distance education (Arneberg et al., 2007, p. 86), with over 7000 distance learning students mainly on postgraduate programmes. The vast majority of distance students are enrolled in

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work-based master's programmes. It is part of the university's mission to continue investing in and expanding the delivery of its work-based distance learning programmes and to enhance the experience of these learners through the effective use of learning technologies.

The development and incorporation of new technologies, as outlined in this paper, is seen as part of this enhancement. The technologies investigated here are voice boards, e-book readers, and virtual worlds. Voice boards are asynchronous audio discussion forums allowing users to record and post threaded audio and text messages. E-book readers are portable electronic devices designed primarily for the purpose of reading digital books and other texts. Virtual worlds are computer-based simulated environments in which users can interact usually through an online persona or 'avatar'. We report on a funded research study into the pilot integration of these three technologies into the distance MA in Applied Linguistics and Teaching English to Speakers of Other Languages (TESOL) at the University of Leicester, and evaluate their impact on the learner experience in relation to the cost of introducing them.

## The use of new technologies in higher education

According to a recent report by the Economist Intelligence Unit (Glenn, 2008, p. 4): 'Technological innovation, long a hallmark of academic research, may now be changing the very way that universities teach and students learn'. The survey concluded that such technologies would have a major impact on higher education in the near future. Based on a comparison of different communications technologies, 52% of survey respondents felt that online collaboration tools would make the greatest contribution in terms of improving educational quality, while 48% favoured 'the dynamic delivery of content and software' (Glenn, 2008, p. 4) to support individually paced learning. The survey also refers to the growing role of technologies in distance education. It recognises the importance of technology in terms of increasing global access to education.

Distance education practitioners and researchers have long been concerned with finding ways to enhance the distance learning experience. More recently, this concern has embraced considerations of the role of new technologies (Beldarrain, 2006; Dillenbourg, 2008; Koszalka & Ntloedibe-Kuswani, 2010). It has been suggested that the use of such technologies offers several advantages over traditional approaches to the design and delivery of distance programmes. For instance, the use of mobile technologies has been seen as increasing flexibility and access, and enabling students to have greater control over the learning process (Attewell, 2005; Hannum & McCombs, 2008). A strong case has also been made for the role of Web 2.0 technologies such as wikis, blogs and social networking sites in fostering student collaboration and interaction in the context of a constructivist approach to learning (Beldarrain, 2006).

There has been limited research into the incorporation of voice boards, e-book readers and virtual worlds in postgraduate distance learning to date. Small-scale pilots within language teaching programmes showed that the use of voice boards enhanced the overall student learning experience (King & Ellis, 2009; Yaneske & Oates, 2010). However, students have expressed frustrations about the limitations in functionalities within the platform (Van Deusen-Scholl, Frei, & Dixon, 2005; Yaneske & Oates, 2010). Difficulties in navigation seem to have a rather significant

impact on the perceived usefulness of this technology. In a study of using voice boards with undergraduate students in pre-medical, nursing and health science, participants reported that no significant benefit in using voice over text-based communication tools was perceived (King & Ellis, 2009). In another study where voice boards were trialled with 600 undergraduate students in an Australian university, students preferred to use text over voice postings on the voice boards (Marriott, 2002).

According to the *Horizon Report* (Johnson, Levine, Smith, & Stone, 2010), e-book readers enable users to store, read and annotate hundreds of digital volumes in a format smaller than a single paperback book. The authors claim that e-books will be used increasingly across campuses in the next two to three years as 'Electronic books promise to reduce costs, save students from carrying pounds of textbooks, and contribute to the environmental efforts of paper-conscious campuses' (Johnson et al., 2010, p. 6). However, a recent study investigating the benefits of Kindle e-readers for medical students, residents and preceptors in clinical settings yielded mixed results. Portability and searchability are reported as the major advantages. Connection speed, difficulty in navigation and lack of colour display were noted as major limitations (Shurtz & von Isenburg, 2011). Other drawbacks identified to date include flickering, difficulty navigating and short battery life (Armstrong & Lonsdale, 2009; Siegentahler & Wurtz, 2010).

Johnson et al. (2010) similarly predict that the use of virtual worlds (which they refer to under the broader term 'augmented reality') is only two to three years away from widespread use on campuses. Virtual environments offer benefits such as opportunities for experimentation without real-world repercussions and learning by doing (Rudman, Lavelle, Salmon, & Cashmore, 2010). They have been viewed as particularly useful in promoting social presence for part-time adult learners (Omale, Hung, Luetkehans, & Cooke-Plagwitz, 2009) and socialisation for learning among distance learners (Ediringsingha, Nie, Pluciennik, & Young, 2009). Similarly, within distance education, the use of virtual worlds has been viewed as facilitating a constructivist learning environment (Dickey, 2003). Specifically within language teaching and learning, virtual worlds such as Second Life (SL) have been found effective in improving learner's capacity to use a foreign language in a variety of real-life scenarios (Henderson, Huang, Grant, & Henderson, 2009).

However, there are also challenges and barriers in using virtual environments for teaching and learning. Omale et al. (2009) suggest that features such as avatar gestures and movements, sound, animations, along with bubble dialogue in three-dimensional virtual environments may become a distraction rather than an enabler for learning. Others have pointed out that such tools do not in themselves constitute a dynamic learning community. Dickey (2003), for instance, highlights the importance of the interplay between content, instructor and learners, while Warburton (2009) concludes that educators need to have a better understanding of virtual identities and relationships and improve digital and cultural literacy and design skills to be able to use virtual environments more productively.

