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Approaches to university network-based language learning

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Abstract

This paper examines the provision of networked CALL services at the Faculty of Modern and Medieval Languages at the University of Cambridge. It argues that in such a context a broad, inclusive approach to networking – one which avoids any over-strict commitment to a single method or paradigm of network delivery, but makes the most of whatever is available – is often the most appropriate. This eclectic approach helps preserve the best of what has been created in the past while keeping up with everything technological advances offer, and respects the wide-ranging and widely-differing views and approaches of Faculty teaching staff. The aim of the MML Network Service is therefore to present a wide range of disparate resources in a single, coherent framework. While welcoming the many advantages the use of the World Wide Web brings, the article stresses that in a broad infrastructure both older programs which have proved their worth and newer, highly-developed programs which have come after them need not be lost while the functionality of the Web is still developing. It also lays out in general terms some technical suggestions for those seeking ideas on the implementation of networking strategies in a Windows-based local area or university-wide network, partly with a view to reinforcing the credentials for CALL and humanities computing generally to be afforded high-quality computing infrastructure both in the present and with whatever technological advances bring in the future.

1 Introduction

1.1 The Modern Languages Faculty in the University of Cambridge

The Faculty of Modern and Medieval Languages (MML) is responsible for specialist, degree-level teaching and research in European Languages and Literature, and Linguistics. At present, the languages taught in the Faculty include Catalan, Dutch, French, German, Italian, Modern Greek, Portuguese, Russian and Spanish. Regrettably, for reasons of financial resources, at a time when the need for language specialists is greater than ever, languages such as Polish and Hungarian are being lost from the Faculty, joining the Scandinavian languages and others which disappeared before them.

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With the exception of French, which is taught post-A level only, all languages offered can be learned *ab initio*. There are over 100 full-time staff and approximately 800 undergraduate and postgraduate students enrolled: they generally work both in the Faculty and out in their colleges. Primarily they follow degree courses, but a number of more general Certificate and Diploma courses are available as well.

1.2 The MML CALL Facility

Amongst the facilities at the disposal of staff and students is a Computer-Assisted Language Learning Facility. The aim of the CALL Facility is to integrate the use of information technology into the Faculty's teaching and learning, primarily for intensive language work, but also for literary and linguistic study. It contains 30 PCs in two adjoining rooms, and both rooms are generally available for open access work and study. One room can be used for class teaching when required, while the other includes a number of individual booths to allow students to work unobtrusively and privately on any software which involves sound recording. The Facility is managed by a full-time CALL Officer, and this post is an academic one. Duties include the development and maintenance of the CALL Facility, advising and assisting staff and students in the use of the Facility, CALL and C&IT, and developing software suitable for use within and beyond the Faculty.

1.3 Overview of the MML Network Service

Initially, in 1997 when the CALL Facility first opened for use, a small Windows NT server offered a number of commercial CALL packages ready for use on client machines running Microsoft Windows within the CALL Facility itself. Since that time, the number of software packages has grown considerably, and the range of sources from which software is procured has widened. Now the *MML Network Service* (MML-NS) offers many kinds of CALL software, both commercial and home-produced, traditional 'standalone' packages and local or international Web resources. It incorporates resources provided from the University Language Centre for general University consumption, such as the regular digitised television news feeds, as well as other Web resources created in conjunction with Faculty staff such as Listening Comprehension past papers which include video clips, transcripts and sample answers. Increasing amounts of literary and linguistic software is included, for example text corpora such as the British National Corpus, electronic text resources such as the German Reklam literary CD-ROM series, and Web resources produced by lecturing staff to back up their own teaching. A selection of Internet resources is provided for each of the languages taught so that students and staff have a ready starting point for their own use of the Web, focusing on the needs of specialist rather than generalist language students: in some cases this means including links relevant to particular Faculty examination papers and topics. The aim of the MML-NS has therefore become to deliver as much appropriate software to as many students and staff as possible, regardless of its provenance; consequently it avoids any exclusive commitment to one method of network delivery. More details about the MML-NS are available from `http://www.mml.cam.ac.uk/call/`.

