



Use of innovative technologies on an e-learning course

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Abstract

This paper examines how four innovative Internet technologies were incorporated into one course at The UK Open University. The technologies were: blogging, audio conferencing, instant messaging and Harvard's Rotisserie system. Each of the technologies is addressed, and details from the student evaluation are provided. The student feedback on all the technologies was positive. The role of the learning object based course design is examined and it is suggested that this approach facilitates the incorporation of innovative technologies into a course. The authors suggest that as students become increasingly accustomed to standard communication tools such as asynchronous bulletin boards, there will be a shift towards implementing a range of technologies, each offering particular affordances for different forms of communication.

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1. Introduction

The use of new technologies on courses often raises issues of pedagogical appropriateness, technological determinism, student workload, access and faddism. However, it is also the case that technology implementation in a positive learning experience can be one of the strongest influencing factors in their subsequent uptake. Many Internet technologies that were once seen as new and innovative are now considered mainstream, such as web sites, asynchronous text conferences, streaming audio/video and even synchronous collaboration tools such as shared whiteboards. All of these tools are

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commonly found in commercial Virtual Learning Environments (VLEs) while several new technologies have emerged in their place. Although this new set of technologies has already received considerable attention in popular culture and is widely used in specific non-educational contexts, they are still adopted only at the margins in education.

This paper sets out how four such technologies were employed on a course developed at The Open University in the United Kingdom (OUUK). The technologies were: blogging, audio conferencing, instant messaging and Harvard's Rotisserie system.

The paper will address how the technologies were used, how the students experienced and used the technologies and how implementation meshed with the course design.

2. The course

The course, which is the focus of this paper, is part of a Masters Programme in Online and Distance Education offered by The Open University. The course, *Learning in the Connected Economy*, is delivered at a distance, based on online activity and while it offers various forms of synchronous and asynchronous communication, there is no face-to-face meeting. Now nearing the end of its second presentation, the course was first presented from March to October 2003 with 55 students, about half of whom were UK residents and the other half located all around the world. The evaluation referred to here is based on this first.

The course as a whole examines the impact of the Internet and connectivity on learning from an individual, organisational, implementation and social perspective. The content of the course is constructed of 155 learning objects presented over four blocks. Each block lasts for 2 months, adopts one of the course perspectives and is 'pre-versioned' to stand potentially as separate short courses in their own right. The learning objects use text, audio, animation, webcasts and audio conferencing activities to cover areas such as costing e-learning, organisational change, online communities and digital divide. In addition, the educational potential of new technologies such as instant messaging, collaborative tools and blogging are explored. Each object is autonomous so that it can be re-used, removed or altered with relatively little consequence for the remaining objects. Each object is sufficiently rich and complex to achieve a specific learning outcome, but because of the learning object format, the order of study and choice of objects studied can be varied by the student. One of the core principles of the course was that of choice – giving students opportunities to select which learning objects to include in their final assessment portfolio, the depth and the depth of study of each object—depending on their personal interests, job relevance or time and inclination. The course was deliberately designed to appeal to both the higher education and corporate sectors and an international audience, through providing a wide range of substitutable topics and supporting several possible levels of engagement.

3. The technologies

3.1. Blogging

Web logs or blogs, have become the fastest growing use of the Internet over the past year or so. Blood (2000) differentiates between two types of blog—the journal, which acts as an online diary and contains

personal thoughts, opinions, reflections, etc. and the filter-style blog, where the blogger posts links to other web content (be it obscure or mainstream), with a commentary on this.

Blogcount.com estimates there are approximately 2.4 to 2.9 million active blogs as of June 2003. Although an impressive figure for a new phenomenon, Jupiter Research indicates this is only 2% of the online community (Greenspan, 2003).

The development of easy to use tools such as Blogger.com, Radio Userland and MoveableType has meant that users can easily publish diaries from any location. They can allow comments on each of their postings, thus creating debate around issues of importance to a particular set of individuals. Communities of bloggers have grown up, linking and commenting on each others postings. There are also community blogs, such as MetaFilter, where anyone can post and discuss issues.