Such studies reflect the growing interest in the use of new technologies in education, particularly in distance education. However, there are relatively few empirical studies that focus on the costs and benefits of such tools. This study aims to help fill this gap, by evaluating the three technologies in terms of their cost-effectiveness.

## The study

The distance MA in Applied Linguistics and TESOL programme at the University of Leicester faces common distance programme delivery challenges, such as enabling flexible modes of study, accommodating different levels of access to technology and encouraging interactive and collaborative learning, all within the increasing limitations on higher education resourcing. The MA in Applied Linguistics and TESOL has been running in the School of Education since 1995 and is one of the most established distance programmes in its field. The programme is aimed at experienced graduate language teachers, mostly work based, who want to further their academic and professional development. There are about 190 students registered at any one time, from approximately 25 countries. The programme can be completed in 2.5 to 5 years.

Although some aspects of the MA programme have been delivered through the University's virtual learning environment (VLE) since 2002, programme delivery went solely online in 2008. This initiated major developments in design and delivery in an attempt to move the programme into its 'second generation'; that is, an interactive e-learning environment rather than simpy using the VLE as a content repository of distance learning materials.

The MA programme team's overall aim is to enhance the distance students' learning experience. In particular, the team identified four key challenges in curriculum design and delivery:

(1) Improving learner engagement with the course content by using a variety of teaching approaches and media.
(2) Improving learner support by offering enhanced guidance, support and feedback in a variety of media formats.
(3) Enhancing flexibility and mobility in programmes aimed primarily at time-limited, work-based learners.
(4) Reducing learner isolation through the provision of additional opportunities for student–student and student–tutor interactions.

To address these challenges, a research study was designed and implemented to pilot and evaluate the use of three technologies within the MA in Applied Linguistics and TESOL: voice boards, e-book readers and virtual worlds. The study was conducted as part of a two-year JISC-funded research project called DUCKLING (Delivery University Curricula: Knowledge, Learning and INnovation Gains), which aimed to enhance the experience of work-based learners studying at a distance through the integration of new technologies. DUCKLING ran within three distance learning Masters' Programmes in Applied Linguistics and TESOL and Occupational Psychology during 2009 and 2010. The project was led by the University of Leicester's dedicated e-learning research unit, the Beyond Distance Research Alliance.

## The interventions

In collaboration with the Beyond Distance Research Alliance, the MA programme team planned the design, implementation and evaluation of the three new technologies within various areas of the distance MA programme, over the two-year period.

### *The voice board intervention*

For this study, an application called 'Voice Board' produced by the e-learning software developer Wimba was used in one of the core MA modules. Wimba Voice Board can be linked to most popular VLEs such as Blackboard and Moodle.

The purpose of using the voice board was to address two of the challenges: reducing student isolation and enhancing student support. We aimed to trial the voice board as a means of promoting interaction amongst tutors and peers and improving formative assessment and feedback. Previously, students were assessed through portfolio tasks in written format. In this pilot, students were assessed through online interactive tasks developed as a series of 'e-tivities', following Salmon's (2002) five-stage model. These were created within the voice board. Six volunteer students participated in the voice board trial over an 11-week period.

### *The e-book reader intervention*

The main aim in the use of e-book readers focused on the third challenge, 'enhancing flexibility and mobility', by enabling students to access course materials anywhere, anytime and without having to be online. In addition, the course team wanted to investigate the possible cost benefits of e-book readers in relation to other types of materials delivery, such as print.

Between October 2009 and March 2010, e-book readers (the Sony PRS-505) were given to one core module cohort of nine students, and an option module cohort of eight students on the distance MA. All e-book readers were preloaded with course materials and podcasts. These were the same resources that were available via the university's Blackboard VLE, but reformatted for the e-book readers. Unfortunately, journal articles and textbooks could not be included on the readers due to copyright restrictions, with the exception of one sociolinguistics textbook from Routledge, for which copyright clearance was obtained. The students involved were aware that this was a trial and that the use of the e-books was to supplement the existing module. All participating students volunteered to be part of the study and were not required to return the e-book readers to the University of Leicester after the study.

### *The virtual world intervention*

The introduction of the virtual world was aimed particularly at two of the four delivery challenges: improving learner engagement with the course content and reducing isolation by providing more opportunities for interaction.

A series of e-tivities using the SL virtual world was designed, developed and piloted for the optional CALL module within the distance MA programme. Six volunteers participated in this pilot, which ran over seven weeks in October and November 2009. Optional SL training was provided in two short in-world sessions. Students then visited SL individually, in their own time, and observed EFL classes at a virtual language school, Languagelab.com,[1] with the aim of considering the uses of virtual worlds for EFL teaching. The lesson observation protocol formed the basis of subsequent reflections by students via asynchronous discussion on the VLE discussion board.

## Methodology

Each intervention required a different form of data collection due to logistics, circumstances and location of students and staff. Table 1 provides a breakdown of the instruments used for data collection, the number of subjects participating in the research, and the methods applied for data analysis.

