

Case study

Using Macromedia Flash to create online information skills materials at Edinburgh University Library

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Keywords

Information services, Skills training, Tutorials, Feedback

Abstract

Growth in electronic information services, pressure on staff resources and developments in the area of electronic learning have resulted in a need for online information skills delivery. Edinburgh University Library has developed some simple animated tutorials using Macromedia Flash to support use of a number of library services. The process of planning, creating and evaluating the modules is described, and the need to consider issues of accessibility, usability and pedagogy is emphasised. Technical aspects of design and documentation are considered. We conclude that it is important to consider the cost and time involved in even a modest exercise of this nature, but that the Flash software makes it very achievable, given an initial investment in development time and training.

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1. General introduction

The rapid growth of electronic information services and resources has resulted in the need for librarians to play an even greater role in equipping their users with the knowledge and skills to make the most of the resources at their disposal. On the one hand, the fact that information is available direct to the user, without the need for an intermediary, makes it possible to use this environment without any assistance. On the other hand, the vast array of possibilities, combined with multiple interfaces, authentication requirements and search rules, means that to navigate the electronic landscape effectively, and to locate useful, quality and relevant information requires ever more precise use of the tools available. The notion that the World Wide Web might make the information professional redundant appears misguided. Instead, there is a growing need to ensure that library users appreciate that they must approach their information needs with greater expertise, and regard us, the information professionals, as the providers of the relevant skills. During 2001–2002 the Joint Information Systems Committee (JISC) funded a project, known as “the big blue” (managed by staff at the University of Leeds and Manchester Metropolitan University) which surveyed present practice in information skills training for students in higher and post-16 education in the UK and confirmed the need to promote the importance of information literacy, and to develop best practice in its delivery (www.leeds.ac.uk/bigblue).

If this is accepted, it is necessary to consider how best to provide skills in an online environment. Usual practice in academic libraries has been to continue to reach users in a traditional way, through face-to-face sessions at enquiry desks or in teaching rooms. However, online delivery of information skills materials should be considered for a number of reasons:

- If the resources are online, it would seem sensible that support should also be online. Users may be accessing a service from anywhere, at any time. Their need for support is becoming less likely to occur within the library, within the institution, or within normal opening hours.
- Teaching and learning providers generally are making greater use of online tools. Virtual and managed learning

environments (VLEs/MLEs) are emerging which require libraries to provide a service that can be slotted into them. It is becoming harder to regard the library as a distinct physical entity within a university; instead, academic disciplines and support services must integrate in ways that allow the student to access them seamlessly from their learning environment. The JISC-funded information for nursing and health in a learning environment (INHALE) project addressed the need to integrate online resources with VLEs (informs.hud.ac.uk/inhale0).

- Libraries are under increasing pressure to provide services with reduced budgets and growing student populations. Cost reducing measures have to be introduced, and one solution is to leverage new technologies in order to automate previously manual processes. As will be discussed, it is dangerous to assume, in relation to information skills delivery, that it is cheaper to provide online but, nevertheless, if staff time cannot be spared to deliver materials in a traditional way, alternatives must be considered. The Open University Library, with a huge and distributed potential user base, has moved into online information skills delivery in a serious way with the skills in accessing, finding, and reviewing information (SAFARI) online tutorial (www.open.ac.uk/safari). Similarly in the UK, the resource discovery network's virtual training suite provides online tutorials aimed at improving Internet information literacy in a wide range of specific subject areas (www.vts.rdn.ac.uk).
- Learning models are changing, and students are more likely to be enabled to learn, and expected to do so, rather than "spoon-fed" through rigid curricula, intensive teaching and controlled reading lists. Online learning resources, for independent and guided self-study, are increasingly becoming an important part of the online learning environment.

2. Edinburgh University Library and the learning environment

There are a number of possible models for the learning environment emerging in higher

education, and it is very difficult to see what the future will hold. It is likely that there will be a need for libraries to support a mixture of online and traditional learning, local and distance students, and old and new learning styles. Needs are likely to vary hugely between institutions, but in Edinburgh University Library (EUL) a combination of financial pressures and the changing learning environment meant attention needed to be given to the extent to which information skills delivery could be done online.

There is also increasing interest in "e-learning", and the library is predicting a rapidly growing need to support e-learning initiatives. This will mean ensuring that library products, services and support, can be embedded into VLEs. It is likely that the institution will focus on one main VLE, but equally likely that a number of others will continue to exist, so the library needs to create systems which will be as platform-independent as possible.