Blogs are a technologically simple development, yet they have been seized upon by the Internet community. In education, they have three primary (and not mutually exclusive) uses:

1. Group blogs—by setting up community blogs around specific subject areas, an online community can be established, where members post articles of interest and discussion arises around these. Such blogs can be set up specifically for a set of students, or can be a general resource to which the educator directs students. Such a use is one example of a community of practice, as many of the participants are the recognised experts in the field, and students get to partake in a legitimate peripheral form of participation in that community.
2. Academics keeping blogs. Many academics and subject experts have started to keep blogs of their own (or contribute to group blogs, as above). The medium has a number of appealing characteristics for an academic. Firstly, the immediacy of publication is often a welcome change from the delays found in much of academic publishing, and this is particularly pertinent when dealing with rapidly changing fields. Secondly, academics are often the experts in their chosen field and so have a good deal to say on relevant current issues (unlike many bloggers who are simply experts on themselves). Lastly, a blog gains readers through the value of its content; in any one subject area it is a marketplace for ideas and this has a strong appeal for academics, as the exchange and development of ideas was often one of the primary reasons for their entering academia. The blog provides a new outlet for these, which can engender dialogue and debate with other academics who are situated elsewhere. Examples of such blogs are those maintained by many of the academics at Harvard Law School. John Palfrey is interested in cyberlaw and uses his blog to provide students (and anyone with an interest in this area) with up to date news and commentary on relevant issues (<http://blogs.law.harvard.edu/palfrey/>).
3. Students using blogs. Probably the most interesting and significant use of blogs in education however is when they are used by students as an explicit part of the teaching and learning process. There are a number of ways blogs can be employed for pedagogical benefit. Students can use them as a journal or portfolio, demonstrating their thoughts, reflections and discussions on the subject area. For example, [Baim \(2004\)](#) uses weblogs to supplement a face-to-face course in business. Students are required to keep a blog and to post at least 500 words per week and also respond to at least five class mates or other students. They can be used more formally as a portfolio tool for gathering evidence and demonstrating proficiency of specific skills. As the notion of ePortfolios gains currency, this use of blogs is set to expand. [Tosh and Werdmuller \(2004\)](#) propose using them in just this manner, and the development of standardised XML tags allows for easy searching and exchange of portfolio based information. Blogs can also be used as a collaborative tool, whereby students working on a joint

project use the blog as the medium for sharing resources and discussion. The most common use of blogs combines many of the above features, and that is the class blog, where a community blog is used both by the educator to deliver news, resources, engender discussion and by students to collaborate and discuss.

On *Learning in the Connected Economy* students were asked to keep blogs during one module of the course. They were first provided with a set of references on blogging, and then directed at a number of popular blogs to gain a feel for the type of writing style and content commonly found in blogs. They then kept their own blog over a period of several weeks. The activity was directly linked to assessment, with an assignment that required students to analyse the learning value of blogs, based on their experience and reading. Commenting on the other blogs and offering suggestions while blogging was in progress was encouraged, an important part of the public aspect of blogging. As well as providing an overview of the technology and its learning potential students were asked to include in the assessment relevant applications of blogs and extracts from their own and fellow students' blogs.

3.2. Audio conferencing

Audio conferencing is often overlooked in the corporate world in favour of integrated suites of products focused on video conferencing (such as Webex and Placeware). It was also the more established of the innovative technologies included in the course. Some of our students in this cohort had already used similar facilities within Microsoft's Netmeeting as a work-based tool and a few were aware of its potential for language teaching.

In many ways use of audio conferencing in distance education can be seen as building on the earlier use of telephone tutoring or telephone conferencing, but now within an integrated package with chat and whiteboard, concept mapping and resource sharing. Some systems allow longer term storage of the audio files to allow asynchronous participation, while others offer only short-term persistence of non-audio resources with the option to save and then upload new or saved sessions. Audio conferencing has been used in certain subject areas where real-time interaction is required, for example language learning. [Hampel and Hauck \(2004\)](#) describe the use of The Open University's Lyceum system to support a distance education German course. Student feedback was largely positive although technical issues were still significant.

Unlike the other communication tools used in this course, audio conferencing is synchronous and effectively limited to use with small groups. The former presents problems where participants are spread across several time zones. The latter makes the normal options of passive participation in conferences—so called 'lurking'—less likely and less attractive to participants by being more obvious. The presence of people online is clearly shown and normal practice is to greet arrivals and invite them into the conversation, so saying nothing at all is not usually an option. On the other hand as only one person can talk at a time there is a new etiquette of turn taking when talking which can be difficult to master and needs to be practiced and agreed in advance.

