The gatekeepers of CELL

Roland Sussex, The University of Queensland

E-mail: r.sussex@mailbox.uq.edu.au

Abstract

Gatekeepers are the guardians of disciplines. In a narrow sense they are responsible for maintaining standards, and setting the qualitative norms of a discipline. Gatekeepers are typically members of editorial boards, publishers’ expert advisers, and also members of the institutions where the discipline is taught and researched.

Computer-Enhanced Language Learning (CELL) now has a range of journals, both on- and off-line, and books which support its work and development, and there is good evidence in online discussion groups that CELL is a vigorous and evolving field.

The problem, however, is how one defines the field of CELL. There are good arguments that CELL is an interdiscipline. There are also arguments that CELL straddles the pure/applied division of disciplines, and so is more like engineering than a ‘pure’ discipline.

What is the role of gatekeepers in a field with these properties? What are the criteria which are relevant to ‘good CELL’, and how are they determined, negotiated and resolved? What does a field like CELL expect of its gatekeepers? What wisdom do they apply from the various disciplines that make up CELL? And what is their role in setting a future direction for CELL?

Keywords

Computers, language, learning, CELL, epistemology.

Introduction

The disciplinary nature of CELL is a complicated and unstable question. To begin with, CELL is anything but homogeneous. When my colleagues and I wrote Computers, language learning and language teaching (Ahmad et al. 1985), we could be reasonably confident that we had encircled most of what was then regarded as CALL. Fundamentally it had to do with a computer, software and a single user in an interactive one-on-one framework. The teacher + computer interaction and the creation of coursework was a second dimension. And CALL was starting to address the issue of roles, as outlined in the ‘tutor, tool, tutee’ framework (Taylor 1980).

Nowadays, however, CALL has become CELL, and the intellectual and technical framework has diversified to such an extent that it is no longer possible even to talk confidently of a coherent CELL. It may well be that a more appropriate name would be TELL for ‘Technology Enhanced Language Learning’, to include a wider notion of digital technology. And even ‘enhanced’ is now too limiting as well. Some CELL materials of less distinguished quality do little to enhance the learning experience. Perhaps ‘augmented’ would be a wiser choice. But, in its turn, that implies that there is an entity ‘language learning’, to which something qualitatively different has been
added. As we shall see, there is a case to be made for proposing a more integrated relationship between the technology and the learning. For the moment, however, and for the purposes of this argument, ‘CELL’ will serve our purposes, though with the rider that the instability of the acronym reflects a much more wide-ranging instability in the nature of CELL itself.

Several years ago, at one of the biennial meetings of the Exeter CALL conference, I presented a paper which argued that CALL was akin to a variety of engineering (Sussex 1995). It seemed then that engineering was an appropriate metaphor or model for CALL. The role of non-applied ‘parent’ or ‘underlying’ disciplines seemed right: physics, chemistry and biology for engineering; language and pedagogy, linguistics and some other cognitive domains for CALL. And the character of application seemed to fit as well. CALL was dealing with real-world questions in real time, accessing expertise from its background disciplines and putting to work their structures, processes and methods.

The engineering metaphor or model still seems approximately right for many areas of CALL, and perhaps for CELL as well. But since that time the disciplinary mix of CELL has become radically more complex, and some of the allegiances have shifted in weight and quality. The engineering metaphor of application to real-time issues and their solution sits behind, or perhaps partly to one side of, the present paper, which concentrates rather on the nature of the new hybrid CELL which we are working with. We will question how it reached its current profile and position, and how it is currently managed and directed.

Gatekeepers

The term ‘gatekeeper’, and its connotations, have been enjoying a resurgence in the contemporary literature on the management of academic disciplines and activities. This metaphor – it is significant that we need metaphors to talk about these issues – brings with it a number of elements which bear on the shaping of intellectual domains and activities. Gatekeepers are responsible for passage past a point, and the point marks either the continuation of the road, or a portal to something else, often something better. The traveller has to show reason why he/she should be allowed to pass. The gatekeeper considers the reason, or the payment, or the bribe, and decides whether or not to let the traveller through. The gatekeeper may be acting on orders from someone or somewhere in authority; alternatively, gatekeepers may simply be there to block unlawful entry or passage. In this case, the judgement is the gatekeeper’s, and requires a more or less expert, and more or less responsible, exercise of wisdom. In either case, the gatekeeper has the authority to exclude those unworthy of entry. By implication, the space on the other side of the gatekeeper is something that is valued and prized – in other words, something worth having a gatekeeper to protect.

