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The web as a vehicle for constructivist approaches in language teaching

USCHI FELIX
Faculty of Arts, Monash University, PO Box 11A, VIC 3800, Australia
(*email: uschi.felix@arts.monash.edu.au*)

Abstract

The central question in this paper is whether Web technology has the potential to add value to face-to-face language teaching in the form of activities that cannot be realized fully in a traditional classroom. While arguments will be presented for and against e-learning, our conclusion is that the latest human-machine interfaces offer an environment for interactive learning that can foster the acquisition of communicative skills. The paper argues that one of the great strengths of the Web is the potential to engage students in creative information gap activities and real experiential learning in the form of meaningful, process-oriented projects in authentic settings. Evidence will be drawn from three sources:

- The current literature on new learning approaches.
- The latest best-practice applications, such as Webquests, Voice Chat, MOOs and innovative co-operative ventures.
- The findings of two large research studies by the author on students' perceptions of Web-based language learning in school and tertiary settings.

The paper emphasises the importance of creating connectivity rather than content.

1 Introduction

The debate on online learning has produced sensible comments on both sides (Ryder & Wilson, 1996; Owston, 1997; Phillips, 1998; Noble, 1997, 1998a, 1998b; Kraut *et al.*, 1998; Feenberg, 1999; La Rose *et al.*, 2001). However, it will not be advanced by uninformed and flippant comments such as "let your laptop do the learning", or "if online learning is so clever, why wouldn't someone come up with an automated student response program?" (Mackay, 2001). Comments like these – like the definition of lecturing as the process by which information is transferred from the lecturer's notes to the student's, without passing through the brains of either – may be funny, but they amount to nothing more than criticism of excruciatingly bad teaching.

Debates on online learning often begin by comparing unlikes. For example, the "theatre of the classroom" and the rich social tapestry of the campus may be contrasted with a barren, solitary, inhuman online experience limited to downloading texts and submitting

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assignments. All such a comparison is doing is to claim that a piece of technology cannot replicate – or even simulate – what a brilliant teacher can do in a classroom. Of course it cannot. What is more, without the intervention of a creative teacher, the Web can at best be a convenient source of materials and a vehicle for communication.

However, the joke works just as easily – and just as unhelpfully – in reverse, but what is the point of pointing out that the latest best practice approaches to Web-based learning are vastly more exciting than boring talking-head lectures? There is simply nothing of interest in such comparisons. Of course there are millions of pedagogically unsound Web pages in existence – just as there are millions of hours of poor teaching in classrooms around the world. What this paper focuses on is a question that is much more relevant to the real world. What do the new technologies have to offer us in our search for even more effective teaching and even greater success in passing on to the student appropriate life-long learning skills?

Recent research based on constructivist learning approaches strongly suggests that the Internet and the Web have the potential to add something even to the best classroom teaching (Schneiderman, 1997; Freeman & Capper, 1999; Becker, 2000; Oliver, 2000). Assumptions are that learners are active constructors of knowledge who bring their own needs, strategies and styles to learning, and that skills and knowledge are best acquired within realistic contexts and authentic settings, where students are engaged in experiential learning tasks. Addressing all this adequately may not be impossible in the classroom but it is a great challenge.

The exciting promise of the Web is that it offers an environment in which a creative teacher can set up authentic learning tasks in which both processes and goals are stimulating and engaging, and which take individual student differences into account. High and low tech examples are now frequently reported at conferences, and go beyond any expectations of what can be done in a classroom or even with sophisticated CD-ROMs. The best versions are goal-based problem-solving activities which involve learning by doing, allow the learner to make mistakes in a safe environment, and, where appropriate, provide intelligent tutor guidance in various branching exercises with meaningful feedback along the way. This paper will present a few practical examples of how the Web and the Internet are uniquely suited to this purpose.

The other irritating aspect of uninformed debate is the claim that students resent online learning. This is not true. Our own research over the past two years (Felix, 2001) strongly suggests that students are open to quality online learning, especially as an add-on to face-to-face teaching. Furthermore, learners who have chosen online courses prefer them to on-campus offerings. It is not even true that the absence of a teacher is necessarily a weakness of online learning. What students do resent – quite rightly – is the replacement of quality classroom teaching by inferior cost-cutting online ventures. Students are very clear about the relative advantages and disadvantages of online learning and our discussions here will present potential models in the light of these perceptions.