Due to the exploratory nature of the study and the limited number of students involved, qualitative methods and thematic analysis were considered the most appropriate choice for data collection and analysis. As our students are scattered globally, collecting data through online surveys, voice board and interviews was considered appropriate in this context.

Cognitive mapping interviews are effective in capturing people's views, perceptions and experiences and presenting complex ideas in a graphical way, and have been used successfully in other e-learning contexts (Armellini & Aiyegbayo, 2010; Nie, Armellini, Witthaus, & Barklamb, 2011; Russell, 2009).

In the three interventions, the quantitative data collected from the surveys were transferred into spreadsheets and descriptive statistics were applied to closed questions. Thematic analysis (Boyatzis, 1998) was used to code and categorise the qualitative data from the audio reflections from the voice boards, the open-ended questions from the surveys, and semi-structured interviews with staff.

In the e-book reader and SL interventions, a cognitive mapping process was used to capture a causal map of each interviewed student and his or her experience of using the technology. Cognitive mapping is a methodology developed from Kelly's (1955) theory of personal constructs: 'People make sense of their lives and situations by constructing, elaborating, revisiting and re-revising a system of interconnected concepts (more formally called "constructs")' (Bryson, Ackermann, Eden, & Finn, 2004, p. 21). A causal map is 'a word-and-arrow diagram in which ideas and actions are causally linked with one another through the use of arrows. The arrows indicate how one idea or action leads to another' (Bryson et al., 2004, p. 4). The causal maps were created using the *Decision Explorer* software.[2]

The Domain and Central analyses (Bryson et al., 2004, p. 324) provided by *Decision Explorer* were applied to the student causal maps generated from the

Table 1. Summary of research instruments and subjects.

| Intervention | Instrument used for data collection | Subjects | Methods for data analysis |
|---|---|---|---|
| Voice board | Collection of audio reflections on the voice board itself | 6 students | Thematic analysis |
| E-book reader | Online e-book reader survey | 17 students | Descriptive statistics<br>Thematic analysis |
| | Cognitive mapping interviews | 6 students (out of 17) | Cognitive mapping analysis |
| Virtual world | Online Second Life survey | 4 students (out of 6) | Descriptive statistics<br>Thematic analysis |
| | Cognitive mapping interviews | 4 students (out of 6) | Cognitive mapping analysis |
| All three interventions | Semi-structured interviews and notes from regular meetings | 3 tutors | Thematic analysis |

cognitive mapping interviews about the e-book reader and SL. The Domain analysis calculates 'the total number of in arrows and out arrows from each node' (Bryson et al., 2004, p. 324). A node with the highest score indicates that it is the 'nub of the issue' (2004, p. 324) of that map. The Central analysis calculates the centrality of a node within the map. A higher Central analysis score implies that the node is of structural significance to the map. Both analyses were used to detect the most important or 'busiest' concepts of each map. These concepts were then compared and contrasted with the key concepts that emerged from the e-book reader and SL surveys.

## Findings

### *Findings from the voice board intervention*

We received generally positive feedback from students participating in the voice board intervention, suggesting that this technology addressed three of our distance learning 'challenges' (Table 2). Students commented that the audio element added a human dimension to their studies and helped overcome the sense of isolation they felt as distance learners. The voice boards also appeared to have a positive impact in terms of enhancing support and providing constructive, interactive feedback on their formative e-tivities. Findings from the trial also suggested that the variety added through the audio element made the materials more motivating and challenging. However, the trial also showed that the tool's lack of functionality might affect the overall success of the use of this tool (see Table 3).

### *Findings from the e-book reader intervention*

Student responses to the e-book reader initiative were generally very positive. Apart from the obvious benefits of mobility, several students described fundamental

Table 2. Benefits reported from the voice board intervention.

| Benefit | Student quotes |
|---|---|
| Reducing isolation, increasing personalisation | 'It's so nice to hear from classmates around the globe; The world becomes smaller'<br>'It's really a good way to personalize the delivery of the degree'<br>'The emotions, tone and intonations are better expressed in the voice than the text' |
| Enhancing support and feedback | 'I'm getting more constructive feedback from the tutors and classmates, as opposed to getting limited feedback on the portfolio activities'<br>'It re-creates the seminar environment over the Internet' |
| Increasing engagement by adding variety to teaching materials | 'It challenges me to articulate my point; Things that are quite easy to do on paper can be quite difficult to do in real time by voice'<br>'It motivated me to study more and perform better'<br>'It's great to read articles that I generally wouldn't read'<br>'This really opens things up to me in many ways' |

Table 3. Key issues from the voice board intervention.

| Issues | Quotes from students and tutors |
|---|---|
| Limitations in functionality | 'The bad point is: I think it has a quite sophisticated platform. When you're listening to one recording, and if you accidentally or even intentionally click on another title, it then stops the recording. It would be nice if we could navigate more easily from one voice board to another' (student)<br>'The inability of not be able to upload anything, any forms of voice, which could be quite handy for the first activity we did. I guess not being able to upload pictures, anything like that could limit its overall success' (student) |
| Technical and access problems | 'Delays in opening threads, opening messages and using other applications, crashing computers, when using the Voice board' (student)<br>'Students in Saudi Arabia are unable to access YouTube or the BBC Voices website due to websites blocked by the government firewall' (tutor) |
| Learning style | 'My learning style is through writing things' (student)<br>'I really like to see what people write also on the voice board' (tutor)<br>'I've gotten used to Blackboard discussion board, especially in its written form. Before I record something, I take notes and try to speak freely, but upon the notes taken' (student)<br>'If someone recorded something, in order to respond, I have to take notes' (student) |

changes in their study habits resulting from the use of their e-readers, mainly because they could now access their reading materials off line for short periods during the day. As one student pointed out in the survey:

> It's helpful from a practical point of view. The nature of distance learning means you have to squeeze in study whenever you have time. Having textbooks and journal articles stored together so conveniently is much better than reams of paper on a packed commuter train in Osaka.