In academic terms, the most common use of the gatekeeper metaphor concerns appointments and promotions. Here the gatekeepers are peers and senior staff, whose task is to ensure that those who are appointed or promoted meet the criteria set by the collegium. This itself is not a straightforward notion. There is sometimes disagreement about exactly where the gate stands, and academic management thinking now requires a constant or rolling review of the criteria and procedures which the gatekeepers are to apply. Further, the gatekeepers’ decisions can be challenged and overturned, rather than being some kind of immutable wisdom, or at least a firm set of rules, applied in an all-or-nothing fashion to those seeking permission to pass. These changes are welcome, and are relevant to our purposes here. The traditional concept of the gatekeeper includes a default overtone of negativity. In other words, unless the gatekeeper can be persuaded to the contrary, the answer to hopeful travellers will be “no”.

This is not the overtone that we need for this discussion, and it is particularly unwelcome when we apply gatekeeping to the management of intellectual disciplines. Here we find again the senior
academics, but this time accompanied by the superstructures, or infrastructures, of academic disciplines: academic journals and publishing houses and their editorial and advisory boards, the paraphernalia of citations and citation indices, curriculum committees, and the more recently implemented processes of quality control and accountability. The collegium is very much in evidence, and represents the body, inchoate though it may often be, where the core values of the discipline are set, and which then oversees the realisation and playing out of those values in the exercise of the discipline in academic departments, schools and faculties. The gatekeeper may be a potentially forbidding figure, but may (and, in my view, should) also potentially be a facilitating and a formative one.

Internet- and Web-based gatekeepers

If we move one step away from such traditional scholastic structures, and a pace toward the technological present, we find Internet- and Web-related gatekeeper functions in Web-based academic publishing. A journal like TESL-EJ is an appropriate exemplar. This journal has the benefits of peer-reviewed quality control, through an international editorial board and standard anonymous reviewing and revision processes. Such standard gatekeeper functions are needed if reputable scholars are to publish with TESL-EJ, and gain the standard benefits (citations, promotion, jobs, status and prestige) which the academic establishment requires of publishing outlets. But TESL-EJ also incorporates the benefits of the Web, with speed, interactivity, and the access benefits of what Stevan Harnad and others (in discussions on the VPIEJ list) are calling “FOS” (Free Online Scholarship). Harnad has been arguing this case for more than a decade. Faced with the potential anarchic dissemination of information on the Web, he has proposed a set of constraints on scholarly publishing. One strand of this approach has to do with the quality of information. Harnad has proposed to limit e-mail lists by having an inner circle of experts who have the right to write to the list, and an outer circle of readers who do not have write rights. He has also, in the e-journal Psycoloquy, and the paper journal Behavioral and Brain Sciences, instituted an editorial process which combines the best of gatekeeping with Web dissemination and architectures. When a paper is submitted to the journal, the editor publishes the abstract and asks for expressions of interest from potential commentators. The editor then selects a group of appropriately skilled commentators and sends them the full paper. The commentaries are returned within around four weeks, and the paper’s author then receives the commentaries and responds to them. The whole suite of material – initial paper, responses and the author’s rebuttal/reactions – is published as a piece of scholarly interchange. Harnad believes that this makes much richer use of ideas while they are fresh, and, by engaging in dialogue, the process enhances scholarship more than is possible in the years-long processes with paper journals.

Gatekeeping in CELL

Harnad’s initiative provides a major exemplar of gatekeeping in a Web-based intellectual environment. But what are we to do with the gatekeeper construct when we come to CELL? Here we are not dealing with a conventional academic department or school: there are apparently no departments of CELL, and only a few appointments with CELL or CALL in the job description. These appointments are in many different locations: departments of languages, applied linguistics or linguistics, education and educational technology, information technology, and perhaps a few others. CELL is inherently cross-disciplinary, by which we mean both interdisciplinary and multi-disciplinary: it crosses the boundaries between disciplines, and engages in a considerable number of them. This traffic tends to be one way, with CELL reaching out to its cognate and neighbouring disciplines; these latter have, so far, paid rather less attention to CELL, an issue to which we shall return directly.
Gatekeeping in CELL is constrained precisely because of the status of CELL as an undiscipline. Regulating it top-down, as with many established disciplines, would require a focused consensus of a kind that we have not so far seen in CELL. Instead, CELL has sometimes borrowed from adjacent or cognate disciplines to set its patterns, paradigms and benchmarks: from educational technology, applied linguistics and language pedagogy, cognitive science, instructional design and other areas. But setting these patterns has not always happened in an organised way, even in the journals devoted to CELL, such as CALL-Journal, ON-CALL, Language Learning and Technology and ReCALL, in spite of their best efforts in a field which is not clearly delineated. For a journal such as System the situation has been more approachable, since the journal already has a broad set of practices in place, and domain definitions which encompass CALL: it has continued to publish quality work which shares broadly the standards and focus of professional work in applied linguistics. But for all the journals there have been difficulties with questions like these:

