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A hybrid approach to developing CALL materials: authoring with Macromedia's Dreamweaver/Coursebuilder

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Abstract

This paper describes some of the pedagogical and technical issues involved in adopting a hybrid approach to CALL materials development. It illustrates some of these issues with reference to a vocational CALL project, LANCAM, which took such a hybrid approach. It describes some of the benefits and considerations involved in hybrid development and evaluates the commercial web development tool, 'Dreamweaver' and its extension application 'Coursebuilder', which was used to author the LANCAM materials. It argues for a reconsideration of generic web development tools in CALL authoring and also for language experts to be actively involved in the instructional design process.

1 Introduction

Developing CALL materials can be both frustrating and challenging as, at the same time, the technology provides enormous potential and yet can create considerable problems and hurdles for the materials developer along the way. It is no mean feat creating computer-based language learning materials which, from the learner's point of view, stimulate learning, are easy to use, visually attractive and motivating and, from the developer's point of view, are pedagogically sound, make good use of the technology but are technologically practicable and reasonably cost-effective to create. Being aware of these and other key user and developer issues is part of what Arneil and Holmes (1999:18) refer to as 'the complex mix of decisions and balancing acts' involved in selecting and using any authoring tool.

Selecting and using appropriate authoring tools is seen as an essential element of good practice in the provision of CALL materials (Felix, 2001; Bangs, 2003; Arneil & Holmes, 2003) but choosing the right tool involves knowing enough about development and user issues and being able to use this knowledge to evaluate options in order to

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decide which tool best fits a particular pedagogic purpose. For the language expert, getting involved in such instructional design issues can be a daunting task but, I would argue, ultimately enhances the CALL materials development process.

In this paper I consider some of the issues involved in choosing an authoring tool and delivery system to develop CALL materials, in the light of my own experiences developing e-learning materials for a vocational language training project. I will first of all provide some background to the CALL project and discuss some of the development issues that were addressed in adopting a hybrid approach to delivery. I will then describe some of the main features of Dreamweaver/Coursebuilder and evaluate the use of such a commercially available web development tool for CALL authoring. It is hoped that the discussion will be of interest to CALL materials developers and to others involved in evaluating authoring software for language learning purposes.

2 Background to the CALL project

LANCAM (Languages for Contract Administration and Management in Construction) was a two-year pilot project funded within the Leonardo training programme of the European Commission. The project's brief was to develop computer-based business language and culture training materials, in English, German and Spanish, for use in the European construction industry. Its aim was to improve the linguistic and intercultural competence of construction managers and thereby encourage cross-border job mobility within Europe. The project involved the collaboration of both commercial and educational partners in the UK, Denmark, Germany, Spain and Ireland. The lead partner was De Montfort University, Leicester, UK.

An initial needs analysis revealed a demand for resources which would promote the communication and cultural awareness skills required to manage international construction contracts successfully. The inability to operate effectively in markets with a different local language, culture and work practices was seen as a key barrier to the further growth of pan-European construction projects within the single market. This project attempted to address this issue by providing self-access computer-based resources to develop linguistic competence and intercultural sensitivity,[1] enabling participants to study flexibly, at their own pace and targeting their own priorities.

Given that this was classed as a pilot project, and the limitations this implies for development and commercialisation, the materials produced were not seen as a stand-alone language skills development course. They were envisaged rather as a set of self-access resources to facilitate the development of language skills and intercultural awareness, in a structured and integrated way, which could be evaluated and further developed at a later stage.

The materials were based around the key stages in the implementation of a construction project and incorporated a range of authentic input. This input formed the basis of interactive language tasks as well as activities and information about differences in culture and working practices between countries. During development, the materials were

1 A detailed description of the cultural content of the materials can be found in Rogerson-Revell, (2003).

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piloted by the partner institutions and field-tested by construction industry professionals and have been evaluated since project completion in various higher education and professional institutions throughout Europe.

