The evolution of audiographics: A case study of audiographics teaching in a business faculty

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Audiographics was an established educational technology prior to the development and spread of the World Wide Web (Web) in the early 1990s. First generation audiographics products used bridged telephone lines (audio) and modem linked computers (graphics) to synchronously connect an instructor with groups of students. In the second half of the 1990s the use of the Web increased dramatically and traditional audiographics use declined. Since the early 2000s, and as part of the development of a second generation of Web services, Web 2.0, a new generation of audiographics tools, now commonly termed collaborative or Web conferencing software, have become available. This evolution of the audiographics technology and its associated instructional capabilities is explored via a longitudinal case study of the use of audiographics in the Faculty of Business at Southern Cross University. Following a review of the first and second generation products used, we identify and show how four key lessons from the initial period of use have been addressed. We focus particularly on how the fourth lesson (flexibility of the delivery format) has been addressed and present preliminary data gathered from early student and staff adopters about their use of second generation audiographics during Semester 2 of 2005 and Semester 1 of 2006. We conclude by briefly discussing some potential developments and suggesting that second generation audiographics offers the opportunity to seriously re-think the nature of student-to-student and student-to-staff communications in the context of our learning and teaching environment.

Keywords: audiographics, tele-teaching, Electronic Classroom, Elluminate Live!, teaching business online, web conferencing, virtual classrooms, synchronous tools

First generation audiographics

Audiographics established itself as an educational technology before the invention of the World Wide Web. The typical layout involved linking a number of classrooms or training sites via a combination of voice circuitry; the 'audio' component being a loudspeaker telephone, and linked computers providing 'graphics' component. At its most basic, two rooms were linked by low end computers and modems over one telephone line, while a voice link was established over a second line. The instructor controlled the session from a computer in one room and the other became a 'remote classroom' where students gathered. Additional classrooms (usually not more than 3 or 4) required telephone bridging (often purchased from the phone company) and additional computer/modem connections. Depending upon the number of participants at each site, speaker phones and multiple screens (or a single projector and large screen) may have been used.

Instructionally, first generation audiographics provided a relatively low cost, low technology solution that was applicable to many teaching and instructional settings. It provided an interactive voice environment supported by a shared whiteboard and the ability to distribute documents and graphics – the fundamental features of the traditional face-to-face lecture room or tutorial. It required minimal user training and was able to draw on existing electronic educational resources or other resources that could be easily scanned and saved in electronic format.

Electronic Classroom®

A local product, Electronic Classroom®, developed by a Queenslander, Robert Crago, captured the Australian market. The software was written in C+ for the Macintosh platform. Over 1000 copies were used in Australia during the 1990s and of these about 7% were in use in universities (Ellis, Debreceny and Crago, 1996).

Within 5 years of its introduction Electronic Classroom ® could be found in use across a range of educational settings: K-12 (Gray & O'Grady, 1993; Oliver and Reeves, 1994), higher education (Ellis & Debreceny, 1994), teacher in-service training (Knapczyk, 1992; McCullagh & Stacy, 1993) and staff training (Miller, 1991). Ellis, Debreceny and Crago (1996) summarise the technical evolution of the product.

To the instructor or student the product displayed a very simple interface – a whiteboard with menu bar, that displayed standard File, Edit, Text, and Paint menus and single left-hand side vertical tool bar that allowed for screen control, provided simple tools (for text and drawing) as well as set of indicator lights, one for each remote site, that allowed control to be requested and passed from site to site. Where more than two sites were involved the audio networking was done using a telephone bridge. This service was often booked using the local telephone company services. The screen features and typical teaching resources will be demonstrated as part of the conference presentation.