Similarly, some students noted that using the e-book saved the time and costs of logging onto the VLE and printing out course materials. They also indicated that they used their e-readers in conjunction with other technologies such as printed materials, netbooks and iPhones (i.e. multiple devices co-exist for use in different contexts).

The findings point to a range of positive impacts, summarised in Table 4, especially for those whose work patterns require them to fill many short gaps, which can be achieved successfully by accessing course materials offline on e-book readers.

However, drawbacks were also reported. Many of these related to technical shortcomings, particularly limitations in functionality with this early version of the Sony e-reader, which have been addressed in more recent models. For instance, students were generally dissatisfied with the lack of a highlighting or note-taking function in the Sony PRS-505, and they felt that this limited their use of the device throughout their studies. One student stated in the survey:

Table 4. Benefits from the e-book reader intervention.

| Benefit | Student quotes |
|---|---|
| Increasing mobility and flexibility | 'I think the e-reader is a very handy tool. It is easy to use. I can carry it with me wherever I go and read whenever I have time. I no longer worry about carrying so many papers in my bag or having an internet connection to access the modules material or listen to the podcasts. I believe that it made my life easier' |
| Saving costs and resources | 'Another impression upon receiving the device was that it had taken away a lot of the burden of having to login to Blackboard and download the course materials, print them off and then file them. This probably saved me about 5 hours of work and a tree's worth of paper' |
| Making better use of time | 'My experience is that it is a great student asset that has enabled me to travel lightly and given me the opportunity to fit in study during periods that may suddenly become available through a class cancellation etc. It is certainly made me optimize my time to the maximum' |
| Optimising study strategy | 'The e-reader has become an invaluable and essential tool for me. It has provided a way of studying which has a more progressive and accumulative effect than Blackboard, and it allows me to study more often and in situations which would have been difficult with printed materials (e.g. on the bus)' |

> A frustrating element is that you can't highlight or underline anything – so it is useful for running through a journal article, for example, for the general meaning, or for a review of something, but I do revert to paper copies of things often when I get back home.

Students were not satisfied with the delays and the flickering in turning pages. Additionally, study habits or preferences, as well as restrictions in accessing materials interactively, also had an impact on the usage of the device. Table 5 summarises the key concerns.

### *Findings from the virtual world intervention*

Evidence from six students involved in the SL pilot showed that the use of this technology partially met two of the identified challenges by providing new opportunities for interaction with peers and tutors and encouraging engagement by using a variety of teaching approaches and media.

All participating students reflected extensively in the survey and interviews on the advantages and disadvantages to using SL for language teaching and learning, and the difficulties and barriers to using SL for their own teaching contexts. One student concluded in the survey:

> I was introduced to this technology that I wouldn't have otherwise been introduced to. It got my creative juices flowing about the future of ESL and the myriad of tools out there that a practicing teacher (reliant on texts and traditional mediums of teaching) would rarely be exposed to.

Among other benefits reported by the students was the advantage of being able to use a simulated language classroom (through the LanguageLab classes) to observe

Table 5. Key issues from the e-book reader intervention.

| Issues | Student quotes |
|---|---|
| Lack of note-taking function | 'I like reading the module material in print because I can highlight the important parts and write some notes on the sides of the paper itself. I can also write the meanings of the new words. These things I really miss while using the e-reader or the laptop' |
| Discomfort with certain functionalities | 'Well, now I'm not really using it at all. I find that there is too little information on a page so that the constant page changing is distracting. I also don't like the way the pages change - a bit slow, with a flicker … I do not like the way the pages change and unfortunately there are many page changes at the font size I choose' |
| Study habits or preferences | '… but personally, I don't find it to be a replacement - for post-it notes stuck in various pages in a real book - some way of writing notes on the page is lacking I think' 'I think I still would rank print first as it is helpful for looking at the units 'in the round', moving quickly between information at a time of revision, highlighting text and so on' |
| Difficulty in accessing material interactively | 'The portability of the e-reader makes it preferable to Blackboard. However, I am currently doing the testing module, which relies on links to web pages. This makes Blackboard preferable to both the other options' |

pedagogical and language teaching theories at work. They also appreciated being able to go into SL individually and select from a wide range of times on a 24-hour schedule to do the observations. All discussions about the observations within the cohort then took place asynchronously on the Blackboard discussion forum. In this way, SL was used as a resource for students to carry out study-related tasks in their own time, without requiring synchronous meetings. The key benefits are summarised in Table 6.