3 Some development issues

As the project required international collaboration, the materials were in theory to be developed at three separate sites (in Germany, Britain and Spain) with the UK main partner taking responsibility for the co-ordination and overall structure. In practice, limited financial and technical resources meant that a substantial amount of the technical production of the Spanish and German materials was done by the main partner also.

3.1 The role of the language expert

While the language teacher/materials developer (who from now on will be referred to as the 'language expert') should obviously play a central part in the CALL project, deciding on his/her exact role within the development process can be both difficult and sensitive. Levy (2002) suggests that seeing the language teacher as 'designer' may help shed critical insights, particularly regarding the many constraints involved in creating language learning materials, such as restrictions on time and resources and the needs and wants of students.

As pointed out by Riley (1995), the degree of technical expertise of the content developer is a fundamental issue. There appear to be three basic choices for the language expert. Firstly, to become a 'technical expert' and be prepared to invest a great deal of time and effort to gain an appropriate level of technical competence. Secondly, to take the role of 'content provider', sticking solely to language content, producing materials initially on paper and handing over all responsibility for interpreting these into CALL materials to a technical expert. This has the obvious advantage of avoiding overlaps of skill and knowledge but can also result in both the technical expert and language expert not fully understanding each other's requirements and restrictions. The third option is for the language expert to collaborate with the technical expert, which inevitably means some transfer of knowledge and expertise between the two parties. For the language expert this can often result in a considerable 'technical' learning curve but in my own experience can have substantial pay-offs ultimately in terms of efficiency and quality of the materials development process. Ultimately, the role of the language expert should relate to issues of productivity and 'returns on investment', although, as McCarthy (2003) and Felix (2002) point out, it is all too easy for materials developers to ignore such issues in their enthusiasm for the CALL development process.

As a materials developer, my ultimate goal is to be able to develop CALL materials as competently and efficiently as is possible using more traditional media. This is not to suggest that the same materials should be created for the different types of media, nor to suggest that e-learning materials can or should be produced as quickly as, say, print-based materials, but that the development process should be comparable in terms of quality of output and productivity. This is obviously an ambitious aim and one that necessarily involves making various decisions about the role and expertise of the language

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expert, the significance of the technical expert and the level of performance and functionality of the courseware required to meet the needs of the end users.

3.2 Delivery mode

The LANCAM project was initially envisaged as developing a web-based application but went through various stages of modification for technical and resource reasons. It was finally decided to take a 'hybrid' approach combining delivery of materials on CD-ROM and the Internet based on a consideration of the issues discussed further in this paper. The application was designed with cross-platform capability and limited browser level (Internet Explorer 4) in mind.

3.3 Task design

In the LANCAM project, as with many such projects, task design was initially in two distinct phases: first the materials developer drafted the activities and tasks (in Microsoft Word) and then the technical expert transferred these into the application files and added any necessary interactivity. However, this process became much more efficient when I, as the English language expert, became proficient enough to design materials directly into the application from the beginning. Also, as I became more aware of the capabilities and limitations of the tools, I could take account of these in the initial design phase (for instance avoiding designs which involve scrolling for drag-drop activities and limiting word size in text boxes).

3.4 The web vs. CD-ROM

Historically it has been difficult to achieve the same level of performance, design and functionality in terms of instructional design, in web-based materials as is possible on CD-ROM, although for a materials designer this is often, as Bangs (2002) states, the ultimate aim. Multimedia authoring tools such as Macromedia's Toolbook and Authorware and Questionmark's Perception have wide capabilities both in terms of design and functionality which means they can be used to create sophisticated, attractive, high quality courseware (which is illustrated admirably with packages such as Macmillan's 'Reward', Auralog's 'Talk to Me', Libra's 'SmallTalk' and the BBC/Open University's 'The French Experience'. In comparison, early examples of Web-Enabled Language Learning (WELL) materials tended to be relatively 'clunky' in appearance and functionality and limited in interactivity. Also, although a new generation of increasingly powerful web-based courseware is emerging, such as seen on the IH Net Languages and BBC Languages sites, both CD-ROM and web-based materials require a technically proficient team for optimal development. Furthermore, neither as yet incorporates the advantages of each other's medium, such as the ease of editability and accessibility of resources on the Web or the speed of delivery of resource heavy audio and video files on CD-ROM.