Second generation audiographics

In the second half of the 1990s the first generation audiographics technologies became one of the casualties of the rapid growth of the Internet and the equally rapid technical evolution of the Web. This demise was due to a number of factors including:

1 The spread of Internet accounts from research and university environments into schools, colleges and the commercial and domestic marketplace. This provided a cheap and convenient way to interconnect computers locally, nationally and internationally. Educators now had a rich source of material including text, images and video. They could locate instructional and resource materials on almost any topic and at almost any level.
2 Improvements in compression technologies that allowed the delivery of VoIP (Voice over Internet Protocol) of a quality similar to traditional phone line audio connections.
3 The availability of faster modems (up to 56K) as well as ADSL modems (256/1500K) and even faster cable modems, that provided the capacity to exchange large files and allowed for application sharing. Higher bandwidth also allowed for the "remote control" of one computer by another at speeds sufficient to undertake (demonstrate) complex tasks.
4 Improvements in compression technologies and the miniaturization and cost reduction in colour video cameras (webcams). These developments made basic, small window videoconferencing over IP easy and affordable.
5 Larger, higher quality colour screens allowed multiple control panel features and shared work spaces to be designed for display using a single Web browser screen.
6 The ubiquitous presence of Web browsers and widespread user familiarity with point and click browser-based software have removed the need for extensive pre-session training. Users can literally learn as they use the system and training is now more focused on just-in-time training and performance support.
7 The spread of lower cost and progressively more powerful consumer level computers together with cheap headset speaker/microphones and Webcams, gives individuals the opportunity to join sessions from their workplace, home or even from a hotel while travelling.
8 The falling cost of hard disk storage space makes it possible to archive large amounts of data on fast recall systems so that users have easy and fast access to recorded sessions.

These factors combined to allow the development and marketing of a second generation of audiographics software, now commonly described as "Web conferencing", "virtual meetings" or "collaborative" software. Some of the most widely used systems now on the market include:

- **Centra® 7** http://www.saba.com/products/centra/index.htm – a line of integrated products that are targeted at schools, universities and business meeting and training environments.
- **Webex** http://www.webex.com.au/au/webexhome.html – state they provide browser-based, on demand Web conferences, Web meetings, Webinars and Webcasts.
- **Breeze 5** http://www.macromedia.com/software/breeze/ – is marketed as a rich Web communication system that can be used for online training, marketing, sales and Web conferencing.
- **Live Classroom** http://www.horizonwimba.com/products/liveclassroom/ – is one of a number of integrated tools provided by Horizon-Wimba and claims to provide a fully featured live virtual classroom.
- **Elluminate Live!** http://www.elluminate.com/ – offers tools such as VoIP, shared whiteboard and applications, remove control, text chat and video for e-learning and collaboration. It is aimed at both the education and business market. SCU, Deakin, Curtain, Chisholm and TAFE WA are current licence holders.
- **Citrix MeetingToGo** http://www.citrixonline.com/ – claims to offer an easy, secure and cost effective solution to conducting meetings online.
- **Microsoft Live Meeting** http://www/mocrosoft.com/office/uc/livemeeting/default.mspx – this product has been evolving and is now a far more complex product than its competitors. Its greatest attraction is probably the integration with the Microsoft Office suite.

Elluminate Live! has become the second generation product of choice for the staff of the Faculty of Business at Southern Cross University (Rowe & Ellis, 2006).

Elluminate Live!

Elluminate Live! is a Canadian product and has evolved from an earlier product called vClass. It was specifically designed to offer an online, real-time training, demonstration and collaboration environment for remote teaching, training and meetings (Farmer & Nobes, 2004). A range of other uses have emerged, including online conferences and seminars (Carrington, 2005; Laurillard, 2006; Rowe, 2006; University of Hawaii, 2006) and those uses continue to expand.