- Shall we publish descriptive work which reports on implementations of modest classroom goals in a computational framework, e.g. a set of drills for French verbs?
- Shall we publish descriptive work which is really informed anecdotal evidence without a strong methodological basis?
- Shall we publish theoretical work with models from a discipline which may or may not apply to much of CELL, or may not be central to CELL as we currently understand it?

Although problematic, this diversity in the current CELL activity is symptomatic of its state of development. The CELL forum has a kind of diversification which is healthy in view of its disciplinary position. We have not only academic journals, but also a variety of discussion fora such as Papyrus, and mailing lists and bulletin boards for practising teachers who may be less interested in research than in recent developments, tools, coursework and applications.

In all of this activity the gatekeepers have been emerging mainly by performance: scholars who publish, give papers at CELL conferences, and provide a hub and an information source. The problem remains, however, of how to fit the two troublesome dimensions into the picture: the intellectual breadth, and the spread from research to classroom application and implementation. Both are needed, and the engineering outputs in the implementation part of this structure are the place where CELL’s creators meet their consumers. Again, the engineering approach is valid. There is a real-world need to provide learning materials which will be usable by a wide range of equipment, and there is no point in designing advanced materials which will not run, or at best will run too slowly for effective use, on the hardware available to the learners. This commonsense approach has done a great deal of good for the spread of CELL in practical contexts. But there is a dichotomy between this realistic approach, and the kinds of intellectual questions which are proper to the intellectualised angle on CELL.

**Discipline profiles and CELL**

These questions relate closely to the disciplinary nature of CELL, and its disciplinary dynamics. At the outset of CELL, when it was still known as CALL and filled that type of role, its main disciplinary guardians were applied linguistics and education. We had a preliminary map of CALL, as it then was, something like this:
Figure 1: Traditional discipline profiles of CALL/CELL.

But over time, the disciplinary picture has become enormously more complex:

Figure 2: Discipline profiles of CELL in the Internet era.

Not all the interdisciplinary connections can be represented in this diagram, which would otherwise be unmanageable: it is arguable that every disciplinary box should be connected to every other box, at least in some measure. The underlying issue is valid, however: CELL has become enormously more complex, and the disciplinary demands on CELL practitioners and scholars have become proportionately more demanding. CELL has followed some of the key tenets of complexity theory (Waldrop 1992), in that organisations and structures have a tendency to become more complex, and at appropriate points to assert their autonomy or independence from some or all of the parent domains. At this point, the role of the gatekeepers changes significantly, from one of interdisciplinary watchers to new intradomain concerns. We have seen this, to some extent, with the growing variety of components which have been playing a part in CELL, and the ways in which criteria, standards and norms have multiplied.

In the middle of this development are two which take on particular importance in the current context. First, together with the complexification of CELL has come an increased professionalisation. The days of amateur programming are still with us, since most CELL initiatives do not have funds for full professional instructional designers, and we fall back – often competently, but not always optimally – on doing the work ourselves, usually with the help of authoring tools like Macromedia Director, Hot Potatoes, Flash and so on (Hémard 1998); see also Cozens, this volume. But
the real focus of increased professionalisation has emerged in the levels of interdisciplinary competence which we are starting to expect. IT implementation of classroom practice is no longer enough: we require, and properly so, that CELL implementations will be informed by disciplinary competence, and that means multidisciplinary and interdisciplinary competence. The earlier informal idea that CELL was defined as a sub-part of applied linguistics, which itself was part of linguistics applied, is no longer sufficient. CELL has shifted markedly toward the social sciences, and towards applied informatics (and towards expert systems and artificial intelligence), as can be seen in the literature cited in professional work on CELL, and the mix of epistemology and methodology which this research calls on.