There are still considerable drawbacks to the delivery of multimedia over the Web, such as relatively slow transmission speed and quality of sound and video, although improvements are systematically underway with the increasing use of broadband and

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streaming technologies. There are, however, advantages to web-based delivery concerning accessibility and flexibility which mean WELL materials are coming relentlessly to the fore. One solution is to combine the best of the two media and develop a 'hybrid' package of Web and CD-ROM based materials.

4 Adopting a 'hybrid' approach

The use of hybrid packages or 'WebCDs' by commercial e-learning organisations is becoming increasingly commonplace. Among the reasons for this is that hybrid applications can bring together the best of both worlds, combining the real-time and interactive capabilities of the Web and the speed, reliability and multi-media facilities of CD-ROMs. As one commercial e-learning provider states,

> 'Why bother with CD-ROMs in the Web era? There are lots of reasons. Try hosting an 8-minute video on your Web site. Try asking your sales force to demonstrate your site to non-Web-connected clients. Try using your site's content on an airplane.' (Jon Udell, of Market Scape)

Within the CALL context, the benefits of adopting a hybrid approach are also increasingly being recognised, as for instance by Felix (2001), Hémard and Cushion (2001) and Arneil and Holmes (2003).

Hybrid applications reside both on the user's local machine and on the Internet or an intranet. For example, the users might receive a CD-ROM or download a file containing course materials, which includes the coding, along with the graphics and audio. If the user is not connected to an intranet or the Internet, the materials display the graphics and audio on the CD-ROM. If the user is connected to an intranet or the Internet, however, the course materials can update themselves dynamically, replacing some content on the CD-ROM with content delivered over the Internet.

5 Some benefits of a hybrid approach

From a development and user point of view, adopting a hybrid approach had some benefits for our specific project which are also largely generalisable. They include:

- *Flexible access*
  The application could be made available on CD-ROM as well as via the Web, for those students without access to the Internet or who simply prefer using stand-alone facilities. The advantage of the Internet is that it is highly distributed; that is, materials from all over the world can be accessed from anywhere in the world.
- *Flexible editing*
  HTML-based content can be edited and updated easily and re-usable templates can be created to speed up the authoring process. In our own case, web-based delivery ensured that updates could be instantly accessible to our development partners and users, and the use of templates reduced the workload and technical expertise needed for some partners.

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- *Quick download time*
  Large, media-rich files can be stored on CD-ROM for quick downloading to a user's computer. Similarly, any necessary plug-ins, such as media players or .pdf readers can be bundled on CD-ROM for use if required by particular programmes.

  CD-ROM and DVD are superior media for multimedia distribution because they can hold huge files and display them nearly instantly either on a local machine or over a Local Area Network (LAN). The problem with Internet-based multimedia is that high bandwidth content, such as video and large image files, take a long time to download. This waiting period slows down the interactions between the user and the materials, causes frustration and can reduce face validity of the materials. Accessing media from a network server (ie server-side delivery) will almost always be slower than accessing content from the local machine (ie client-side delivery) for the simple reason that hard drives and CD-ROMs are faster than all but the fastest network connections. The potential for delivering large amounts of information with greater speed than through network connection was an attractive benefit of the technology for our project. The fact that all data is local and that no scarce network resources are utilized makes CD-ROM extremely attractive in certain environments.
- *Links to the Web*
  Those with Internet access can jump transparently from the CD to the live website for fresh information. The ability to integrate customised learning materials with websites half-way around the world can provide a very rich and dynamic environment for language learning, particularly if it is used to create real-time, task-based activities. In our project, this meant that resources could also be 'added-on' to the core materials by providing links, for example, to on-line glossaries and dictionaries, targeted language and construction industry websites, to provide a substantial and updateable information and reference bank.
- *Reduced cost and increased mobility*
  Given that the project resources were aimed at a wide variety of users who were geographically disperse, it was important to consider cost and ease of access. The option of not needing to be on-line all the time obviously reduces the cost for users with long-distance, dial-up Internet connections. Furthermore, being able to use a standalone CD-ROM allows greater mobility for users with portable computers.
- *Enhanced feedback*
  One of the difficulties of using purely web-based technologies is that providing feedback entails making time-consuming connections to a server, so it is impossible to provide fast or immediate feedback on tasks as they are being completed. However, by adopting a hybrid approach, the user can download content to their local computer and, since all code is then executed locally, sophisticated interactive feedback can be given while a student is doing an activity.