With the release of version 7 (July, 2006) the effectiveness of the product was increased by participants being able to talk over the Internet with full duplex audio, text chat, share video, whiteboards, multimedia files and share applications – all in one intuitive, Web browser interface. The program can be hosted on a server at Elluminate's Head Office (Calgary, Canada) or can be installed on a user's own server. The proprietary Collaborative Communications Framework (automatically ensures that everything is in the right place at the right time) was built specifically for live, multi-media collaboration. The product is Web browser based, so from the users perspective is operating system independent. There is very minimal lag time or garbled communication when using voice, either on a dial-up modem or a high-speed LAN. When there is a connection problem, you are automatically reconnected to the room at the point of interruption with all content still there. These are powerful features enabling users to maintain a clear focus on content rather than the technology (Elluminate Live!® Version 7.0 Moderator Quick Reference Guide).

Following an initial system check and once-only download of the program to the user's computer, it is simply a matter of using a Web link (URL) to join each session. This link can be set up and made available in a variety of ways. Using the link initiates a check to see that the current version being used is available on the user's machine and opens a 'room' for use. The features available in the room are established by the moderator for the session.

The basic features of the program will be shown during the conference presentation, but are summarised here for those not able to attend. The standard interface comprises a set of drop-down menus across the top of the screen. There are four basic panes to the screen, three on the left hand third of the screen and the fourth on the remaining two-thirds. The top left hand pane is for participant management and lists the names of those present in the session, privileges available to them (for example, access to the microphone, whiteboard tools and application sharing features) and a series of interaction icons (polling options, raise/lower hand, emoticons and temporary unavailability). The moderator (leader) of the session

can vary these privileges individually or for the group as a whole. This is the part of the screen used to allocate and observe participants working in small group activities using the break-out room feature.

The middle left hand pane is a direct messaging (text-chat) area. This ensures that even participants without a microphone have the opportunity to ask and/or respond to questions. The messages can be broadcast to: all participants, just to the moderator, or between individual participants. The text can also be resized (and coloured) to cater for those with vision impairments. The bottom of the left hand pane is the audio panel. This allows access to the microphone and controls for volume of speaking and hearing.

The large right hand pane is the whiteboard area. It can be used with text and graphics tools and also serves as the projection screen for viewing presentation slides, application and multi-media sharing. If the privilege is granted, participants are able to annotate material and use shared applications on the whiteboard.

Instructional use of Electronic Classroom®

The use of Electronic Classroom® at Southern Cross University occurred for a number of years in the early 1990s because of the enthusiasm and work of a couple of staff members who were early adopters of the technology. One staff member was able to demonstrate the technology within the School of Social and Workplace Development while the other was able to both demonstrate and teach using the technology within the School of Commerce and Management, Faculty of Business.

The 'champion' staff member in the Faculty of Business taught a number of his accounting subjects to small groups on the Lismore and Coffs Harbour campuses and the then regional study centres in Tweed Heads and Grafton. The teaching of units involving accounting principles, often requiring the use of spreadsheet type graphics, which was ideally suited to 'virtual classroom' environment provided by Electronic Classroom®.

Why was this initial use successful? The staff member was a Mac user and enthusiastic about using technology in his teaching. It also saved him the time required to travel between campuses and regional centres by car.

Why did the use not spread with the School and Faculty? In Commerce and Management while staff members had a high level of computer literacy they used the Windows platform and, while the Electronic Classrooms® Mac interface was not complex, it was nevertheless not what they were used to. In the School of Social and Workplace Development while many staff members were Mac users their overall level of computer literacy was not high and many stated they preferred face-to-face contact with students.

Use of Electronic Classroom® ceased three years after it commenced when the accounting staff member championing its use moved to an overseas university. At the same time the Web became a cheaper and lower cost way of sharing resources and specifically teaching resources such as self study packages.

What lessons can be learned from this initial period of use? The most important lesson was to recognise that innovation is often driven by an individual, a local champion, and can falter if that individual ceases to be active. Secondly, it is important to recognise that the development of new and "competing" technologies, even when they don't compete directly, can reduce the appeal of an existing technology. Thirdly, it is important to note that there was no provision to record and play back sessions. Late students missed the work and students could not use the actual (recorded) class session for revision. Finally, it needs to be recognised that there was very little flexibility in the physical delivery format. Both the staff member and students had to be attending specially set-up teaching rooms at allocated times. Phone line bridging and software limitations did not allow individual students to link in directly from their homes.