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2 Networking CALL software

2.1 'Traditional' CALL software

The software collection has grown with the principle that if, in terms of Faculty teaching and learning, an item is both useful and usable, it should be built into the bank of resources on offer. This means that there remains room for tried and tested software, even when its appearance may betray 'ancient' origins. An example is the software package *LUISA* produced by Leeds University for Italian grammar, vocabulary and comprehension: in appearance it is clearly a DOS program, probably 20 years old, with limited text-only display. Yet its clear design and layout coupled with an extensive and detailed range of exercises has made it a firm favourite of first-year students who study Italian *ab initio*, and many of them use it throughout what is a very intensive, year-long language course. Language learning at this level and of this intensity can squeeze some CALL packages dry in a matter of weeks, so the fact that students keep on using it so long is a significant tribute to its quality.

While the World Wide Web is with good reason currently pre-eminent in the thoughts of those whose job is to create or network software, language-related or otherwise, it would be a significant loss if valuable gems such as *LUISA* were abandoned or overlooked in a general rush to the Web browser. There is a danger that Web-based applications might oveshadow packages which are more mature on a number of levels – not because they are better but simply because the Web has the allure of something new. Some new Web-based programs may well be an improvement on older software, and updates to existing good-quality software are possible – but while programs such as *LUISA* can be re-designed and implemented for Web use, both the low commercial potential of University-level software and the lack of serious investment by universities in subject-specialist IT staff mean that such developments and updates are not necessarily as common as they might be. Moreover, the rate of technological development means that 'updates' can at worst be up-to-date for a few weeks or months only, and that programmers and designers are kept busy re-doing work carried out perfectly well years or even decades earlier.

2.2 Web-based resources

The Web has made a wealth of resources available to Modern Languages students, offering possibilities undreamt of as far as earlier generations of learners are concerned. Raw materials such as newspapers – both national and regional – are ready and waiting every day, as are digitised audio and video services. Databases, text archives and corpora, and specialised research collections and presentations are now readily available in abundance. High-quality CALL software can now be delivered quickly and cheaply. So despite some of the limitations the Web has, its use is central to any provision of software to language students, and likely only to increase.

The Web resources built in to the MML-NS can be grouped under three general headings: Faculty-produced resources, resources incorporated from the Language Centre, and resources incorporated from outside institutions. A number of MML staff have produced Web pages with their teaching requirements in mind. These include lecture notes,

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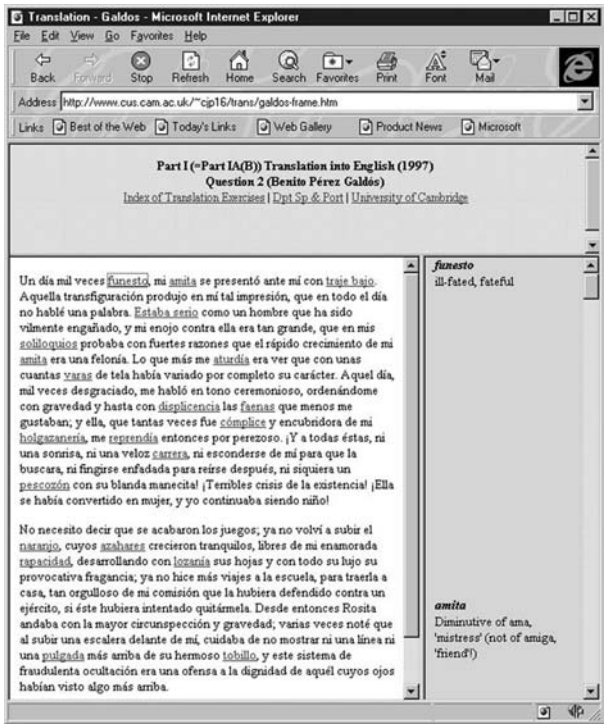


Fig. 1. MML Web-based computer-assisted translation software.

computer-assisted translation passages, grammar notes, grammar exercises produced with authoring software, digitised set texts and video resources for listening comprehension work and film studies. A selection of general Internet Language and Literature resources is also maintained, to help students new to language work on the Web find useful resources and helpful starting points. The Language Centre has assisted in the development of some Faculty resources, such as versions of past examination papers which include video, transcript and sample answers. Some of the general resources the Language Centre provides are also suitable for Faculty use, notably nightly news broadcasts digitised on a regular basis. (Purely for reasons of copyright, the distribution of these files is limited to the University of Cambridge only.) Resources from other locations are also incorporated: good examples include the *Cours de Phonétique* available from the University of Lausanne `http://www.unil.ch/ling/phon/index.html`, and Robert Beard's On-line Russian Reference Grammar `http://www.departments.bucknell.edu/russian/language/index.html`. Live links to all the Web resources included in the MML-NS are available from the Software Catalogue `http://www.mml.cam.ac.uk/call/catalogue/`, and also via the Start Menu shortcuts used in the full Windows 95/98 desktop service.