  This was an attractive benefit for the LANCAM materials where they were envisaged primarily as resources to enhance language learning and cultural awareness. In order to do this, it is important that activities are motivating and constructive and encourage the user through a learning rather than a testing process (Bangs, 2003; Arneil & Holmes, 2003). This can be done, for instance, by helping the user to discover more about topics, by providing links to more online resources, or to see lan-

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guage tasks as a learning rather than a testing experience by providing a range of feedback including hints and clues rather than just an end score.

5.1 Some technical considerations

Given the rate of change and developments in new technologies, there are inevitably shortcomings in combining Web and CD-ROM-based technologies.

- *Transferability*
  It can be difficult to keep intact all the hyperlinks, image maps, plug-ins, and interfaces that make the downloaded version look and feel like a live website while adding applications and viewers that can handle additional content, for example, video clips or presentations, that a desktop or laptop user would expect. Therefore an important consideration during project development was ensuring that someone would be responsible for maintaining the dynamic aspects of the materials after the project had ended.
- *Activity types*
  We were concerned to have as wide a range of activity types in our materials as possible. Traditionally, using HTML editors rather than multimedia authoring tools has resulted in a limited amount of functionality and therefore a restricted range of activity types (for example drag and drop and matching activities) and interface formats. Nevertheless these restrictions are being overcome with the latest generation of e-learning tools.
- *Interface design*
  Traditional multimedia authoring tools have the design capabilities to produce an attractive and sophisticated CALL user interface which is difficult to replicate with current web-based CALL programmes. On the other hand, general purpose Web development tools, such as Dreamweaver, can create very rich, high quality user interfaces, although issues such as download time for audio and video files and setting up navigation systems remain.
- *Tracking*
  Whereas multimedia authoring software can provide built-in data tracking, web-based applications can only provide permanent user tracking facilities by linking to a server-side Computer Managed Information (CMI) system or database. This was not really an issue in our project as the materials were seen primarily as stand-alone, self-access resources, rather than as part of an institution-based course which would necessitate built-in assessment and student tracking facilities.
- *Interactivity*
  Courseware tools aimed at creating interactive, rich-media CD-ROM-based applications support a high level of interactivity. However, Web development tools are generally more limited in this area but may be able to overcome restrictions, for instance, as in our case, by using extension applications that enables some interactivity through additional Javascript applets or 'behaviours'.
- *Security*
  If a hybrid system is being used to deliver material, for example on CD-ROM, a user can open the CD-ROM and copy images and audio. Although copyrights can

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help prevent outright stealing, and both Windows and Mac operating systems provide basic ways to keep novices from accessing media, the fact remains that it is available to anyone who has the program. Material delivered on the Web can be secured in a variety of ways, such as password protection, although such measures can never be totally foolproof. In the case of our own LANCAM materials, although they are in fact password protected if accessed via the Web, they are freely accessible on CD-ROM. This raises the question of whether security is needed, for instance, to protect copyright or to prevent cheating in a test and if, in fact, it is necessary in the first place.