The aforementioned Lyceum system was adopted on *Learning in the Connected Economy* as its low demands on bandwidth made it more suitable for students connecting via a modem. As with other synchronous technologies used on this course there were sometimes technical or logistical problems that prevented some students from participating fully throughout. For this reason an alternative to the formal activity was offered which used the asynchronous text-based conferencing tool with which

students were already familiar and with which they generally communicated online during this course. However, very few students failed to participate in the Lyceum debate itself—typically 2–3 per within a tutor group of 15–16. Most students used both the Lyceum synchronous tool and the asynchronous conferences.

As with any educational use of technology we needed to very carefully consider the formal and informal use of the audio conferencing within this course. As audio conferencing was available from the start of the second block—from about 2 months into an eight month course—we assumed that it would be used not only for the formal set-piece debate activity but also for one-to-one or small group planning sessions around the debate and for informal discussions too. One tutor used the system to offer individual support to selected students and reported that some of these thereafter contributed more intensively and confidently to the other text-based online discussions. As the system that we used permitted the creation of public and private spaces it was used for more informal student-led discussions within another of the tutor groups. These students help a series of Lyceum ‘drop in sessions’ over several days to address different resources and themes of the course that interested them. There was no automatic record of such conversations—unlike the normal conference discussion which were visible to all students and their tutors. The students produced their own ‘minutes’ of the sessions to share with others who were unable to attend the sessions.

However, most students used the audio conferencing only for the formal debate activity, usually because it was difficult to find the time for an optional activity even if the discussions were profitable. As one student pointed out “It’s a bit ruthless and not in the spirit of education and I regret the missed opportunities, but sometimes, it is that which attracts the marks that counts, rather than making the most of all the learning opportunities available. So for me, if the choice is preparing for an assignment or spending some time on Lyceum, I would reluctantly spend the time on the assignment.” This comment is equally true of other technologies used within the course, where each block produced further technologies for students to try out.

The debate itself overcame some of the problems of managing participation in audio conferencing by ensuring that each student was allocated a role (as opposer, proposer, chair, researcher, technical reviewer, scribe or interrogator). Some roles took more active part in the synchronous debate while others led during the preparation—which could be synchronous or asynchronous.

3.3. Rotisserie

Asynchronous text-based communication systems are now in widespread use in both pure e-learning and blended contexts. The use of such systems for collaborative activity probably represents the most abundant area in e-learning publications and research. There exist a number of practical guides and advice for the educator in structuring such activity (Salmon, 2000; McConnell, 1994).

While asynchronous communication has proven immensely popular and successful in education, there are often problems with online activities and discussions, which need careful management. These include lack of participation, resistance to participation, unfocused discussion, fractured discussion that is difficult to follow, manipulation by the strongest member and so on.

Most of the research literature is based around similar technology and focuses on the educator’s role in establishing, facilitating and coordinating activity. Some researchers have begun to examine the affordances of computer mediated environments, and to design environments specifically to encourage certain types of interaction, e.g., Bradner (2001).

The H20 project at Harvard University aims to develop software based around strong pedagogical principles. The first of such software is the Rotisserie system. This is a structured conferencing system that seeks to overcome some of the problems often found in online discussion by introducing an element of organisation and compulsion. The Rotisserie web site claims:

The Rotisserie implements an innovative approach to online discussion that encourages measured, thoughtful discourse in a way that traditional threaded messaging systems cannot. In contrast to the completely asynchronous, broadcast-to-broadcast mode of existing threaded messaging systems, the Rotisserie adds structure to both the timing and the flow of the discussion. <http://h2oproject.law.harvard.edu/rotisserie.html>

Rotisserie is based around a series of rounds (the number determined in advance), so that all users who are signed up for a Rotisserie session will be sent an email, telling them to respond to an original posting by a set deadline. They may post their reply at any time prior to this deadline, but it is not published until the deadline has passed. In the next and each subsequent round, each member is assigned (randomly or according to set rules) another posting to respond to, again within a set timeframe, and so on, depending on how many rounds the educator has determined. This allows for far more structured and controlled dialogue.

Such a system may not be suitable for all forms of dialogue; [Wegerif \(1998\)](#) for example, argues that the social dimension of CMC plays an important role and this system does not allow for ‘frivolous’ or off-topic postings. However, it can be used for specific tasks, such as setting up time-limited discussions around specific resources or questions, or it can be used as a peer assessment system, with each student being randomly assigned another’s submission to mark.