2.3 Multimedia and video-based CALL software

Naturally the MML Network Service seeks to incorporate good multimedia software

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Fig. 2. MML video-based software.

whenever it proves itself appropriate to the needs of students and staff. This includes Web-based software of the sort already mentioned and also 'traditional-style' software such as the German video-based Listening Comprehension software under development both for use within the Faculty and for publication. It presents on CD-ROM ten recent, authentic German video clips with subtitles and glossary information, each with 10 fairly traditional CALL exercises. While the clip can be viewed from start to finish as with a video tape, the key to the design of the software is the flexibility with which short extracts from the clip are available for viewing at every appropriate point. For each question, a video play button is available, and students click it to see a segment which helps them draw out the right answer from the clip. They can click this button as many times as they want (with or without the available subtitles and glossary information).

This ability to specify short segments for near-instantaneous playback ('random access') is a feature unique to *digital, computer-based* video, since continually re-winding and fast-forwarding a video tape for intensive use of this sort is completely impractical. Despite the key advantage digital video has, the initial focus for Web-based video applications has been on 'streaming' video such as developed by Real Player and latterly QuickTime. The first priority was to send a continuous flow of video across the network quickly, avoiding the need to wait for an entire file to download before viewing could begin. The result is that video is delivered on screen much as a tape would play it. This has clearly been a wonderful innovation, but problems remain when the use of digital video needs to be a bit more sophisticated. Until recently, streamed video applications lacked close control of the 'random access' facility, and to mimic it, numerous individual files each containing a short extract were sometimes made. The drawback is that depending on the capabilities of the network connection, there can be significant pauses each time a download is triggered, to the extent that the delays become a significant distraction to an individual working intensively on an exercise. In contrast, the true random access nature of CD- or hard-disk-based video files means that in such applications playback is almost instantaneous with no perceptible delay, and that only one video file, the full-length clip, need be manipulated by the software engineer.

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As network capabilities improve, the early disadvantages of streaming video are lessening; the length of the pause between requesting a video file and its playback on screen is shortening, at least on local networks, and the download of full clips is nowadays completed much more quickly. Provision for manipulating streamed video once downloaded is being planned and implemented: SMIL, the Synchronised Multimedia Integration Language, is an HTML-like language currently under development for presenting Web-based video and audio (see `http://www.w3.org/AudioVideo/` for more details). However, just as networks have begun reaching up to the quality of personal CDs and hard drives, another huge technical leap forward in the form of DVDs has come along. Digital Versatile Disk (DVD) technology offers the potential for software applications which include extremely high-quality video, far beyond what the Internet and arguably most local intranets can comfortably deliver. Already, CALL-related DVDs are available: *C'eravamo Tanto Amati* is a DVD version of Ettore Scola's film produced at Brigham Young University for language and film studies students. In summary, while the Web can do a great deal with multimedia software, for various reasons 'standalone', disk-based products can in some settings still offer significant extra functionality.

3 Users of the MML Network Service

3.1 Meeting staff requirements

A central reason for keeping a wide and inclusive approach to the networking software is the varying nature of staff requirements. Most faculties or departments of any size are a coalition of many different views on the merits or otherwise of teaching theories, intellectual approaches, and simple matters of taste. Inevitably, then, the purchase and provision of software needs to respect staff biases and interests, with the technical methods required to network software often being a secondary issue. Other, more practical considerations also suggest an open-ended approach in the provision of networked software. Some staff say loudly and clearly that commercial packages do not meet their requirements; that programs are out of date or contain errors; that they need to be able to incorporate tried and trusted raw material of their own into software quickly and easily. For such people, authoring software, or the ability to extend and amend existing software, is essential if CALL is to become a vital part of their teaching provision. In contrast, other staff stress the fact that they are already extremely busy with preparation, teaching and marking; that the additional burden of creating software is a demand on their time that cannot reasonably be met; that, just as they need good textbooks, they need good-quality software which is ready to be used rather than having to make their own. For these staff, it is important to provide that range of good-quality software so that it can be readily incorporated into their teaching routines and into the learning strategies of their students. Both positions are reasonable and need to be respected, and from a computer networking point of view, it is important to provide an infrastructure which can meet these expectations in full, and present the range of options for staff and students in a coherent fashion.