- *Reliability*
  Material delivered on CD-ROM or disk will, barring physical media failure, normally be read quickly and without a problem. Delivering data over a network is neither as reliable or as rapid, especially over the Internet. Regarding media, unfortunately, there is currently no way to check whether a particular graphic is displayed properly; so intermittent problems with the network can still affect material even if it previously worked. Furthermore, server changes or reconfigurations, which are often beyond the responsibility of the materials developers, can jeopardise access to web-based materials. Again, in relation to our own project, we are currently considering having the materials put onto a new server to secure access in the longer term.

6 Choosing development tools

There are hundreds of development tools on the market from programming languages to authoring tools and there is a considerable amount of literature evaluating their merits (Bickerton *et al*, 2000; Riley, 1995; Laurillard *et al*, 1993). Initially we considered various options for our project, including the Hot Potatoes software which is designed specifically for the development of language learning materials and non-language-learning-specific multimedia authoring tools such as Director. However, we finally opted for Macromedia Dreamweaver 3 (now version 4 and 'MX'are available) and its extension software 'Coursebuilder' which together enable the development of web-based interactive learning content. Our decision was based partly on the technical capabilities of the authoring system and partly on factors relating to the project such as technical expertise, time and cost. Adopting a hybrid approach incorporating Web access meant that our materials had to be produced in a web-readable (ie HTML-based) code. This restricted the choice of authoring tool to web-based development software.

We then had a further choice to make between CALL-specific software and general Web development tools. At the time, the most favourable contender regarding CALL-specific software was Hot Potatoes. There are many features that make Hot Potatoes a serious option, not least the low cost for non-profit making ventures like our project and the fact that it provides a relatively wide range of CALL-specific functionality. The ready accessibility and ease of use of Hot Potatoes makes it an excellent choice for many individual or institutional CALL materials developers.

Nevertheless, as we had considerable technical expertise within our project team it seemed more sensible to opt for a general Web development tool, in this case, Macromedia's Dreamweaver, which the technical staff were already very familiar with.

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There is also the advantage that such commercially developed and well established software is readily available internationally and benefits from substantial product support.

This did however leave the issue of how to tailor the software to develop our own interactive CALL resources. Again, at the time, Dreamweaver was one of the few Web tools with a built in extension package, Coursebuilder, which extends its potential for functionality and enables the construction of interactive tasks and server-side tracking. A further consideration was, as mentioned earlier, that Web development packages such as Dreamweaver offer a considerable degree of sophistication regarding interface design so that it is possible to produce a visually attractive and professional quality user interface. Given our access to graphic designers and Web developers already familiar with the Dreamweaver software, it seemed sensible to choose this as our development tool. Obviously the choice was not without some concerns, in particular, the limited technical experience, both in general and specifically in relation to Dreamweaver, of the language experts in all partner institutions and, conversely, the lack of language learning experience of our technical staff. Inevitably this meant a rapid and steep learning curve for many in the project team.

7 Main development features of Dreamweaver/Coursebuilder

Having considered some general issues relating to the development and use of a hybrid application, I will now describe some of the key features of the Dreamweaver/Coursebuilder tool, illustrating how it was used to create CALL materials in the LANCAM project.

Dreamweaver is a popular Macromedia product for building websites and Internet applications using drag and drop visual layout tools and based on HTML, DHTML and JavaScript coding. The software is primarily used by subject matter experts, Web developers and training developers and, according to Macromedia, '70% of projects developed using Dreamweaver require very little technical proficiency'.