Challenges encountered in this SL pilot resulted in a low take-up rate. Eighteen students expressed interest at the beginning of the pilot, but only six students

Table 6. Benefits from the SL intervention.

| Benefit | Quotes from students and tutors |
|---|---|
| Relating pedagogic theory to practice | 'In the current economic climate, it's important for our students as professionals to have wide capabilities and not just theoretical knowledge' (tutor) |
| Increasing flexibility | 'One of the advantages of using SL to teach/learn a language is that learners can log-in anytime that is convenient for them, just like LanguageLab is doing. In addition, such arrangement will help the learners to save on transport time and cost' (student) |
| Enhancing interactivity | '… met other professionals and students of EFL [English as a foreign language] in SL' (student) |
| Increasing engagement, adding variety to teaching materials | 'SL provides something completely different … visually stimulating, immersive, playful and fantasy' (tutor) |

Table 7. Key issues emerging from the SL study.

| Issues | Quotes from students and tutors |
|---|---|
| Professional relevance | 'I don't think SL can replace a classroom and I think the 'real world' has a lot of benefits for learning' (student) |
| Time zones | 'The problem is always the issue of time difference' (tutor) |
| Communication difficulties | 'One of the main disadvantages of using SL is the lack of eye contact, and I find it really hard to know when is my turn to talk. I've to pay really close attention to the conversation, and chip in when there's a pause. However, sometimes there'll be situations where a few people will talk at the same time, which is rather confusing' (student) |
| Technical specifications | 'I noticed quite a few problems with people's equipment on SL so having a class interrupted fairly regularly by people with technical issues is disruptive to the learning process' (student) |
| Technical support and training | 'I think further [training] sessions would have been helpful so that we could get to more technical aspects of SL' (student) |

progressed to the end and five completed it. The key barriers and problems that constrained the use of SL for the 12 students who chose not to proceed included difficulties with connectivity (e.g. firewall or broadband limitations), other technical problems (e.g. audio malfunction, avatar stuck, screen frozen) or lack of technical competence or confidence. In addition, staff had difficulties engaging in the virtual world pilot, since SL is not currently supported across the institution and staff could only use the platform at home or in the University of Leicester's e-learning suite, the 'Media Zoo'. In addition, students in some countries were unable to access SL. The main issues raised are summarised in Table 7.

## Discussion

This section discusses how the original challenges identified by the MA course team have been addressed by the introduction of voice boards, e-book readers and virtual worlds, and considers their relative costs versus benefits. Table 8 summarises these challenges and the impact these new technologies have had on them.

There is evidence that the technologies trialled within the DUCKLING project have together helped address our key distance learning challenges and enhanced the student learning experience, particularly by increasing the level of personalisation and learner support, providing more engaging and varied materials and improving

Table 8. Challenges, technologies and impact.

| | Challenges | | | |
|---|---|---|---|---|
| Technologies | Learner engagement | Learner support, guidance and feedback | Flexibility for mobility | Learner isolation and opportunities for interaction |
| Voice boards | √ | √ | – | √ |
| E-book readers | √ | – | √ | – |
| virtual worlds | √ | – | – | √ |

flexibility of the curricula to support and accommodate the needs of mobile work-based learners.

### *Voice boards: low cost, high benefit*

In line with earlier research (Fothergill, 2008; Nie, Armellini, Harrington, Barklamb, & Randall, 2010; Yaneske & Oates, 2010), our study confirmed the high value of the human voice, captured and delivered in digital format, as part of curriculum design and delivery. Voice boards proved to be a relatively low-cost, high-impact technology. They offer the benefits of traditional, threaded, text-based discussion boards, with the added voice facility, which was found to be very simple to use. Enhanced personalisation was a key benefit for learners, evidenced through focused, highly appreciated peer and tutor feedback. This asynchronous voice-based interaction resulted in a clear perception of reduced isolation and a sense of belonging to a group with shared academic goals.

The formative e-tivities that triggered the interactions not only served as a scaffold that enabled students to achieve the learning outcomes, but also as a motivational device that kept the group focused and engaged over time. The technology itself did not pose any significant challenges to students or staff.

The university currently meets the cost of the voice board software licence as part of a suite of products. Direct costs such as e-tivity and voice board set-up were minimal. However, as is the case with text-based discussion boards, the voice boards incurred additional variable costs associated with the e-moderation of postings (Salmon, 2011). These costs were similar to those that would have been incurred had the e-tivities been run using traditional text-based discussion boards. The technology, therefore, did not add to the e-moderation costs of the modules.

Given the highly positive results of the voice board trial and the low cost associated with the technology, e-tivities that make use of voice boards are now being rolled out across all modules on the MA in Applied Linguistics and TESOL.

### *E-book readers: moderate cost, moderate benefit*

Students who used the e-book readers reported benefits, particularly in relation to added flexibility to access self-contained materials, a key aspect for mobile learners. E-book readers were easy to use and enabled students to make more efficient use of their available study time. Students also reported a reduction in printing requirements. However, purchasing, loading and shipping the readers generated significant costs. The model used in the study (the Sony PRS-505) cost £240 in 2009. An equivalent model (such as the Sony PRS-300S or the Amazon Kindle) costs in the region of £100 in 2011.

Formatting courseware for a 30-credit module and converting it to an e-book reader-friendly format (ePub) required six to eight hours of work by a skilled learning technologist. Each preloaded device had to be tested and packaged before being shipped to the students. In this study, this process was costed at £60 per device. Secure delivery of the e-book readers to overseas students cost, on average, £30 per device. Participating students were allowed to keep the e-book readers they received as part of this research.