Instructional use of Elluminate Live!

This section will show how each of the lessons identified above from the initial phase of using audiographics in the early 1990s have been addressed in the second period. This will be followed by a summary of feedback from students and an outline of the variety of instructional (and other) uses that have already been used in these early stages of the second period of using audiographics. This will focus

on how the final of the lessons identified above – the lack of flexibility in the physical delivery format – has been addressed.

The first lesson was to recognise that innovation is often driven by an individual, a local champion, and it may falter if that individual ceases to be active. This remains the case. One of the authors is the current driver for phase two. While efforts are underway to ensure that some support structures are put in place so that the current phase is less dependent on the individual, much additional effort and goodwill in a challenging institutional budgeting environment is required. Rowe (2004) provides a reflection on the impetus for adopting online delivery methods, while Rowe & Ellis (2006) outline the "accidental" way the current local champion came to be in this position.

The second lesson above recognised that the development of new and "competing" technologies, even when they don't compete directly, can reduce the appeal of an existing technology. One of the key attractions of Elluminate is that it is works on Macs and PCs. The distinct advantage here is that participants are able to use the program on the computer they are most familiar with, using material they are most familiar with, rather than learning a new technology in a "lab" situation perhaps on computers they are not used to and using constructed material that may have little meaning to them.

Another aspect worthy of mention regarding the lesson is that users are far more comfortable with technology (Vitartas, 2006) now then they were in the early 1990s simply because they use it so regularly in their activities. The fact that many applications are now browser-based also means that the earlier technical connection challenges are just not an issue any more. Another example is the way that the current local champion has piggy-backed on the use of tools available within the learning management system to get to the current level of involvement with second generation audiographics (Rowe, 2003 & 2004). One of the key elements of this was the encouragement to use the virtual classroom (text based) tools that emerged from focus group activity with colleagues who were early adopters of other features within the learning management system (O'Reilly, 2003).

While Elluminate can be used as a building block within our learning management system, the decision was taken not to attempt this during our initial phases. One of the real benefits of this is that staff have been able to develop their familiarity and confidence with audiographics quite independently of the learning management system. This has been important because it has enabled certain delivery approaches to mirror what staff have done previously by alternative means. A simple example has been the change to audiographics for teletutorial sessions previously delivered using a third party arranged telephone conference. Feedback from both staff and students about the improvement in what is achieved in the sessions has been overwhelmingly positive and is dealt with in more detail later.

The third lesson, like the second, is no longer an issue due to the advances in technology. Second generation audiographics have a recording function so that play back is available immediately the session is completed. The recording can be paused, stopped, fast-forwarded. The slides and text messaging can also be saved from the recording and several interactive tools can be used during playback. An example is taking a quiz that may have been delivered during the live session. Students who were unable to attend the session (for whatever reason) can access the material at a time convenient to them – an often quoted advantage of asynchronous tools that fits well with this synchronous delivery tool. This feature is also invaluable for the moderator as a professional development opportunity. This aspect is explored further next, and also in the *Future directions* section below in relation to the potential for staff training, professional development and quality review processes, both locally and internationally.

The final lesson from the 1990s was the recognition that there was very little flexibility in the physical delivery format. The features and tools available in Elluminate presented above, are testimony to how this is no longer the case. Preliminary data about student and staff use is now presented to support this. The validity of the effectiveness of these features and tools has been captured in feedback obtained from students in surveys collected during teaching periods where it has been used. This feedback is summarised next. It is presented according to use over the first two semesters of implementation – the initial 6 month 25 seat licence for semester 2, 2006 within the School of Commerce and Management and the first part of the extended 12 month 50 seat license for semester 1, 2006 within the Faculty of Business. This is supplemented by a summary of the number of staff adopting Elluminate and the variety of ways they are using it .