The problem is not so much what we can do online, but why and how we are going to do it. Content alone will not transform our teaching approach. We need to think about how students can best interact with the content, the medium, and each other, in a quest for connectivity and meaning. Doing it well will involve a major commitment of money and time, and even then we will still be faced, at least for the moment, with the ugly problem of access. There is not much point delivering a wonderful product to students

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over a 56K modem. Equally, there is no point restricting developments to the lowest common technical denominator in a climate that is changing so quickly and in which so much needs to be done. This article will therefore highlight a range of possibilities from the mundane to the sophisticated.

The paper is structured in four parts. First, it looks at students' views of the environment, and then presents a brief summary of the relevant new learning approaches. Next, it examines the relative merits of presenting content and creating connectivity online, and ends by discussing the models which might best respond to students' needs, and the recommendations coming out of the literature.

2 Student perceptions

During 1999 and 2000, two studies were carried out on students' perception of the Web as a viable environment for language learning (Felix, 2001). The group was made up of 104 tertiary, 82 secondary and 22 primary students. The definition of online learning here was a broad one: students were engaged in a variety of approaches to Web learning, and all had access to a teacher, either face-to-face or by e-mail. A further important point is that the great majority of students used the Web as an add-on to face-to-face teaching. This paper reports the general results from these studies. More detail can be found in Felix (2001).

The basic message is that both studies confirmed that the Web is a viable environment for language learning. In general, few differences in perceptions emerged between the tertiary and school-aged students, even though there were several notable areas of particular difference between the groups. One example is that, right from the beginning, school children felt more comfortable with the environment and enjoyed it more, whereas some 17% of tertiary students felt uncomfortable to begin with. School children also found the materials more useful, despite rating them less highly overall, and were more impressed with graphics.

In addition, the qualitative feedback from the school children, while tending to be positive, was generally less enthusiastic than that from the tertiary students. This may have had to do with the fact that a large number of the technical problems reported came from this group. It may also reflect a more critical attitude in the group since many were already used to sophisticated computer games far beyond the scope of the educational materials used here.

In terms of reported advantages and disadvantages of using the Web for language learning, the responses from a total of 164 older and younger students were very similar, with advantages outweighing disadvantages (see Table 1).

In terms of the preferred mode of access to Web-based learning the option most favoured by both older and younger students was within face-to-face teaching in class, while the least favoured option was distance education without a tutor. Where distance education with a tutor was concerned, primary students had an especially poor view of the option, whereas it was highly rated by adults. The explanation for this difference may be that the younger students lacked the experience to make a judgement of this mode of learning.

In terms of study preference, overall preferences were very evenly divided between those who preferred to work alone (31.1%), with a partner (33.5%), or in a group (35.4%). These distributions were slightly altered in the breakdown relative to gender,

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Table 1. *The reported advantages and disadvantages of using the web for language learning*

Advantages	(133)	Disadvantages	(90)
Time flexibility	(33)	Lack of speaking practice	(20)
Wealth of information	(30)	Unreliability and slowness	(17)
Fun	(13)	Absence of teacher	(15)
Reinforcement of learning	(10)	Distraction	(14)
Variety	(10)	No interaction with peers	(13)
Privacy	(8)	Inadequate feedback	(11)
Gaining computer literacy	(8)		
Absence of teacher	(6)		
Ability to repeat exercises	(5)		
Learning with authentic materials	(5)		
Miscellaneous	(5)		

but the data showed no significant difference between males and females or between tertiary and school-aged children. Further, although it would have been natural to anticipate, for example, that a preference for working alone would emerge as a special strength in Web-based learning, no significant relationships were found between study preferences and any of the variables under investigation.

Where strategies were concerned (memory, cognitive, compensation, metacognitive, affective or social), no significant relationships were found with students' perception of various aspects of the environment. Individual ratings were fairly evenly distributed across the range, with the exception of affective strategies, which were the least favoured, especially by native speakers of English. Preference for affective strategies was also highly correlated with a preference for working in groups.