As the university does not support e-book reader technology centrally, the project had to do so for the duration of the course. This included occasional

troubleshooting and guidance on how to maximise the benefit of the device. For example, as new course materials became available on the VLE, project staff helped students transfer them to the e-book readers. We have estimated this variable cost at £20 per student who received a device.

In sum, the provision of preloaded e-book readers to 17 students on the MA in Applied Linguistics and TESOL in the 2009/10 academic year had a total direct cost of £350 per student. As a result, and despite the drop in the price of e-book readers, it is unlikely that the programme team will continue to provide them for their courses post project. However, this study has highlighted the need to produce course materials in different formats (including ePub) so that courseware can be downloaded to a range of student-owned portable devices.

### *Virtual worlds: moderate cost, low benefit*

Of the three technologies trialled in the project, the SL virtual world appeared to demand the greatest effort for the lowest gain. Benefits reported by students include opportunities for more interaction, collaboration, immersive classroom observation and simulation. These are often difficult to experience on a distance course.

There were indirect benefits too. Firstly, our collaboration with LanguageLab showed that it is feasible to exploit the affordances of SL without building new in-world resources. Secondly, the e-tivities developed for this trial are now available as an open educational resource for others to use. Thirdly, although SL is generally seen as a synchronous platform (where students and tutors meet in real time), it can be designed into the course for asynchronous use: each student can log in at convenient times and carry out activities that make use of existing artefacts, then report back via traditional means such as the VLE. This approach provides a departure from the typical uses of SL as reported in the literature; that is, a synchronous meeting place for student cohorts (see, for example, Edwards, Domínguez, & Rico, 2008).

Both fixed and variable costs were incurred. These included: buying or upgrading computer equipment to meet SL specifications; buying, developing and maintaining a SL island; training staff and students; and moderating SL sessions. Gaining sufficient competence in using SL proved too demanding for some students and staff, particularly in relation to the resulting experience and associated benefit. Technical and bandwidth problems were common and resulted in several potential volunteers dropping out of the study. As SL is not centrally supported by the university, the project had to provide this support to all participants.

In conclusion, the challenges and costs of using SL outweighed the benefits. However, the trials have given the programme team an opportunity to consider the potential of virtual worlds in future versions of the MA.

## Limitations and further research

Although the trials with all technologies involved relatively small numbers of volunteers, those who participated remained committed and enthusiastic throughout each intervention, and the evidence gathered is indicative of the potential impact that these technologies may have on the original challenges. The findings of this study are in line with a parallel study conducted with Occupational Psychology students within the DUCKLING project, particularly regarding the use of digital audio (Nie et al., 2010). Firm conclusions on the costs and benefits of using these

technologies will only emerge after several cohorts have completed the programme and by further comparison with similar studies. This future work should not be based solely on self-selected participants. Future research should ideally examine the relationship between such innovations in curriculum design and delivery and factors such as recruitment, retention, progression and quality of assessed work.

Inevitably, any study of emerging learning technologies is confronted by the issue of technologies in transition. For instance, e-book readers have evolved rapidly over the past two years. More recent e-book reader models than the ones used in this research are not only cheaper and faster but also offer a range of functions that our students would have benefited from, such as highlighting text, annotation, Wi-Fi and 3G connectivity. With new devices such as the Amazon Kindle and the Apple iPad, more textbooks in e-book format are becoming available at an affordable price. The extent to which these devices and their new features would contribute to better reading and learning experiences has only been marginally researched.

Another factor that had a significant impact on the e-book reader intervention was the refusal by publishers to allow preloading copyrighted materials onto the e-book readers. While the use of e-book readers has increased students' access to course materials, this technology would arguably have been even more useful if all essential readings had been preloaded on them. To sustain and scale up the use of the device, a possible way forward is the more extensive use of open educational resources and open research archives. Further research is needed to establish the feasibility and impact of this approach.

## Conclusion

Digital audio through voice boards proved to be the lowest-cost, highest-benefit of the three technologies researched here in the context of work-based distance learners on the MA in Applied Linguistics and TESOL programme. E-tivities provided the structure and rationale for the focused use of voice boards on the course. Increased personalisation and engagement, additional opportunities for peer and tutor feedback and reduced isolation were widely acknowledged, all at a low or marginal cost to the institution and the students.

E-book readers preloaded with course materials added value to the learner experience too, although at a higher cost to the institution than digital audio. Students, particularly those who study while on the move, appreciated the flexibility afforded by e-book readers. The ability to preload copyrighted material such as journal articles and e-books would have constituted a significant bonus.

The virtual world (SL) demanded set-up costs and intensive training efforts for relatively small rewards: the added value of the intervention in the context researched here was limited, although in-world classroom observation was beneficial. Figure 1 maps the three technologies on a cost–benefit matrix.