3.2 Meeting student needs

Student use of the CALL Facility and MML-NS seems largely determined by how well

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CALL programs and C&IT generally are integrated into the courses taught. Where staff teach in the CALL Facility, or refer students to courseware just as they would refer them to a text book, use of the service naturally abounds. Many students do use CALL for their own practice or revision regardless of how well integrated the use of a particular package might be, but some staff have observed that not infrequently it is the most diligent and least in need of practice that apply themselves in this way. Training students in the use of the facilities and in computing generally is important, as is the presence of an academic member of staff whose duties include helping them make the most of what is available. To this end, the Faculty has introduced a pilot Certificate course in Humanities Computing for Languages, with a view to making it a permanent option for students in the future. The course includes practical computing skills likely to be of use to students as they work for a modern languages degree and as they go out to work, either during the year abroad or in employment after graduation. It also considers areas such as CALL, multimedia, electronic text, textual analysis and corpus linguistics. Along with weekly lectures and practical work, the course culminates in two projects: one is the construction of a personal Website relating to course work, and the other is further practical development work or more theoretical, analytical work in any CALL or Humanities Computing field which demonstrates application and extension of skills in any area of the course. Early impressions from running this course for the first time suggest that students involved are gaining useful skills and insights that might otherwise have escaped them, and that the course provides something refreshingly different to complement the more traditional coursework for which the Faculty and University have become known. Further details are available from the course Web site: `http://www.mml.cam.ac.uk/call/cert/`.

4 Technical aspects of the MML Network Service

The basis of the MML Network Service (MML-NS) is a Windows NT server providing software to be run on Windows 95/98 client machines. The general aim of the service is

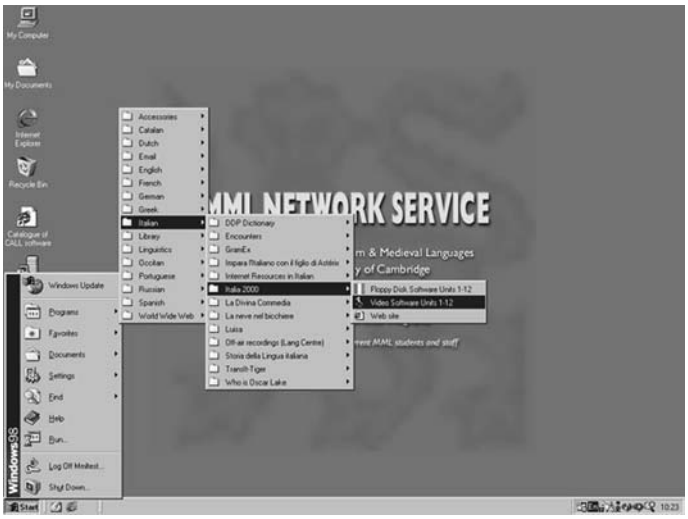


Fig. 3. MML network service desktop.

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to bring together disparate CALL resources into a coherent whole. To this end, client machines which log in to the MML-NS use a ready-made Start Menu which provides all the shortcuts necessary to access the available software. Thus, as shown in the illustration, students can go to the win95/98 Start Menu as usual, select their language from the Programs section, and then pick out the item of software they require. The illustration uses an Italian example to demonstrate how different kinds of networked software can be presented together. The *Italia 2000* package offers three types of software: what can be termed 'traditional' text-based software originally put on a floppy disk, a Website incorporating streaming video clips, and 'standalone' CD-ROM software similar to the German software described above, which makes intensive use of digital video within traditional CALL software. The floppy disk software and CD-ROM software run from copies made to the server; the Website is external. Despite their different origins and technical demands, all three are offered in one place.

4.1 System policies and PolEdit

Those not aware of how to implement a Start Menu of this nature may like to read up on the use of *System Policies*. It is possible to stipulate automatically many of the settings used by particular machines and usernames when they connect to a central server by using a tool called *Policy Editor* or *PolEdit* to create general or individual system policies. The settings which can be made include the appearance of the desktop and its standard menus and icons, and many security features which help prevent tampering with the system. This means *PolEdit* is a powerful tool which requires careful use by a systems administrator. It is normally available on Windows installation CD-ROMs, and comes with some information in the system Help facility. Although not very widely documented, reference works are beginning to cover it in some detail, and O'Reilly have now published a book devoted entirely to it (Anderson-Redick, 2000). For systems policies to work, *User Profiles* have to be enabled on the client machine. This is the feature which allows different configurations for different users of the same computer rather than all users being given exactly the same desktop. It is also a feature which can be controlled with system policies.