In the OUUK course Rotisserie was used to manage a role playing activity. Students were asked to adopt one of four roles, and to respond in character to the statement “Increased connectivity is bringing about a fundamental change in all aspects of learning.” They were then allocated another student’s posting to respond to in the second round, and again responded according to the role they had chosen. The statement represented one they would be discussing in their final dissertation, and so the activity provided a means of encouraging them to take different perspectives on it.

As well as providing students with different viewpoints, the activity also required them to consider the differences between the Rotisserie environment and the more traditional asynchronous bulletin board system they had used throughout the course.

3.4. Instant messaging

Instant messaging is, as its name suggests, a means of communicating in real-time via the Internet. It is achieved by means of a software client, for example AOL’s Instant Messenger. Users who all have the same client can create a list of people with whom they wish to communicate. The IM client will notify the user when these people come online. Users can set their status to indicate whether they are busy, away or so forth, so other users know whether to contact them. It has the advantage over email in that you can be certain the recipient has read your message. The synchronous nature of the communication also has a number of advantages (and disadvantages).

Just as asynchronous email changed the nature of communication, so IM has had an effect on the type of communication people engage in and their online behaviour. In many ways, as email has moved into

the mainstream of communication within organisations, IM has become the means by which much informal, social interaction takes place.

A Pew Internet report (2001) talks of an instant messaging generation, with 74% of online teens using IM. Although it has long been popular with teenagers, it has recently penetrated the workplace and been formally adopted by some organisations, such as IBM (Dean, 2000). IM is used for informal discussion, often of a social nature. This can have implications in education, as Nicholson (2002) reports, where students who used IM claimed to have a stronger sense of community and found it easier to communicate.

IM represents one of the technologies, along with PDAs and mobile phones that students will bring with them to their higher education experience, regardless of whether it is formally incorporated into that learning experience. Having an appreciation of the type of communication it supports is therefore important in understanding the broader context in which a student is operating.

On *Learning in the Connected Economy*, the aim was to give students early exposure to IM, so one of the activities in the first module was to install an IM client, and then arrange an online discussion session with some fellow students to discuss the proposal that ‘instant messaging creates a different social space to other forms of communication, both real (i.e. face-to-face) and virtual (e.g., email, or bulletin boards).’ They were encouraged to keep their IM client installed for the remainder of the course and build up their buddy list, so they could use it as a channel of communication with fellow students.

4. Student experience

Given that the subject matter of the course was e-learning itself, the aim of implementing each of these technologies was firstly to give students the practical experience of using the technology and secondly to consider their potential as educational technologies. The course was evaluated from a number of perspectives, including the use of technologies. The primary method of evaluation was through telephone interviews; 31 of the 45 students were interviewed and their comments transcribed.

There were three key questions in the interview relating to the technologies which were:

1. Did you feel that the main technologies we covered such as IM, blogging, Rotisserie and Lyceum were interesting, significant or worthwhile?
2. Which one did you like most/least and why?
3. Would you have liked more technologies?

Other more general questions regarding course design and coverage also elicited responses regarding the technologies.

Only three students made any negative comments regarding the technologies. Of these one reported that she found them frustrating and unreliable, one had little technical experience at the course start and so struggled with technologies and another said that, they were enjoyable but time consuming. The remaining students were all extremely positive and found them both interesting and useful. Fifteen students reported that they found the course of most benefit simply in gaining experience of the technologies. One student reported being responsible for implementing instant messaging at work and another had used the blogging experience on the course as the basis for a research bid from local government and had been successful.

Instant Messaging and Lyceum proved to be the most popular technologies with seven votes each (not all interviewees nominated a favoured technology or participated in all of the technology related activities). Blogging and Rotisserie were nominated the most times for least favourite, both with six votes. Interestingly, the fact that blogging was a ‘required technology’ for one of the assignments, did raise certain resentments amongst a minority of students. However, almost without exception, these students admitted that they had been ‘won over’ to the benefits of blogging through the exercise of having to use it and reading the blogs of their peers. For Rotisserie its nomination was usually qualified with a comment such as ‘I found it interesting to experience a different environment and would have liked longer.’ This may have reflected the number of rounds selected for this activity or simply the student’s lack of time because this occurred at the end of the course.