A number of relevant initiatives and projects have been implemented, or are presently underway:

- The integration of information skills tutorials in a medical VLE. The Edinburgh electronic medical curriculum (EEMeC) is an online environment (covering the curriculum, teaching, assessment and so on) developed for, and only accessible to, students, teaching staff and administrators involved in undergraduate medical education courses (www.eemec.med.ed.ac.uk).
- The development of a database-driven, Web-based infrastructure through which to provide customisable tutorials (under development).
- The development of tools to allow library resources to be integrated into VLEs/ MLEs in a seamless manner, avoiding the need for multiple authentication. EUL has been a partner, with the Open University, in the JISC-funded dynamically enhancing VLE information from the library (DEVIL) project (srv1.mvm.ed.ac.uk/devilweb) which is part of the JISC programme DiVLE on linking digital libraries with VLEs (www.jisc.ac.uk/index.cfm?name=programme_divle).

This paper concentrates on a modest, but practical and inexpensive, solution for the provision of simple online tutorial modules,

which uses animation to replicate the way certain essential tasks might be explained within an information skills session or at an enquiry desk. It was decided that this was the sensible way in which to begin to develop skills and experience in this area: to produce something that could be developed reasonably quickly, and would be of immediate value. The pedagogical issues relating to more ambitious aspirations should not be underestimated, and this seemed a good way of beginning to develop an understanding of what the issues are. A particular exemplar of the desired outcome was the Birmingham University integrated library development and electronic resource (BUILDER) project's induction packages (builder.bham.ac.uk/induction). BUILDER was one of the UK's e-Lib (Electronic Libraries) Programme Phase 3 projects which covered hybrid library development (BUILDER Final Report, 2001). The notion of small, "bite-sized" chunks of information, delivered in an attractive way and dealing with small, routine, but essential, tasks within the information environment which had been used in BUILDER was an ideal starting point for our work.

3. Planning and design

Work on developing the information skills tutorials began in 2001. It was decided to use Macromedia Flash for the exercise. Macromedia Flash is a software product for developing material on the Web with a high visual and interactive content and is the most widely used package for this kind of development (e.g. BUILDER) and is available from the PCs in the university. The first stage was to develop a prototype, and the library catalogue was identified as a suitable application area. The resources to do the technical work were unavailable in EUL, but a member of staff from another central Edinburgh University service, Media and Learning Technology Service (MALTS), agreed to do it at no cost to EUL. The BUILDER model was followed, whereby a script was developed by library staff, rather like a storyboard, that was used by the MALTS developer to add the content to the module. MALTS developed an interface that closely resembled the BUILDER style, but with an EUL look and feel. The result was

partially successful, but there were some technical issues outstanding that caused usability problems, and it was felt that navigation through the module was not as intuitive as it could be. The elapsed time for this phase was about three months.

The next stage was to identify funding for further development, improvement of the prototype and additional modules covering other areas identified as achievable and meeting user needs. An application for a small grant from the University was successful, and resulted in an award of £2,500 to develop a suite of modules. The money was used entirely to fund the employment of a part-time developer. The grant funding required that, if possible, a student of the university be recruited. In the end, a recent graduate of the university with the necessary skills was employed and appropriate library staff were given the role of creating the content. The developer spent about 250 hours over a six-month period (from late 2001-mid 2002) working on this project and the five library staff members involved developed the content in addition to their normal tasks. The first author was responsible for managing the project and co-ordinating the work of the developer and the content providers. In addition, a learning technology officer who was, at the time, based in EUL, provided advice on a number of issues and acted as a consultant to the project.

The first task of the project team was the revision of the MALTS interface to make it more intuitive and usable. The developer made a number of proposals, and, with the help of learning technology officer, who had expertise in interface usability and accessibility, a satisfactory design was created, which moved significantly away from the prototype. The developer then met with content providers to discuss the most appropriate way to deliver the content. The need for regular communication between the developer, project manager, content providers and the learning technology officer cannot be underestimated. It was found to be absolutely vital to do this in order to ensure all parties remained on the same course, understood the objectives and delivered within the agreed time-scale. Meetings were held weekly or fortnightly between the developer and the project manager with the learning technology officer also present if possible.

4. Technical considerations

Before embarking on a project the core elements of which require fairly recent technologies, especially on the Web, where the diversity of the users and their access methods are wide, some thought should be devoted to the technical requirements and considerations that will be dealt with. With respect to Flash, there are technical issues both on the server and client side that must be resolved before proceeding into the development phase of such a project.