Semester 2, 2005 use survey

Rowe (2006) reported the results of student feedback from semester 2 of 2005. Although the sample was very limited (9 of 10 active students from an online Advanced Auditing course) the feedback from the first cohort of the SCU students to use the program provided invaluable input to the decision to extend the use to the Faculty level for all of 2006. The survey was conducted independently by a representative of the Teaching and Learning Centre using a semi-structured phone interview averaging 45 minutes. The results are summarised here as a point of reference for the wider range of responses gathered during semester 1 of 2006 reported below.

The overall results highlighted overwhelming satisfaction. This is supported by level of attendance at the voluntary weekly sessions. Of the 12 sessions conducted during the course, the average attendance was 8 out of the 10 active students, with 8 or more attending 7 of the 12 sessions. The ease of use and lack of technical issues were consistently mentioned in responses. The most valuable (and easy to use) tools reported were the microphone (audio), the emoticons, hand-up icon and the whiteboard. While it is acknowledged that these were also the most frequently used tools as the moderator was learning the tools, it also highlights the most commonly used features of a physical classroom (bearing in mind the whiteboard also acts as the projection screen). All students indicated a preference for live voice over text chat, enjoyed the interaction with fellow students and 6 indicated a preference for Elluminate over face-to-face classes.

Semester 1, 2006 use survey

While this initial feedback provided impetus, the pre and post questionnaires used to collect student feedback for semester 1 of 2006 for Faculty of Business adoption, were adapted from Schullo (2005). There were 40 respondents to the pre-use survey and 25 respondents to the post-use survey. Demographic information is provided in Table 1. The discussion below focuses on the student perceptions of their computer literacy, expectations and experiences.

Table 1: Demographic details for interviewees/respondents

	Semester 2, 2005	Semester 1, 2006	
		Pre	Post
Number of respondents	9	40	25
Gender	4 M, 5 F		
Age (mature >25)		23 Mat, 17	15 Mat, 10
Location	7 Ext, 2 Int		
Study mode	7 P/t, 2 F/t	28 P/t, 12 F/t	15 P/t, 10 F/t
Stage of course (year 1,2,3)		1(5), 2(11), 3(24)	1(6), 2(6), 3(13)
Course	BBus (9)	BBus (39), BBA (1)	BBus (17), BBA/BIS (8)
Computer	8 PC,1 Mac	39 PC, 1 Mac	
Connection	7 BBand, 2 Dup	17 BBand, 19 Dup, 4 dnk	

Pre-use survey

In computer proficiency, most respondents (72% of the total of 40) ranked themselves as an intermediate or advanced user. When particular application types are grouped together, an interesting sub-set emerged. This intermediate or advanced proficiency rating rose to 94% for the grouping of word processing, spreadsheet, presentation and email – the most commonly used applications. The rating dropped dramatically (to 55%) for the less common application grouping of chat, webpage creation, audio & video programming and web browsers.

In regards to previous online learning experience, 22 (55%) respondents said that they had never done any online course before, 7 (17.5%) had done one online course and no one had experienced two online courses. However, 3 (7.5%) had done three online courses and 8 (20%) had done at least four online courses. They were then asked if these experiences had involved any synchronous online learning systems (SOLS). Only 9 (22.5%) reported some experience with SOLS with the others (77.5%) reporting

little or no experience at all with SOLS. 8 respondents (20%) had used text-chat features of a SOLS, 1 had made use of two-way audio and 3 (7.5%) had experienced application sharing. No one indicated having used two-way video or a full synchronous online classroom.