Web authoring programs today, such as Dreamweaver and Frontpage, not only facilitate the creation of static webpages, but also enable the creation of interactive webpages using a pull-down menu to insert JavaScript 'behaviours' or snippets of code. These behaviours are accessed through Dreamweaver's extension application, Coursebuilder. Coursebuilder is described as:

> ...an extension application to Dreamweaver for creating Web-based learning content and interactive Web pages. Coursebuilder extends Dreamweaver with a set of easy to use templates and tools that simplify and accelerate the development of online learning content. Coursebuilder for Dreamweaver is the first visual authoring tool developed specifically for creating Web-based learning. Learning interactions created with Coursebuilder are 100% Web-native, enabling cross-platform and cross-browser delivery without plug-ins or applets. [Macromedia Coursebuilder manual 1999:12]

So that while Dreamweaver is essentially a Web development tool, Coursebuilder facilitates the instructional development process by providing pre-scripted learning interactions, quiz and assessment templates. It can also enable the developer to provide a

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variety of user feedback and track user performance results if linked to a learning management system or database.

From the point of view of producing CALL materials, the Coursebuilder extension allows the developer to build and customise a range of interactive task types or 'learning interactions'. The Interaction Gallery wizard enables the step-by-step creation and editing of basic interactions visually rather than using hands-on code. The wizard creates editable HTML, DHTML, and JavaScript based on the information that is entered.

Coursebuilder includes what it calls 'traditional' learning interactions (such as multiple choice, drag and drop) and learning interactions that function more like desktop controls (buttons, timers and slides). It is also possible to combine Coursebuilder interactions, for example, including a timer object with a drag and drop object that records how long a user takes to complete the drag and drop activity or to set a time limit for the interaction.

An Action Manager function can also be used to adjust conditions and actions for any



Fig. 1. 'Cultural sensitivity' quiz from LANCAM unit 1 (German materials).

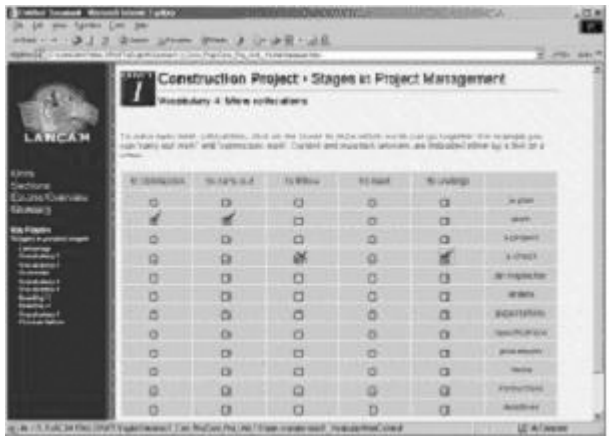


Fig. 2. A 'collocation' vocabulary activity from the LANCAM unit 1 (English materials).

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Fig. 3. A 'word stress' pronunciation activity from LANCAM unit 1 (English materials).

or all of the interactions on a page. The Action Manager tab of each interaction is used to describe the flow of the interaction and to customise the interactions.

7.1.1 Learning interactions

The main interaction types available with Coursebuilder are outlined below and illustrated with examples from the LANCAM project materials:

(a) True/false, multiple choice questions
This type of interaction can be used for surveys, drill and practice, and tests and assessments. A multiple choice quiz, such as in Figure 1, can be tracked to determine if further instruction might be necessary and to collate survey results.
Many variations on the 'true/false' concept can be designed using some of the buttons, slides or timers. For instance, to develop vocabulary activities as shown in Figure 2, or pronunciation activities incorporating audio files created in Flash, as shown in Figure 3.

(b) Drag and drop exercises



Fig. 4. A 'listening comprehension' activity from LANCAM unit 1 (Spanish materials).

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Fig. 5. A listening activity from LANCAM unit 5 (English materials).



Fig. 6. A 'Resources' activity from LANCAM unit 1 (English materials).

This type of interaction enables users to interact directly with a task by manipulating objects on-screen. For example, in the listening comprehension activity in Figure 4, learners drag the title of each construction professional to the correct photograph while listening to the speakers describing their jobs. Figure 5 illustrates a similar drag and drop activity but using a substantially different design interface, illustrating the advantage of using a development tool which incorporates sophisticated design capabilities alongside high level functionality.