Distance learning can be seen as more resource intensive than other modes of study. It requires a flexible approach, including innovative use of new technologies, in order to provide engaging and cost-effective solutions (Brennan, 2005; Nixon, Smith, Stafford, & Camm, 2006). The DUCKLING project enabled us to deliver and evaluate the value of three technologies in relation to their associated costs. As a result, the MA in Applied Linguistics and TESOL course team is now introducing programme-wide innovations that capitalise on the affordances of new learning technologies, particularly digital audio. These innovations include more responsive

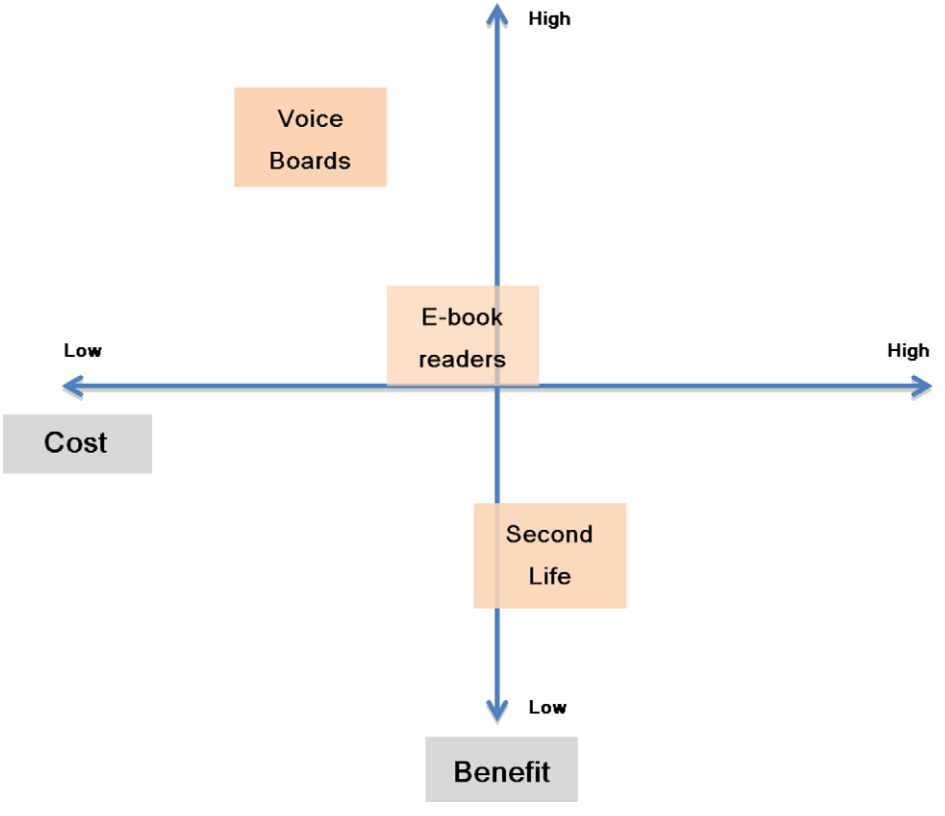


Figure 1. Cost–benefit matrix.

student support systems, new forms of interactive assessment and an increasing recognition of the role of social (rather than individual) construction of knowledge in curriculum design. Teaching fellows in Applied Linguistics and TESOL provided effective and timely liaison between the academic course team, the learning technologists and the researchers.

This study has shown tangible benefits not only to students and staff directly involved in the distance MA in Applied Linguistics in TESOL programme but also within and beyond the university. Within the university, the DUCKLING findings are leading to similar pedagogical innovations in other departments and disciplines. Beyond the university, the dissemination of such research has helped raise awareness of the potential value of incorporating new learning technologies into curriculum design and delivery in innovative ways, their cost implications and the support systems they require. Outputs of the DUCKLING project have been made available in highly transferable formats as open educational resources. This research may inspire and enable others in the educational community to test the role of these learning technologies in enhancing the distance learning experience.

## Notes

1. See http://www.languagelab.com/en.
2. See http://www.banxia.com/demain.html.

## References


Armellini, A., & Aiyegbayo, O. (2010). Learning design and assessment with e-tivities. *British Journal of Educational Technology, 41*(6), 922–935.

Armstrong, C. & Lonsdale, R. (2009). *E-book use by academic staff and students in UK universities: Focus groups report*. Retrieved June 6, 2011, from http://www.jiscebooksproject.org/reports

Arneberg, P., Guardia, L., Keegan, D., Lossenenko, J., Mazar, H., Michels, … Zarka, D. (2007). *The provision of e-Learning in the European Union: the Megatrends project*. NKI Publishing House. Retrieved February 5, 2010, from http://nettskolen.nki.no/in_english/megatrends/

Attewell, J. (2005). *Mobile technologies and learning: A technology update and m-learning project summary.* London: Learning and Skills Development Agency.

Beldarrain, Y. (2006). Distance education trends: Integrating new technologies to foster student interaction and collaboration. *Distance education, 27*(2), 139–153.

Boyatzis, R.E. (1998). *Transforming qualitative information: Thematic analysis and code development*. London: Sage.

Brennan, L. (2005). *Integrating work-based learning into higher education – A guide to good practice*. Bolton: University Vocational Awards Council.

Bryson, J.M., Ackermann, F., Eden, C., & Finn, C.B. (2004). *Visible thinking: Unlocking causal mapping for practical business results*. Chichester, UK: John Wiley & Sons.

Dabbagh, N., & Bannan-Ritland, B. (2005). *Online learning. Concepts strategies and applications*. Upper Saddle River, NJ: Pearson Merrill Prentice-Hall.

Dickey, M.D. (2003). Teaching in 3D: Pedagogical affordances and constraints of 3D virtual worlds for synchronous distance learning. *Distance Education, 24*(1), 105–121.

Dillenbourg, P. (2008). Integrating technologies into educational ecosystems. *Distance Education, 29*(2), 127–140.