Going along with – or perhaps as a natural consequence of – this evolution is a change in the relation between pedagogy and technology. This evolution fits with the periodisation presented in Mark Warschauer’s paper at this Conference. During the early period of CELL – we might call it ‘pre-CELL’ – the published work was not deeply theorised, and in many ways technology, or at least the application, was the pedagogy (Ahmad et al. 1985: Chapter 1). Technology certainly constrained the pedagogy in this period, for instance in the use of programming arrays to implement pattern drills. From the 1980s, however, the arrival of multimedia (Boyle 1997) opened up CELL to more authentic learning materials and experiences, especially audio and video. At the same time, CELL became more alert to research methodologies in applied linguistics, which made the concept of ‘application’ altogether richer and better grounded. And the arrival of non-linear typologies of architecture and learning, beginning with software like Hypercard, took CELL away from the conventional individual, personalised one-on-one learning experience, in the direction of a more extended contact with the learning material and a socially enlarged learning context.

This new domain of learning-with-computers required new cognitive models, especially constructivism and its emphasis on socially negotiated knowledge. This incorporation of Vygotskian ideas (Vygotsky 1978) encouraged researchers to tackle questions of the nature of the chunks of knowledge that were being taught, their grain-size and architecture. Constructivism also relocated CELL in the kind of social context of learning which communicative language teaching had been advocating since the 1970s. As CELL thinking became more explicit in its commitment to learning in social space (Sussex 1998), it also made the ‘expert system’ or ‘expert tutor’ approach to CELL more difficult, since open-ended constructivist learning through interaction is so difficult to incorporate in CELL materials without expensive and extensive input from experts in artificial intelligence: one can model formal systems like morphology, since the problem is essentially finite, but modelling social interaction is quite another matter. Computer-Supported Collaborative Learning (Warschauer 1999) and Web-based learning (Peterson 1998) have made CELL into a socially anchored enterprise, with a more extended contact with other learners: the ‘social computing’ of the title of Debski et al. (1997). These changes tended to shift CELL from a ‘tool’ to a ‘medium/resource’ approach to technology, where the technology provides channels of access to digitally encoded learning material and experiences.

CELL and the Web

This shift was powerfully reinforced by the arrival of the Web. Much has been written about the educational impact of the Web, both actual and potential, and I will concentrate here on three specific issues.

The first has to do with shrinking the distance to access to socially-situated learning. The overwhelming richness of authentic material, and its sheer volume, have made it possible to place our learners in a context where there is a shorter distance between their conventional and their learning worlds. The problems of providing authentic materials in the everyday classroom have been partly overcome. Nowhere is this more evident than with major globalising languages and
cultures, and most especially with English. Here the adjustment has been so radical that in some ways the ‘normal’ distinction between EFL (English as a Foreign Language, say English taught in China) and English as a Second Language (say English taught to overseas students in the USA) has been blurred. The Web’s cultural impact is immediate, and often indiscriminate.

The second issue emerges from the first. Ease of access to the Web is paralleled by ease of depositing information on the Web. But as the focus of CELL has shifted away from the individualised interactive constructive model, so also the technical features of the Web have changed the kinds of learning activities which are realisable with reasonable inputs of time and expertise. In particular, the Web is not so amenable to creating or delivering the kinds of interactive learning which early CELL did so abundantly: question-and-answer, practice, and learning routines requiring detailed analysis and feedback. In spite of software like Hot Potatoes, the Web remains a place where it is not easy to verify the quality or bona-fides of the material: the burden of evaluation has passed more to the learner, and this includes the problems of information assessment and evaluation. Google currently lists three billion pages of materials on the Web: we have to instruct our students in discrimination before they can start to learn.

Indeed, and this is the third issue, it can be argued that the Web threatens to remove the pedagogy from CELL. If in early or pre-CELL, the technology was the pedagogy, we now have a situation where pedagogy threatens to be sidelined by the technology. It can also be argued that the Web, and the technology which it represents, is in some respects presenting an epistemology of CELL – a framework for thinking about learning and how it is constructed and achieved.

**Technology as epistemology in CELL**

‘Technology as epistemology’ is a powerful metaphor. A useful way to illustrate this idea can be found in the application of technology to literary analysis, and in particular, computational text linguistics. Burrows (1987), in a dramatic study of Jane Austen’s prose, investigated not the lower frequency words such as manners or gentry, which might be expected to typify the conceptual structure of her novels, but rather the most frequent words: conjunctions, prepositions, articles and pronouns. He was able to show that Austen systematically controls these factors to differentiate not only her characters, but also each character at different stages of development through the novels. This result might have been achievable through manual means. But Burrows uses technology to provide an unanticipated way of thinking about language and its relation to character and social context. In this framework textual statistics are a new way of conceptualising text.