When asked whether they would have liked more or fewer technologies, three students responded that they would have preferred fewer, six responded that they wanted more, with the remaining 22 indicating that they found the balance right.

These results are summarised in Fig. 1 below.

Some typical comments regarding each of the technologies are given in Table 1.

Some students reported that they kept both instant messaging and Lyceum installed and they used this as an informal means of communication throughout the course with their peers. In this instance, these technologies acted as an alternative to the asynchronous conferencing system. Such is representative of the type of peer-to-peer dialogue these technologies are specifically designed to support.

The final assessments of students were also analysed. These took the form of a portfolio where students were required to select the solutions from eight activities to act as evidence in the discussion of a given statement. There were limits on their choices, as not all activities were deemed suitable for inclusion. Students were also required to select two objects from each module and two which were collaborative activities—amongst which most of the technologies featured.

It would be inappropriate to suggest that selection of the activities acts as an index for popularity or student satisfaction but the choices between the technologies are interesting nonetheless. The most frequently selected learning object was chosen by 21 of the 37 students who submitted a final assessment but many objects were selected by only one or two students, so the average number of times an object was selected was 5.8. The instant messaging activity was selected by twelve students, Lyceum by five

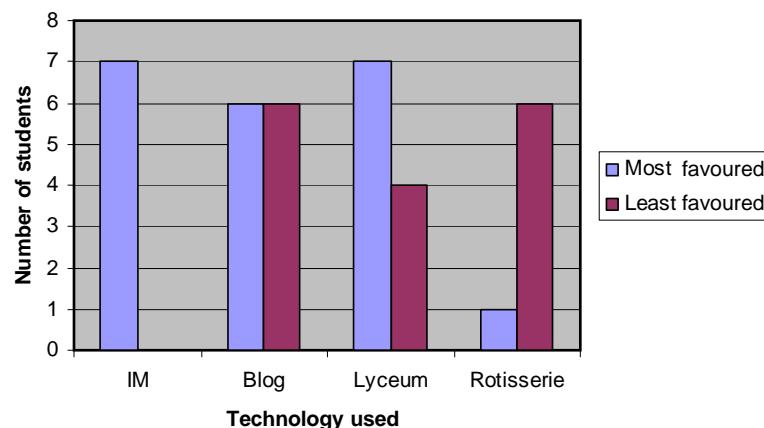


Fig. 1. Most and least favoured technologies.

Table 1

Typical student comments regarding each of the four technologies

Instant messaging	"I could see lots of potential for this"	"Took too long to organise sessions"	"IM was interesting, tried it once, but preferred asynchronous"
Lyceum	"I was gobsmacked by this"	"I didn't have broadband and found it frustrating"	"I liked the multiple channels, typically 3 used at one time (audio, whiteboard and chat)"
Blogging	"Blogging was useful, fun and interesting"	"I liked blogging a lot, the idea that it was outside the formal environment"	"I didn't like blogging, but was interested to do it and see what people put in their blogs"
Rotisserie	"Rotisserie was interesting, could have been used for peer assessment"	"I couldn't get Rotisserie working and thought it was an experimental technology"	"Interesting—it needed longer, it was hard to review discussion, but the different perspectives were good—a very divergent type of forum"

and Rotisserie by ten students, indicating they were usually selected more often than average, although whether this is a result of students wishing to engage with the technology or a result of the assessment constraints is not clear (and from a learning objectives perspective, may be not significant). Blogging is not included in this analysis as it was linked directly to an assignment during the course and was thus compulsory. It is worth noting that these numbers indicate only those who chose to select the solution for inclusion in their final assessment, the numbers actually engaging in the activity would be higher.

5. The role of course design

The course was designed around learning objects, e.g., autonomous activities which covered a specific subject. Each of the technologies discussed was the subject of one learning object. This design has a number of benefits for course production in general (Weller et al., 2003), but particularly when implementing innovative technologies. Firstly, it allows for controlled risk, by isolating the technology within a stand-alone object, it contains any potential knock-on effects. Secondly, it allows for a degree of choice. Although the portfolio-based assessment of the course required students to include an example of the use of technology in the course, the particular technologies they chose to include were at their discretion. The learning object approach itself facilitates choice, as the learning content is not part of a deeply integrated whole, so students have some freedom to select objects based on strategy, interests, experience, etc. Thus, if they were reluctant to use a particular technology, they could simply read that object without actively taking part. This has the consequence of liberating the course designers somewhat in their selection of technologies. For example, some students had an aversion to using instant messaging (or the particular messaging client chosen), regarding it as intrusive. Had this been an essential technology then such reservations would have represented a major tension in the course.