Finally, where learning styles were concerned (visual, auditory, tactile, group, kinesthetic or individual), an interesting finding was the strong preference expressed for kinesthetic and *tactile* as a major learning style and for *visual* and *auditory* as a minor style. This sort of preference appears to be conducive to working with the Web, especially when one of its great strengths is the potential to engage students in real experiential learning with exposure to meaningful, goal-oriented activities in authentic settings.

3 New learning approaches

If we look at the literature on language learning and technology in learning over the past decade, three interrelated trends emerge. These are;

1. *Constructivist approaches* (Duffy & Cunningham, 1996; Geelan, 1997; Grandy, 1997; Gruba & Lynch, 1997; Harper, 1997; Jonassen, 1994; McMahon, 1997; O'Haver, 1997; Philips, 1995, 1997; Winn, 1991);
2. *Problem solving approaches* (Boud & Feletti, 1991; Camp, 1996; Savery & Duffy, 1995; Stepien & Gallagher, 1993); and
3. *Collaborative learning approaches* (Debski, 1997; Dillenbourg & Schneider,

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1995; Gremmo & Riley, 1995; Lambert & Walker, 1996; Light, 1993; Renié & Chanier, 1995; Warschauer, 1996).

All have a feature strongly in common: a move away from the static transmission models for knowledge and skill acquisition that are based on traditional cognitive learning approaches which emphasise learning as an incremental mathematically-facilitated process (Hannafin, 1997). This latter approach is often found in CALL where the majority of resources still feature drill and practice and lock-step structures. While there may be a marginal place for such activities in language learning – after all, students quite like receiving instant feedback in self-access activities (see Table 1 and Felix, 2000) – the Web has the potential to engage students more fully in the construction of knowledge, especially at an intermediate and advanced level.

The new approaches, which draw upon situated learning and social cognition theories (Hannafin, 1997), emphasise dynamic, situated learning environments in which knowledge and the conditions under which it is constructed are inextricably linked. It is interesting to note that these new learning approaches have three characteristics in common with the originators of communicative approaches to language teaching (Widdowson, 1978) – namely, that tasks have to be contextualised, authentic, and meaningful to the student.

It is also interesting that, compared with teachers who use instructional transmission methods, teachers favouring constructivist approaches have been found to make more use of computers in the classroom, while their students use computers more outside the classroom (Becker, 2000). At the most adventurous level, students may negotiate their curriculum, and instead of traditional assignments submit work in the form of published products on the Web. This is a strong feature in the approaches advocated by Barson (1999), Debski (1997) and Shneiderman (1997).

A word of caution: not all students take readily to these rather challenging learning environments (Felix, 1999; Levy, 1997), and a great deal of guidance and intervention may be required to avoid potential problems with group dynamics, assessment and time commitment (some of these are addressed in Barson (1999) and Debski (1997)). Naturally, relatively high levels of proficiency are required for the more ambitious models presented below. Measures for providing structure and support for Web-based learning at lower levels of proficiency are discussed in Hess (2001).

4 Content vs. connectivity

4.1 Content

If curriculum design is informed by these considerations, content alone clearly cannot be enough (see Odlyzko, 2001). While content on the Web offers flexibility, in that materials are available anywhere and any time, developing or reproducing content in itself does no more than providing students with access to a book. It reflects a contained (the Latin origin of content) transition model approach to teaching in which the instructor directs and controls the process. Even if some interactivity is added to the content by providing students with automated feedback, the full potential of the new technologies is still not exploited. If nothing more is provided than drill and practice with equivalent

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assessment requirements, we would be better off developing materials on CD-ROM, which has the anywhere/anytime advantage but with significantly increased reliability and speed.

One advantage of this approach, of course, is that it fosters accuracy. However, how meaningful is the learning experience to the students, how long-lasting the skill or knowledge that have been acquired, and how transferable what has been learnt? I remember well my expert regurgitation of the most intricate French imperfect subjunctive sentences, learnt by means of computer drill and practice, at a time when I had great difficulty understanding or communicating basic necessities during my first visit to Paris.

Of course the best CD-ROMs have attempted to inject more meaningful interactivity into the learning experience. In programs such as *Oscar Lake* and *Carmen Miranda*, students are engaged in problem-solving, goal-oriented activities that involve them in information gap resolution exercises difficult to create in a traditional classroom. However, even here, the task is still contained in two important ways: students have no real influence over the outcome or the creation of the exercise, and the task is predominately a simulation exercise lacking in authenticity.