4.2 WINS: Windows Internet Naming Protocols

While the use of system policies has meant that networked CALL software is presented effectively in a small Local Area Network, it is a different networking feature that has led to the availability of the MML-NS right round the University. For reasons of constraints in force on the use of network protocols on the Cambridge University Data Network (CUDN), the early Windows NT-based CALL service was restricted to the CALL Facility and the Faculty building. With the advent of ever more Web resources and the discovery of legitimate ways round the network protocol problem, the Network Service has been able to burst out of its local confines and, one way or another, reach students and staff 'at home' in their colleges right across the city. Just as the scope of software on offer has increased naturally over time, so the use of the local network has evolved and expanded in the light of experience and experimentation.

Since the CUDN does permit the use of IP (Internet) protocols, it is possible to make

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use of WINS, Microsoft's Windows Internet Naming Service, when implementing Microsoft networking operations such as the MML-NS. Essentially, WINS links a standard PC ('netbios') name to an Internet address, usually by means of automatically looking up the information in a central WINS server. The name of a PC running Windows is usually preceded by two slashes: *ComputerName*. Coupled to the machine name come shared drives and directories: *ComputerName**Languages**French*, for example. When WINS is used in the absence of other network protocols which recognise this formalism, the *ComputerName* is resolved into an Internet-type address. This approach can even enable the use of PC resources outside the confines of a Local or University Area Network, but most universities would prevent this for reasons of security. On a technical level there are also difficulties with naming conventions, but these can be overcome where the will to do so exists. The University of Cambridge Computing Service operates a central WINS server for those who need to operate in this way, and makes recommendations for netbios names which assist smooth running and security. (See `http://www-tus.csx.cam.ac.uk/pc_support/WinNT/nbname.html`.)

4.3 Implementing a network service

Once the key elements of system policies, user profiles and (if necessary) WINS are in place, students and staff are in a position to connect their PCs to the MML-NS. This can be done either with the 'full' version, where the whole desktop can be altered to appear as in the illustration given, or a less intrusive version, where one or two network drives are connected. One drive, the one the students and staff use, contains the shortcuts which launch the programs; the other, which can be hidden from the people using the programs, contains all the data and system files the computer requires to run the programs. Whichever approach is used, the end results, in terms of using the software, are the same: programs which had been limited to a small local area can now be run over a much wider area. This even includes copies of video-based programs, such as those discussed above, that are usually found on CD-ROMs. Several Faculty students and staff have now made use of the MML-NS in their college rooms or computing facilities. In addition a few tests showed that the video software could run adequately at another university 100 miles away. This suggests that good, wider-area networks could well make effective use of this approach, but full consultation with experts responsible for running any such network is mandatory (particularly when applications include video- and audio-based software, which still demands much of any network), and further it implies that the network provision of CALL resources over distance need not necessarily be the exclusive domain of Web-based applications.

5 Difficulties in networking CALL software

Effecting services like the MML-NS on machines right round the University brings with it a number of potential difficulties. One is the extra work required in configuring client computers to include reference to the WINS server: in fact, this can be done as part of the frequently-performed standard IP configuration routine required to connect any computer to the Internet. Another concern is that running MML-NS programs may

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interfere with a computer's configuration: this is a possibility and testing is advised before any university-wide implementation, but thankfully almost all the files required to run any program reside on the server rather than being installed on the client machine.

Difficulties are not limited to LAN-based services such as the MML-NS of course. Web applications frequently require a particular type or version of browser in order to work correctly. When something works well in Netscape, it is not unusual to find that it fails in Explorer, or vice-versa. This is a particular problem with Javascript/JScript, subtly different versions of which are implemented in the two main browsers. In other cases, plugins have to be installed on the computer, a practice that brings an arguably greater risk of compromising system integrity. When faced with such compromises, developers typically have to limit some functionality in order to realise the cross-platform potential of the Web, or create software which can only be run with one type or version of browser. The extent of any trade-off between functionality and ease of access is a decision that has to be made by developers or departments according to their aims and circumstances. If the aim is to produce basic software quickly and easily, then the trade-off is not a problem; in general, it is still the case that traditional 'standalone' software generally offers more in terms of functionality and design than Web-based applications, though the emergence of Java as a standard programming language for the Web may in time bring together these two worlds.