Edirisingha, P., Nie, M., Pluciennik, M., & Young, R. (2009). Socialisation for learning at a distance in a 3-D multi-user virtual environment. *British Journal of Educational Technology, 40*(3), 458–479.

Edwards, P., Domínguez, E., & Rico, M. (2008). A second look at Second Life: Virtual role-play as a motivational factor in higher education. In K. McFerrin, et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2008* (pp. 2566–2571). Chesapeake, VA: AACE.

Fothergill, J. (2008). Podcasts and online learning. In G. Salmon & P. Edirisingha (Eds.), *Podcasting for learning in universities* (pp. 80–91). Maidenhead: Open University Press, McGraw-Hill Education.

Glenn, M. (2008). *The future of higher education: How technology will shape learning.* The Economist Intelligence Unit. Retrieved February 23, 2011, from http://www.nmc.org/pdf/Future-of-Higher-Ed-%28NMC%29.pdf

Hannum, W., & McCombs, B. (2008). Enhancing distance learning for today's youth with learner-centered principles. *Education Technology, 48*(3), 11–20.

Henderson, M., Huang, H., Grant, S., & Henderson, L. (2009). Language acquisition in Second Life: Improving self-efficacy beliefs. In R.J. Atkinson & C. McBeath (Eds.), *Same places, different spaces. Proceedings ascilite Auckland 2009* (pp. 464–274). Auckland: The University of Auckland, Auckland University of Technology, and Australasian Society for Computers in Learning in Tertiary Education.

Johnson, L., Levine, A., Smith, R., & Stone, S. (2010). *The 2010 horizon report*. Austin, TX: The New Media Consortium.

Kelly, G. (1955). *The psychology of personal constructs*. New York: Norton.

King, K. & Ellis, T.J. (2009). Comparison of social presence in voice-based and text-based asynchronous computer conferences. In *Proceedings of the 42nd Hawaii International Conference on System Sciences* (pp. 1–10). Hawaii: EEE Computer Society Press.

Koszalka, T., & Ntloedibe-Kuswani, G.S. (2010). Literature on the safe and disruptive learning potential of mobile technologies. *Distance Education, 31*(2), 139–157.

Marriott, P. (2002). Voice vs text-based discussion forums: An implementation of Wimba voice boards. In M. Driscoll & T. Reeves (Eds.), *Proceedings of World Conference on E-learning in Corporate, Government, Healthcare, & Higher Education 2002* (pp. 640–646). Chesapeake, VA: AACE.

Nie, M., Armellini, A., Harrington, S., Barklamb, K., & Randall, R. (2010). The role of podcasting in effective curriculum renewal. *ALT-J Research in Learning Technology, 18*(2), 105–118.

Nie, M., Armellini, A., Witthaus, G., & Barklamb, K. (2011). How do e-book readers enhance learning opportunities for distance work-based learners? *ALT-J, Research in Learning Technology, 19*(1), 19–38.

Nixon, I., Smith, K., Stafford, R., & Camm, S. (2006). *Work-based learning: Illuminating the higher education landscape.* Retrieved June 6, 2011, from http://www.heacademy.ac.uk/assets/York/documents/ourwork/research/wbl_illuminating.pdf

Omale, N., Hung, W.C., Luetkehans, L., & Cooke-Plagwitz, J. (2009). Learning in 3-D multiuser virtual environments: Exploring the use of unique 3-D attributes for online problem-based learning. *British Journal of Educational Technology, 40*(3), 480–495.

Rogerson-Revell, P. (2007). Directions in e-learning tools and technologies and their relevance to online distance language education. *Open Learning, 22*(1), 57–74.

Rudman, P.D., Lavelle, S.P., Salmon, G., & Cashmore, A. (2010). SWIFT-ly enhancing laboratory learning: Genetics in the virtual world. In L. Creanor, D. Hawkridge, K. Ng, & F. Rennie (Eds.), *ALT-C 2010 Conference Proceedings* (pp. 118–129), University of Nottingham, UK. UK: ALT-C.

Russell, C. (2009). A systemic framework for managing e-learning adoption in campus universities: Individual strategies in context. *ALT-J, Research in Learning Technology, 17* (1), 3–19.

Salmon, G. (2002). *E-tivities: The key to on-line learning*. London: Routledge.

Salmon, G. (2011). *E-moderating: The key to teaching and learning online* (3rd ed.). London: Routledge.

Shurtz, S., & von Isenburg, M. (2011). Exploring e-readers to support clinical medical education: Two case studies. *Journal of the Medical Library Association, 99*(2), 110–117.

Siegentahler, E., & Wurtz, P. (2010). Improving the usability of e-book readers. *Journal of Usability Studies, 6*(1), 25–38.

Van Deusen-Scholl, N., Frei, C., & Dixon, E. (2005). Co-constructing learning: The dynamic nature of foreign language pedagogy. *CALICO Journal, 22*(3), 657–678.

Yaneske, E., & Oates, B. (2010). Using voice boards: Pedagogical design, technological implementation, evaluation and reflections. *ALT-J Research in Learning Technology, 18* (3), 233–250.

Warburton, S. (2009). Second Life in higher education: Assessing the potential for and the barriers to deploying virtual worlds in learning and teaching. *British Journal of Educational Technology, 40*(3), 414–426.