In the classroom, it is fairly easy to tackle the lack of influence and engage students in the process of learning by means of a negotiated curriculum. By contrast, it has always been a great challenge to achieve authenticity. Even the best face-to-face learning environment outside the target language country can only produce simulation since the setting can only be as authentic as its native speaker teacher. We will demonstrate below that this is one important area where the Web and especially the Internet can add quality to the classroom learning experience.

4.2 Connectivity

If we begin by thinking about connectivity or interactivity in any curriculum design exercise, a different picture emerges. The process will be informed by a constructivist approach, in which students become active agents in the direction of their learning. The Internet as well as the Web are used as tools in the design of creative learning activities. The anywhere/anytime flexibility provided by the CD-ROMs mentioned earlier is expanded in quality by the students' ability to shape the task and carry out work in authentic settings, both synchronously and asynchronously. Social interaction is fostered by collaborating and co-operating in meaningful exchanges through authentic information gaps.

The emergence of e-mail in language learning in the 1980s transformed what students could do in their classes, by connecting them to a vast choice of partners and expanding the variety of tasks. The international *Tandem* site, which pairs native speakers of various languages, is of particular interest here (Little & Ushioda, 1998; Ushioda, 2000). The 1990s offered a further expansion of choice in the form of bulletin boards, discussion groups, chats and MOOs (MOOs have been around for several decades in the form of dungeon and dragon games, but were not exploited for language teaching until fairly recently). Excellent ideas for collaborative learning in these rather challenging environments can be found in Shield & Weiniger (1991), Shield, Davies & Weininger (2000), and Utz (2000). The most striking advance where language learning is concerned is pro-

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vided by the new kids on the block – voice chat and voice Bulletin Boards. They are likely to be taken up rapidly to fill the greatest perceived gap in Web-based learning, especially when they are as user-friendly as *Wimba*.

The other marked advantage over classroom teaching offered by the Web is the relatively easy access to sole or collaborative publishing of students' work. Here we have the potential for truly experiential, goal-oriented learning in which students are able to choose the task, negotiate the process, determine the outcome, and share the result on a global scale. While some of this is possible in the classroom, the vast variety offered by already existing Web materials and partners world-wide, expands the potential for matching more closely individual learners' interests, abilities, strategies and styles.

A marked disadvantage of these approaches, of course, is that accuracy is very difficult to monitor or achieve (Cabot, 2000). We need to weigh the time saved in preparation of materials against the extra time needed to help students refine their often very ambitious projects before they go online. A great deal of unobtrusive tutor guidance and monitoring is also required during the process (Berge, 1995). If students are not to become frustrated or language fossilised, a careful balance needs to be struck between allowing them to make mistakes in a safe and potentially anonymous environment, and providing helpful feedback. While students' feedback on this type of learning is generally positive, they sometimes complain about assessment procedures, unequal commitment between partners, and insufficient time in which to complete the task (Levy, 1997). A great deal of care needs to be invested in the initial negotiation of the exercise between tutor and students and between the students themselves. It goes without saying that assessment procedures have to mirror and continue the learning process. An excellent discussion of authentic assessment can be found in Laurier (2000). All this being said, when the approach is successful it has the potential to lead to the acquisition of skills, in a way that better reflects what awaits the students in real-life situations, in terms both of language and of social interaction skills.

5 Models

In Felix (1998, 2001) we identified many Web-based activities defined by three levels of interactivity: (1) point and click; (2) information gap resolution; and (3) experiential learning. Here we will revisit the latter two, presenting the latest best-practice models in the light of our students' perceptions and the learning approaches discussed above. Naturally, there is a great deal of overlap between the two categories with relative emphases determined by the interest, needs, capabilities, strategies, styles or affordances of individual students, groups or teachers. Our selection focuses on models that seek to achieve maximum connectivity and student engagement and that address students' concerns about the lack of interaction and speaking practice. Because of this, activities listed here are best suited for intermediate and advanced students. Activities suitable for beginners are included in Felix (2001).