There are a number of reasons for mentioning some of the more technical aspects involved in networking CALL software in an article such as this. One is to underline the fact that CALL and the use of IT in language faculties generally deserves the best that can be technically achieved. CALL practitioners in universities sometimes report anecdotally that relations with their central computing support services are difficult, and that integrated schemes of the sort envisaged here are consequently difficult to implement. There may be several reasons for this, including perhaps the fact that traditionally computing has been closely aligned with scientific and technological subjects: huge technological advances have opened up many possibilities for CALL and Humanities Computing generally, yet that message has still to get through in some quarters. In other instances, it may be that computing services are simply under-resourced, and prevented from assisting as much as they would ideally like. And it could be that some computing services do not help simply because they have not been asked, and very few people in many arts faculties or departments know exactly what to ask for. The case for academic, subject-specific IT support staff, free from the vital, all-consuming role of general technical support has been argued elsewhere (Burnage, 1999). It seems clear that the presence of staff who understand something both of the technical possibilities and the subject areas concerned can help create the required infrastructure. If nothing else, articles such as this one demonstrate clearly that the application of networking technology, taken for granted in some subject areas, can and should involve CALL and humanities subjects generally.

The MML-NS itself is an example of what can start to happen once the right questions are asked. Another is the recent provision of courses in the construction of Web pages for Modern Languages students here. The Computing Service has for many years run a UNIX machine reserved for undergraduate teaching. Until 1999, when the Modern Languages faculty first asked to use this system in conjunction with these courses, only

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Physics and Computer Science undergraduates had access to it. After the initial surprise of being approached by the Modern Languages faculty, the Computing Service was, and still remains, extremely helpful in making the system available to us, notably for the pilot computing course mentioned above.

5.2 Some future developments

Options for the extension of the MML-NS include incorporation with the University Computing Service's Public Workstation Facility. The PWF offers a wide range of general-purpose software plus specific teaching packages to a number of Computing Service outlets around the University and in some of the colleges. Adding the capabilities of the existing MML-NS to the PWF would increase both the numbers of MML students likely to use the software outside of the CALL Facility, and the range of software available within one coherent framework.

Another option is the use of the Terminal Server approach, sometimes called Thin Client networking. Essentially this approach involves users connecting to a central, high-powered machine via their local network. This machine is place where all the computation is done, with nothing done on the local, client machine beyond displaying a window to show users what they are doing. This window appears as a normal Microsoft Windows desktop, and users work with it as if it was just that. The big advantage is that this window can appear on any kind of computer, not just PCs, for which the appropriate small piece of 'client' software is available and installed. Consequently people using a PC, a Mac or a UNIX machine gain access to PC software without needing to buy a PC; the largest barrier to cross-platform use of PC-based CALL software falls, and services along the lines of the MML-NS are available to a much larger number of people. Another advantage for financially-pressed institutions is that older machines, even machines running DOS, can be made to 'run' the latest version of Windows.

A University Computing Service working party investigated the possibility of using this approach to network software round the University using Citrix software, and the results were good with one crucial exception. While text- and graphics-based applications worked very well, video and audio did not. To make video work correctly involves re-making files in a proprietary format, which is time-consuming and cumbersome for streaming video applications already digitised to *de facto* standards such as Real Player or MPEG, and more or less impossible for CD or disk-based software in which avi files are intricately embedded. That said, using a terminal server approach is worth considering since it does help to make at least all the non-video software more widely available.

6 Conclusions

This paper argues that in a setting like the Modern Languages faculty in the University of Cambridge, a wide, inclusive approach to networking is not only necessary but academically advantageous. A well-presented service can incorporate a wide range of resources, preserving the best from the past and avoiding re-duplication of effort, while still making the most of useful technological developments, Web-based or otherwise.

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This paper was originally prepared and presented at the EUROCALL 2000 conference with colleagues from the University Language Centre, Agnès Fauverge and Christoph Zähner, and it included detailed coverage of the Centre's different approach to networking CALL software. The wider remit of meeting the general language-learning needs of everyone in the University belongs not to the Faculty, but to the University Language Centre, and their experiences and approach reflect the different contexts they work in: a number of Centre staff are developing new, general courses from scratch which are entirely Web-based. What is covered in print here, however, is the approach in the Faculty of Modern and Medieval Languages, and the opinions of the named author.

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