Given this very low number of students who had experienced online learning using a SOLS, the responses to questions about the initial setting up process to use Elluminate are interesting. It is noteworthy that they support the feedback from semester 2, 2005. 20 (50%) respondents found it easy to set up while 12 (30%) thought it somewhat hard to deal with. Only 8 (20%) indicated that it was actually difficult to set up. These proportions correspond closely to the respondents who found the instructions clear or somewhat clear (75%) compared to those who felt they were unclear (20%). Common problems reported include failure in downloading, failure in installation, students not having Internet connection or student's ISP blocking the program.

As noted earlier, the ability to record and playback sessions is one of the key lessons that has been overcome from the experience of the early 1990s. Respondents were asked about their intention to use the playback feature of sessions. 27 (67.5%) respondents indicated they intended to use the recordings, with the remaining 13 (32.5%) indicating they were not sure. The breakdown of this between part and full time respondents indicates that playback feature could be more useful for part-time students. 11 (91.7%) of the part-time respondents intended using the recordings, while only one part-time respondent was not sure. In contrast, a much lower proportion of full-time respondents 16 (57%) intended to playback sessions with the remaining 12 (43%) being unsure.

Post-use survey

In this section, the focus changes from respondents expectations to their experiences. Questions focussed on attendance patterns, the features used, and respondent's level of, and reasons for satisfaction with Elluminate.

While 23 (92% of the total of 25) respondents reported participating in 3 or more sessions, 20 (80%) of those reported taking 4 or more. The other 2 (8%) reported participating in 1 or 2 sessions. 18 (72%) respondents preferred to participate in sessions from their home, an indication of the need to consider convenience and changing location when planning delivery approaches. 3 (12%) respondents did not attend any live session because they played back recorded sessions, adding further weight to the potential for exploring alternative delivery options.

Respondents reported using many available features. The most common comprised two-way audio (18), text-chat or direct messaging (18), whiteboard (18), application sharing (11) and hand raising (9). Data gathered about the perceived usefulness of various tools tended to correspond to the tools most frequently used, that is, the more a tool was used, the more useful it was reported as being. While the audio tool was not separately asked about in this regard, text-chat (80%), whiteboard (68%) and hand-raising (68%) were most highly rated as useful. This is consistent with the findings of semester 2, 2005.

While 16 (64%) respondents reported problems connecting to a classroom at least once and 14 (56%) reported problems in using two-way audio at least once, the rating of tools by respondents highlights that these issues are more of an annoyance to users than a major issue. For example, only 5 (20%) respondents ranked whiteboard (presentation space) 'N/A' or 'Poor' while 20 (80%) thought it fair, good or even very good. The audio tool had only 3 (12%) respondents unsure (N/A or Poor) about its quality and 22 (88%) rating the quality fair or above. The rating for screen layout was almost identical. 22 (88%) respondents reported they often or always felt more connected to fellow students and 21 (84%) to their lecturer. 20 (80%) respondents thought their lecturer's approach was often or always effective. 18 (72%) respondents were often or always satisfied with the peer interaction. One strong point made by respondents was to acknowledge the enthusiastic support from their lecturers as a firm motivation for their participation in sessions – this needs to be interpreted in the context that ALL sessions are promoted as supplementary and *not* compulsory.

A further reflection of the overall satisfaction with the communication aspects is that 24 (96%) respondents reported being happy to take another course next semester if it involved using Elluminate. When asked about whether they believed taking a course using Elluminate was a good decision, 23 (92%)

respondents said ‘yes’. One said ‘no’ and one was unsure – and the student who said “no” had completed his final course and indicated that he would definitely consider using it again if he had more courses to complete. Students who have experienced our more traditional tele(phone) tutorials were unanimous in reporting Elluminate as a more efficient and effective solution for distance education.

Staff adoption and types of use

In this section a summary of the number of early staff adopters and what they are using it for is presented. During semester 2, 2005 only two staff within the School of Commerce and Management actively used the program for teaching (auditing and quantitative methods). It was actively used for demonstration purposes “to spread the word” within the School, Faculty and wider SCU community (for example as a method of presenting a seminar for the Teaching and Learning Centre). The decision for an expanded Faculty license was taken in December 2005.