5.1 Information gap resolution models

These can be found in many interesting permutations, ranging from cleverly organised mystery games, to contextualised language and research tasks embedded in Webquests, and

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creative simulations. The new voice chats also lend themselves naturally to this category and may well soon take over from what is currently being done by e-mail. Although the activities listed here share some characteristics with the experiential learning models below, they are designed, produced and monitored by the teacher.

5.1.1 Meurtre à Cinet

This very creative activity, also available in Spanish, and designed to provide writing for communicative purposes, is fully described by the developers in Nelson & Oliver (1999). The basic form is a murder mystery conducted over four rounds, in which students are given a character to play, information about what they were doing at the time of the murder, and tasks to perform. In each successive round, new clues are provided on the Web in the shape of documents of various types. Students engage in meaningful e-mail communication among themselves as they ask questions in their own quest to solve the mystery, or respond – always truthfully, but not necessarily completely – to the questions that are put to them. This sort of activity seems ideal for the introduction of voice chat instead of, or in addition to, e-mail.

5.1.2 Dream Holiday

Dream Holiday is the story of one person's holiday to three different countries. Links throughout the narrative require students to participate either in research activities linked to the Lonely Planet travellers' guide site, or in language-based activities that focus on the use of tenses. A tutorial is included to help students consolidate their understanding of the different tenses. The research activities guide students through the information they will need to devise their own dream holiday. Once all the activities have been completed, students research and then write about their holiday.

5.1.3 Travelsim

This travel simulation activity gives students practice in speaking skills as they work together in class. It provides an idea of what it would be like to plan a trip to the Grand Canyon, even though it does not include all the steps that would be required in real life. It is designed around a series of problem-solving tasks in which groups of students are given a sum of dollars to spend on various activities of their choice, selected from a drop-down menu. Students are given reports of what they have done so far along the way, with a complete version at the end, together with a facility to send a greeting card.

5.1.4 Wimba

Wimba is a user-friendly threaded Voice Bulletin Board. It currently appears to be used mainly for fairly traditional language exercises, such as asking students to describe what they did at the weekend with feedback given in the form of correct models and formal corrections of grammar. However, its potential for setting up sophisticated information gap activities is obvious and only restricted by the user's imagination. The simultaneous availability of text and sound is a great advantage over previous Bulletin Boards and

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addresses one of the greatest disadvantages of the virtual environment as reported by our students.

5.2 Experiential learning models

Approaches in this category emphasise students' active involvement in negotiating the curriculum and shaping both the process and the outcome of the learning. They invariably have as their goal tangible products, such as published Websites, magazines or portfolios, produced co-operatively by groups of students either in a single location or from anywhere across the globe.

Here, too, many examples are available, ranging from single language efforts, to large-scale multiple language projects, to shared learning environments in MOO settings. At the most sophisticated level, commercial sites allow users to contribute to and participate in a dynamically changing game environment which includes manipulating digital objects in the search for clues.

5.2.1 Windows on Austria

This collection of student projects offers 20 windows on different aspects of Austrian culture. The aim is for students to improve their ability to use the language in a realistic communicative situation by developing contacts with information sources and by engaging in correspondence by email. An important goal is that they get used to the Internet as a source of flexible, authentic learning material, and contribute their own projects to a resource base that will be available for use in secondary and tertiary language education on the Web.

A large number of projects of this kind for all sorts of subjects, proficiency levels and age groups can be found on the A Webquest for Webquests site.

5.2.2 Project-driven foreign language learning

Reshaping foreign language learning through social and creative use of computers is a sophisticated large-scale multi-lingual version of the approach. The project integrates multimedia tools into project-driven language learning, with teachers, students and different language groups collaborating in negotiated student work supported by a purpose-built Web-distributed Global Learning Environment which provides technical infrastructure and pedagogical support.

5.2.3 Active worlds

Active Worlds is a constantly developing universe of virtual worlds, where users speaking dozens of languages can meet and chat to people from all over the planet, explore virtual worlds, play online games, shop, surf the 2D and 3D Web, and build their own virtual home. *Active Worlds Educational Universe* is a development of the original site as an educational community that allows educators to explore new concepts, learning theories and creative curriculum design, and discover new paradigms in social learning. Currently, there are over 80 educational worlds available in the AWEDU, where classes

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are taught, experiments performed, projects carried out and meetings held.