This kind of conceptualisation of technology is only just starting to be addressed in the theorising of the Web and its potential for CELL. Some aspects of the Web’s architecture and operation relate easily and directly to issues which have been independently developed elsewhere. Derrida’s (1978) “bricolage”, or “productive tinkering”, is one such activity. But the Web is not architecturally so well adapted to some of the more structured expectations of learning and teaching: modelling, verification, quality control, and the pressing need to get some kind of structure into multimedia (Boyle 1997) and multidisciplinarity. There is some danger that the Web may be too unstructured and overwhelming for the good of CELL.

On the other hand, the Web and socially-constructed computing in the humanities are providing some major new stimuli which illustrate, in different ways, how technology is providing a framework for reconceptualising even the so-called ‘high humanities’, the interpretive disciplines in the critical domain. In pre-computing days the literary critic’s arsenal was formed by years of reading, reflecting, linking and critiquing. Now, however, students may have the same access to textual information as have their instructors: the data of literary (artistic, musical) criticism are the same, and the quality of the outputs of analysis has a great deal to do with our ability to
manipulate the tools, for example, KWIC concordances, statistical distributions, and qualitative network building tools like NUDIST. In one sense, then, the high humanities have been brought closer to the social sciences by computational tools and frameworks. Some of these links involve the architecture of hypertext; others involve the ability to ask questions which were hitherto unaskable, at least in practical terms. Burrows’ success is striking: by using computational and statistical tools one can reveal new patterns of meaning and organisation in text which would almost certainly not have been accessible to non-computational investigation. The computational tools, in other words, provide us with a new way of looking at text, new empirical tools – literary criticism is henceforth at least partly an empirical science – and a new set of architectures of meaning.

Burrows, and his new models of textual criticism, are also part of the arsenal of CELL, which now incorporates writing and reading, and their pedagogies. Unlike Taylor’s (1980) model of computing tools and tutors, the tools of 2001 are now as much conceptual frameworks for the individual and collaborative exploration of language, form and meaning. But as we have seen, competent CELL has more than this text technology. It involves instructional designers, programmers, expert systems analysts and, for some ambitious applications, artificial intelligence specialists. Classroom investigations are increasingly involving computational ethnography, as reflective practice is incorporated into the kind of serious reflective investigation which machine-readable protocols and computational tools now make possible. And behind this are the applied linguistics and language pedagogy specialists, who have found their domains not so much hijacked as suddenly peopled by incoming other-disciplinarians with a pressing interest in CELL and its perspectives on language teaching and language acquisition.

CELL, then, has a multidimensional relation to the disciplines with which it shares its borders. As far as language teaching is concerned, CELL has functioned as a catalyst for discipline change and enhancement, since language pedagogy is now learning from CELL, rather than merely the other way around. CELL has provided new ways of thinking about language teaching and learning, and new ways of investigating what it does and how it does it. CELL has fashioned new interdisciplinary links which have given language teaching, and more broadly applied linguistics, channels of interaction with other disciplines. If CELL is not itself a discipline – and at this stage I do not think that it is a discipline, nor do I think that it would be helpful for CELL to aspire to this status – then at least it has shown a centripetal ability to attract and absorb wisdom from other areas, and it is starting to demonstrate a centrifugal ability to project its experience and wisdom out into other areas.

If CELL is not a discipline, technology is at least partly on the way to providing an epistemology for us to think about CELL itself. It is not, in other words, merely a tool or a medium for the delivery of learning. But it is having to reinvent itself in the aftermath of the advent of the Web. Before the Web made a major impact on CELL, there were some highly promising research endeavours into building and validating student models, pedagogical models, and teacher models in what was then mainly computer–student one-to-one interaction. The arrival of the Web, however, seems to have removed much of the key rationale for such research, so that books like Wenger’s (1987) are less referenced now. The exact role of “intelligence” in current CELL is not clear: Barson (1997) asks whether CELL should be trying to mimic, reflect or convey intelligence. There are also problems with the refocusing of learning strategies to concentrate on heuristics for exploring and navigating the Web. There are no obvious answers. In the place of the study of intelligence – for instance, in intelligent tutoring, we have an equally important, but quite different, emphasis on learning environments, exploratory and constructivist learning, and – in a few papers such as that by William La Ganza at this Conference – a renewed interest in the role of autonomy and the individual learner.