With the flexibility allowed by the learning object approach, this did not arise, as the course designers could simply advise a student not to participate in that activity and select a different one for inclusion in their portfolio. The last major benefit the learning object approach offers for the adoption of new technologies is that it facilitates the task of updating course content. As the objects are stand-alone, they can easily be modified, or completely replaced with little impact on the remainder of the course. This is particularly useful when dealing with new technologies, where either the version, and thus associated

instructions and functionality, may change every year, but also the technology itself may fade from popularity or be superseded by a new technology. For example, although blogs may be a topic of current interest, it is possible that in 2 years time they will either be so commonplace as to not be worthy of focus or they will have lost popularity. To maintain the currency of the course, it is therefore important to be able to integrate new technologies as they come along, and the learning object approach makes this relatively easy.

6. Discussion

Early adoption of technologies is often found when the teaching is about the technology or there is a specific purpose for it—in short, when the medium is the message. This was seen with early use of Computer-Mediated Communication (CMC), for example, at The Open University (Weller, 2002). The use of these technologies follows a similar pattern in that the course was focused on e-learning and the students were required to investigate the technologies for their potential as educational tools. As the technology becomes more pervasive and easier to use it spreads out into other courses; for instance blogging is now set to be a baseline service offered to all students or course teams, regardless of subject area.

As course designers we took care to ensure that the spread of new technologies was even across the course, although the use of some—such as Lyceum—extended over several weeks. Feedback from the students indicates that the balance between new technologies and academic content was about right. Most students found the experience of using the new technologies both enjoyable and enriching, with many reporting that they had then proceeded to use or implement them in their professional context. There was very little negative feedback regarding the technologies, which may be a consequence of the audience for such a course. However, the element of choice inherent in the course design was probably a significant factor in reducing anxiety about any given technology, while the assessment approach provided the motivation to ensure that there was a sufficient cohort for any one activity.

All of these technologies are aimed at fostering specific types of communication. This emphasises that there is rich variety in face-to-face communication, which is influenced by numerous factors such as the formality of the situation, the topic under discussion, the number of people present, the intention of the orator, the social setting and so forth. Each of the technologies discussed here seeks to engender an online form of a particular type of human communication—which is not to say that they necessarily seek to replicate the exact experience of face-to-face communication. After all each medium has its particular set of affordances, which should be utilised to the benefit of the user. What they do have in common is that they seek to realise the same goals that are the motivation of the communication. For example, instant messaging aims to foster informal, instantaneous dialogue, such as that you might engage in if you meet someone in a corridor. This impromptu type of dialogue can be both social, but also work related, and forms an important part of the social life of information, to use a term coined by Seely-Brown and Duguid (2002) term. Similarly, Rotisserie can be seen to be promoting the more formal exchange and dialogue one might experience in a committee structure or formal debating forum.

Although all the technologies raised here are primarily communication tools, they could be seen as augmenting specific phases in a learning cycle or learning style. For example blogs may support the reflection phase in Kolb's (1984) cycle, while instant messaging is used during experience in action. Similarly, in Laurillard's (2002) conversational framework, audio conferencing can be used to promote

discussion and debate, while the more structured dialogue of Rotisserie is better suited to articulation and expression.

The use of these technologies to promote specific forms of communication may become increasingly common as students become more accustomed to various forms of Internet technologies and thus the overhead of using a range of technologies is lowered. As Kraan (2003) has suggested with regard to VLEs, ‘the only way in which all subject communities will be catered for properly, may be to forget about monolithic VLEs, and move to collections of specialised tools that do one or two things really well.’ Much the same might be said of the myriad forms of dialogue and conversation that we may wish to accommodate. The notion that the standard asynchronous text-based bulletin board can cover all of these will seem increasingly unrealistic. Rather, the traditional bulletin board forms the basic level for communication, but we come to view dialogue in the learning environment as multi-channelled, with particular tools providing affordances for specific forms of communication, which are matched to the learning outcomes of any activity or course.

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