The virtual reality environment of *Virtual Wedding* is one example of what can be done using the *ActiveWorlds* software suite. This project uses the metaphor of a wedding to create cultural simulations, in a blend of linguistics, literature and cultural studies. Its principal aim is to create a model that will incorporate an innovative and communicatively and analytically oriented use of information technology and virtual worlds into the study of English at university level. Students are co-operatively engaged in building virtual communities played out anywhere from Jane Austen's England to Seinfeld's New York.

5.2.4 Majestic

For an example of what commercial companies are doing with the genre of experiential learning and what our young students may well now be used to, see the description provided by the *Majestic* Website:

> *Welcome to Majestic, the suspense thriller that infiltrates your life and leaves you guessing where the game ends and reality begins.*
>
> *Majestic is an episodic online entertainment experience set against the backdrop of a grand and sinister conspiracy – an unfolding mystery adventure that uses the Internet as a canvas for its story, weaving the player through both real and fictional experiences in real-time. Highly personalized and naturally paced, Majestic tailors the experience specifically for each player as it dynamically changes the content of web pages, e-mails, faxes, voicemails and chat conversations in order to immerse the player at the very heart of a developing story.*
>
> *Majestic players assume the leading role in their own adventure, interacting with other characters, uncovering clues, searching for answers, collecting and using digital objects and resolving challenges to progress through the experience. Unlike other forms of entertainment, Majestic actively pursues and interacts with the user based on events developing within the fiction, creating a uniquely suspenseful entertainment experience.*

Although the site is a publicity vehicle for the film *AI: Artificial Intelligence*, it is still a powerfully attractive game, rich in possibilities for pedagogy. Such enterprises are not to be despised. After all, we cannot possibly produce resources of this richness for our students in our impoverished educational environment – or, indeed, in virtually any educational environment imaginable. Hollywood movies with publicity budgets running into the millions exist in a different world. It is a cause for thanks when those budgets result in a site into which we can usefully tap at very little cost in terms of our own time and money, even if the dominance of the Wintel model can sometimes mean (as here) that the sites are not available to Macintosh users.

6 Conclusion

On the basis of our students' perceptions, the recommendations in the literature, and the many successful models of using the Web and the Internet for creative language

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learning, we can confidently assert that these environments offer powerful tools, not simply for practising and reinforcing language structures, but especially for the creation of real-life learning tasks in authentic settings. Furthermore, students value the flexibility, the reinforcement of learning, the privacy and the wealth of information that Web-based approaches tend to offer. It is a further source of encouragement that all the perceived disadvantages of the environment can be overcome.

One thing that it is essential to realise is that the most interesting part of what is happening on the Web is not visible to the observer. What really matters is what is taking place in the communication between users of the Web. This point underlines the critical difference we have been drawing between content and connectivity.

A realistic assessment of Web-based teaching is that it is not a time-saving approach, but rather a time-shifting one. Teachers will save on the time they would otherwise spend preparing elaborate materials, but they will also have to invest time in assisting in the organisation of tasks and projects, moderating communication, and creating sound assessment strategies. Care also needs to be taken to address the perceived risk of distraction, and to ensure that the technologies used are robust and online materials reliable.

Essentially, our motives for using the Web should not be economic but pedagogical. This is not to say that economics can simply be ignored. The conflicts created by bureaucratic demands are real, but it may be possible to respond positively and save money by using existing resources rather than creating our own. Still, what is important is the value that is added to the learning process: the experience must lead to the acquisition of language and social interaction skills, in a way that reflects what is waiting for students in the real world.

The bad press that the online environment sometimes receives can be traced to the assumption that the user will be able to log on to a fully fledged distance course from which they can learn everything without extra effort. In fact, there are very few courses that even attempt to meet this demand (*Global English* may be one of the exceptions). Instead, what the Web offers is a multitude of ideas and materials that the teacher can exploit – with a bit of effort – to enhance existing programs.

Our final message is that online learning is here to stay, and that we should embrace the technology for what it can be – a tool which, in the hands of creative educational designers, dedicated online moderators and enthusiastic students, has the potential to enhance our learning experience beyond and in addition to the expectations of even the best classroom environment.

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