(c) Explore interactions
These can be used to place 'hot' areas on the screen for users to explore specific objects or concepts in detail, as illustrated in Figure 6 where the learner has the opportunity to explore background facts and figures about Britain.

(d) Text entry interactions
Single or multiple word text entry activities can be designed using this

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interaction type, as illustrated in Figure 7 where learners have to type in missing words or phrases for a listening follow-up activity.

7.1.2 Creating templates

It is also possible to create, customise and edit interactions and create interaction templates, which are saved in the Interaction Gallery, so that it is not necessary to start to create new activities from scratch each time. This reusability feature was particularly useful in our project as there was limited technical expertise and limited time for materials development so any way of simplifying and speeding up the development process was valuable.

7.1.3 Creating user feedback

As others have noted (Arneil & Holmes, 1999; Hémard & Cushion, 2001), there is a need to balance flexibility and practicality when creating user feedback. There is a danger of falling into the one-click right-wrong paradigm of task design which can result from limitations of software and design. It is, however, also impracticable to build in infinite flexibility of responses to exercises because of the impossible burden this creates for data entry and the limitations of client-side Javascript. Basically, it appears at present that the more 'intelligent' the interactivity the more sophisticated the coding needs to be to deal with it. For example, in the multiple choice exercises in the Hot Potatoes software it is now possible to provide a reasonable level of complexity to deal with variations in student responses but it requires the developer to have some knowledge of Javascript to customise interactivity in this way. Coursebuilder, on the other hand, provides limited feedback to correct and incorrect responses but this does not require any knowledge of programming languages.

We used the Action Manager feature in Coursebuilder to enhance and modify interactions, including adding and customising feedback to user responses in different types of activities, limiting the number of responses and time spent on them and assigning a score for an interaction.

7.1.4 Tracking performance

Tracking performance can be advantageous both for students, to enable them to build a personalised record of what they have learned (Skehan, 2003) and for instructors, in order to document progress for various purposes (Arneil & Holmes, 2003).

The Coursebuilder application automatically keeps track of information about users' performance but does not store this information indefinitely and does not save information permanently before the user exits an HTML page. In order to do this, the information must be transferred (via the Coursebuilder Knowledge Track feature) and recorded with a CMI system like Lotus Pathware, or a server-side database such as Microsoft Access. The Knowledge Track function can keep track, for instance, of the number of correct or incorrect responses, the number of tries, the overall score for an exercise and the amount of time spent on it. This function could be used to collect results, such as from a set of multiple choice questions, summarize these results, and send a score back to a tracking system. As the LANCAM materials were seen as standalone rather than institution-based resources, the tracking function was not developed but it was envisaged that later versions of the materials could move in this direction.

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8 Evaluative summary

Overall, although not ideal for our project, Dreamweaver was considered the best option to produce a hybrid language learning product. The sophistication of the tool, in terms of the complexity of the configuration and the scope of the design capabilities are both an opportunity and a challenge. We were fortunate on the LANCAM project in that the development team had access to graphic designers and technical experts to exploit these opportunities and sort out some of the technical challenges. However, it is not an easy development tool to learn independently or from scratch, despite Macromedia's claims.

Its main shortcomings lie in the fact that Dreamweaver is a Web development tool: it is not targeted at courseware construction or specifically at the creation of language learning materials. Consequently, the interactivity is limited and specific language-related capabilities (such as creating a glossary or graphical error recognition functionality to spot misspellings) are not available. Furthermore, there is no help in building a pedagogic framework or navigation system. Nevertheless, Dreamweaver plus Coursebuilder is a powerful tool, capable of producing professional level output both in terms of interface design and functionality, and given the increasing sophistication of our end users these are qualities, as Bangs (2002) confirms, which are becoming increasingly important in CALL authoring.

The main benefits and considerations involved in using this specific application for CALL materials development are summarised in Figure 8.