During semester 1, 2006 16 staff actively used the program in teaching 14 units, for student orientation sessions and postgraduate supervision activities. The teaching activity included 5 accounting staff teaching a component of our commitment into Hong Kong Institute of Technology. In addition, it was used for meetings with offshore partners, international academic colleagues for collaboration, seminars and conferences. The use for demonstrations to non-Business Faculty users continued and liaison with IT staff was extended. Face-to-face classes were both recorded and broadcast live to remote participants, including (live) delivery from Hong Kong, United Kingdom and France. Active alternative delivery for tele(phone)tutorials and (face-to-face) workshops was initiated.

As semester 2, 2006 begins, the program is being actively used for teaching in 26 units by 18 staff (5 of whom did not use it in Semester 1). Use for a wider range of meetings has been scheduled for both academic and administrative functions. The delivery into Hong Kong will be repeated. A Vice-Chancellor’s Strategic Initiative award will be used to improve and modify the way training is presented and sessions are arranged, including streamlining the operation of the established user group sessions. An on-going program for gathering student feedback and the initiation of staff feedback is also set in place to inform some of the potential discussed in the next section.

Future developments

There are a number of trends that will see audiographics not only continue but almost certainly expand to become an important distance education tool. In terms of hardware, the integration of home television systems with personal computers will see the ability to output data to various types (plasma, LCD etc) of large, high definition screens. This will eliminate the problems of providing instruction via a small, poor quality screen and will give students using these systems literally ‘table top’ size work areas. It is also likely that touch screens will become increasing important (we are already seeing a resurgence with the rise of the tablet PC). Falling storage costs means sessions can be easily stored either by an institution, local service provider, even by a dedicated large capacity hard disk owned by the researcher.

Software enhancements will no doubt soon include the ability to extract audio or video steams from recorded sessions and repackage them for playback as podcast or videocasts thus adding an extra degree of mobility to the learning environment. The closed captioning feature offers potential for delivery in offshore locations to experiment with delivery into a local language.

In terms of social and cultural issues, such as the rise of terrorism and regional wars and the possibility of epidemics and pandemics, along with the increased cost of travel (mainly fuel), it is likely that quality distance teaching using the latest interactive technologies, will become increasing sought after as a means of safe, efficient study.

In terms of instructional design it is likely that audiographics will become a common peer-to-peer communications technology that students will become familiar with even before they enter university. ‘Lite’ versions of programs carrying a small amount of advertising are an established model for moving expensive proprietary technologies into the wider public domain.

The potential to use the playback feature as a professional development opportunity is also worthy of further exploration. The potential for tailored staff training, professional development and quality review processes, both locally and internationally exists. Staff training can be tailored to specific tools most useful for the range of common uses. For example, the way polling tools and application sharing are used in meetings requires different skills to their use in a class setting. The ability to train and offer opportunity to offshore partner staff to deliver class sessions locally can be offered. Reviewing sessions allows staff to review content and delivery aspects of their skill set.

Conclusions

The current generation of Web browser based audiographics products, typified by Elluminate Live!, provide an easy to use, engaging environment for both instructors and learners. The ability of both students and instructors (with a laptop) to join a session from literally anywhere in the world with an Internet connection, eliminates the "be at a specific place" demand of traditional education and to some extent the record and playback features reduces the other traditional demand of "be there at a specific time". Student to student communication is also supported and the ability to use "break-out rooms" for small group collaborative work and remote (external) student presentations is easily arranged.

Given that future developments in related technologies are likely to further enhance the audiographics environment, while at the same time cultural factors, resource pressures and safety issues are likely to make traditional environments less attractive, then perhaps distance education will soon redefine itself, not as the poor cousin of traditional face-to-face classes, but as the preferred mode of study where learning is in your own time and place with all the resources you need at your fingertips.

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