CELL is also becoming a more articulated research domain. Its methodology has become tighter and more sophisticated as it has moved closer to mainstream social science research, especially but
not exclusively, in terms of quantitative methodology and research design. And, in several important but still incipient ways, it is starting to develop a more theoretical profile (Debski 1997; Levy 1997, 2000). Its gatekeepers have had to be increasingly vigilant over the quality of the combined components. What has not been so clear has been whether the gatekeepers have been acting out of a sense of direction forward, or in reaction to things already established, mainly the standards of CELL’s component disciplines. Is CELL, in other words, importing its gatekeeping expertise on contract from other disciplines, or is it establishing a disciplinary base of its own, selectively taking from adjacent disciplines but fashioning something more specific to CELL itself?

While CELL is still seen as specialised, even exotic, and not necessarily mainstream, by many in the language teaching profession, it has the potential to make a huge impact on language pedagogy. Far from being the recipient of models and frameworks from language pedagogy, CELL can reverse the direction of donation and become a catalyst and an agent for change: the technology as an agent of pedagogy. Unlike the case with early CELL, where a communicative orientation in language pedagogy did not mesh well with the programming tools on the CELL side, the current social-collaborative model of CELL is well in tune with major thinking on the pedagogy side: in terms of constructivist learning, of collaborative learning, and of socially situated and negotiated learning, including cultural and intercultural learning. CELL therefore offers not only frameworks for thinking about language teaching and learning, but also directly applicable tools for research and investigation. It is not yet clear how we might turn this opportunity into a genuine epistemology to link CELL and language pedagogy, but the potential is there.

Conclusion

A conclusion cannot always be conclusive. It is characteristic of the present unstable and dynamic state of CELL that the conclusion to this paper should focus on issues to raise as much as it does on issues resolved.

The gatekeeper concept allows us several benefits. It raises the issue of quality control, as well as qualitative essence: what is good CELL work, if it is to be allowed to pass through the gates? But gatekeepers are, at least traditionally, keepers of the status quo: they are not initiators or agents of change. It is where CELL passes beyond the reach of its current gatekeepers that it becomes both intriguing and ungraspable.

In an important sense, it is difficult to anticipate where CELL is going. Some shorter-term developments in technology are predictable in terms of performance/cost benefits; so are some enhancements in programming tools and pedagogical framework templates. The current directions, insofar as we can see them clearly, are sound, and are likely to continue. But there is some sense of an approaching crossroad. Some of the flavour of this intuition can be found in works like Kuhn’s The structure of scientific revolutions (1978), where he proposes critical moments where science takes a volte-face into a new paradigm. I am not sure that we are approaching a volte-face, or if we are when it will happen: maybe it will be in response to recent developments in culture-based language pedagogy (Liddicoat & Crozet 2000); maybe it will be in an attempt to bring practice closer to the potential of hardware and software, since computer-enhanced learning in general is probably a decade or so behind the current technological potential of the tools which we have available.

It would help, indeed, if we could see more clearly where we are, and where we have recently been. This has been the thrust of this paper: an attempt to discern the nature of our achievement, and to evaluate the components of our current position, and its directions. CELL has diversified, but not fragmented; consolidated, but not solidified; it has begun to establish methodological and theoretical foundations. But it is still difficult to discern a clear trajectory for CELL in the next five
years, let alone the next decade. One of the major benefits of conferences such as this one is that they allow us to discuss such large questions, and to begin thinking about them in a purposeful way.

Note
1. **CELL** stands for 'Computer-Enhanced Language Learning'. We use it here instead of the more usual **CALL**, for 'Computer-Aided Language Learning' or 'Computer-Assisted Language Learning', since the idea of 'aiding' and 'assisting' has now been overtaken by more general ideas of augmenting non-computer-related language learning in a number of technologically-engaged ways. The term **CELL** is moderately widely used, though it is being challenged by **TELL**, which refers to the still more general and generic 'Technology-Enhanced Language Learning'.

References
*VPIEJ list*. VPIEJ-L@LISTSERV.VT.EDU

**Appendix**

**List of software mentioned in this paper**

*Flash*


*Hot Potatoes*


*Hypercard*


*Macromedia Director*

An authoring tool to create extensible multimedia content (including 3-D) for the Web and on CD-ROM. See product details at: [http://www.macromedia.com/software/director/](http://www.macromedia.com/software/director/)