9 Conclusions

Producing CALL materials which are pedagogically sound and which optimise the potential of the technology used is complex and time-consuming. Additionally there is, as Felix (2003) reminds us, the risk of reinventing the wheel in the production of CALL resources. I would argue that the danger of duplication of effort is also present in the selection of authoring tools and that greater consideration could be given to existing,

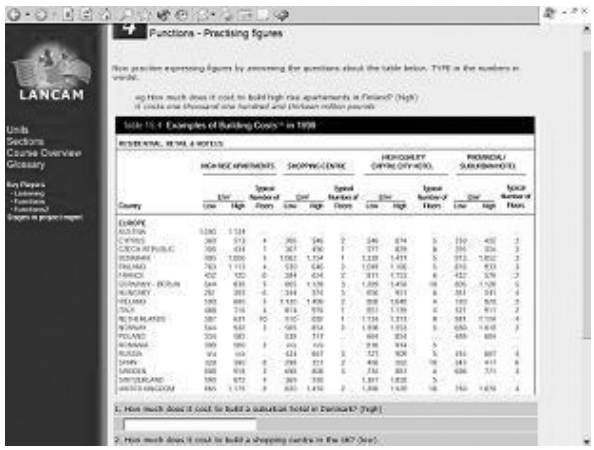


Fig. 7. A textfill activity from LANCAM unit 4 (English materials).

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Benefits	Considerations
Sophistcated design capabilities	User requires some instructional and graphic design expertise.
Enables development of advanced, customisable interactive learning content.	Requires considerable initial learning curve.
Cross-browser and platform compatibility.	Requires minimally version 4 browsers to operate fully.
Tried and tested product. Technical support and upgrades available. Can add-in other Macromedia products (eg Flash, Fireworks) easily.	Relatively expensive to buy product and support.
No knowledge of programming or scripting languages required.	Visual tools but not entirely WYSIWYG. Not designed specifically for language learning.
Available in other languages.	Fiddly to input non-English scripts.
Can create, edit and reuse templates and customise interactivity.	Quite complex configuration and limited range of activity types imposed by the browser environment.
Scoring and data tracking options available.	Need to link to CMI system or server side database to record and store user performance.
No plug-in requirements for an end user to view material created in Coursebuilder through a Web browser.	Rich media such as audio and videoneeds to be integrated using additional software such as Flash or Fireworks.

Fig. 8. Using Dreamweaver/ Coursebuilder as a CALL authoring tool: a summary of benefits and considerations.

generic development tools, including commercially available tools such as Dreamweaver, rather than investing a great deal of time and resources in developing CALL-specific applications which do not necessarily provide more or better features, particularly with regard to functionality and design.

Another important consideration in CALL materials development, which has been pointed out by others (Arniel & Holmes, 1999; Kitts & Whittlestone, 1998; Tippett & Cook, 1998), is how to solve the dilemma of needing both technical competence and linguistic and pedagogic expertise to develop effective computer-based language learning resources. Ideally we need software to enable us to create high quality web-based materials with a similar level of functionality and performance as is available using traditional multimedia authoring tools and preferably without becoming technical experts. This is still an ambitious goal at the moment but one which is becoming more attainable with the increasing sophistication of various e-learning development tools.

However, there is also the danger that the growing complexity and range of authoring tools may exclude many teachers from becoming involved creatively in CALL materials development if they feel unable to keep pace with rapidly changing concepts and techniques. As Godwin-Jones (2000) says ‘The danger inherent in this process is to remove

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those with pedagogical experience one step away from the technology. We need to have teachers directly involved in pushing the boundaries of the technologies in order to help search out new methods to enhance student learning.'

Many language materials developers have neither the time nor the inclination to learn the technical details of how a piece of software works, any more than they were inclined to learn how a typewriter or word processor worked. What they do need to know is what the technology can do so that they can exploit that functionality and design capability, together with their pedagogic expertise, to create optimally effective language learning materials.

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