Server issues can be resolved fairly easily by the administrator of the Web server in order to configure the server to deliver the correct multipurpose Internet mail extensions (MIME)-type associated with Flash. Client issues, on the other hand, can, ultimately, be insurmountable, and it has to be accepted that it will not be possible to reach 100 per cent accessibility. For example, Flash makes two major demands on the client machine: first, it must be installed with the software required to run Flash movies; second, it must be connected with sufficient bandwidth to receive the data in a reasonable time, as Flash movies, although highly efficient in their storage of image data, can still become relatively large.

Solving the first problem requires action by the user in some cases. For networked university machines there should not be too much problem having the most recent Flash Player installed campus-wide, ensuring that all on-site users can access the data. Since no such control exists over remote users, it is their responsibility to ensure the machine is capable of running the movies if required. The second problem calls for much the same solution: on-campus machines will usually have a sufficiently high network speed that even the most weighty of movies loads in a fraction of a second; off-campus users must have patience, if using a modem, or use a faster connection.

It is in the area of remote or off-campus users that client-side issues may be irresolvable, and for this reason technology of this nature, at least for the time being, must supplement, rather than replace, pure text information. This is also the case in relation to the technology's applicability to disabled users in the later section on usability and accessibility.

In addition to the above, technologies such as JavaScript on the client side, or server side, scripting with languages such as Perl, PHP, or ColdFusion may be useful. Use of such extensions is beyond the scope of this paper.

5. Module creation

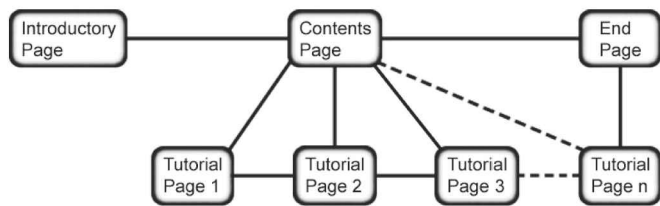
The main issue with the design process is to ensure that sufficient information is presented without being too cluttered, and without requiring a lot of space, as screen "real-estate" is at a premium. The flow of the modules is entirely dependent on what exactly they are intended to show, although it is recommended that a template module should be created from which other modules can spring with as little effort as possible. With this in mind, a template Flash file was developed, containing all the persisting features, quickly customisable and ready to grow into a new module. This made future development and consistency easier. The following is a brief list of the elements used to make the template

- *A thin header bar containing the module name and a Library Online label.* Although non-standard in the general design of the *Library Online* Web site, it was felt that to use a typical header bar would require too much space.
- *Persistent navigation at the bottom of the page, distinctly separated from the window content.* This navigation is limited to moving forward and backward through the scenes in the module, replaying the current scene, and returning to the contents page. There is no need to confuse the user with additional options.
- *Non-symbolic navigation.* That is, the "back" button says back and the "next" button says next.

Once the general look and feel is developed, the flow of each module can be designed. It was discovered that it is best to develop linear modules that work through a single task with no diversions, as this is easier for the user and the developer alike. The flow of all the EUL modules follows exactly the basic model in Figure 1.

The introductory page presents the module title and a brief description of the contents. The user then moves directly into the contents page, which will then launch any of the subsequent scenes. Alternatively, each page

Figure 1 Flow of modules on information skills



allows the user to move forward and backward in a linear fashion through the tutorial. At the end of each scene, in which one screen-shot or specific area of the topic is discussed, the user is automatically forwarded to the next page. Internal page navigation is done with the use of only two types of button: “show me” and “continue”. These buttons appear beneath instructive text presented within a floating window. “show me” is intended for use when the user has read the instructions, but requires further clarification; this comes in the form of another floating box, which points to the relevant area of the screen, and introduces some more explanatory text. It is possible for the user to navigate the entire tutorial without activating the “show me” feature. “continue”, then moves the user onto the next part of the scene, or onto the next scene if necessary.

The following sequence attempts to convey the look and feel of the tutorials in general. We introduce the MyAthens interface, and the purpose of this short section of tutorial is simply to show the user each of the parts of it. Figure 2 is the opening page of this particular section. In Figure 3 we scroll down the MyAthens page to the service list. Here we indicate to users where to find the

Figure 2 Opening page of the tutorial on using MyAthens

Using the MyAthens Interface **Library Online**

Personal Information		Account Information	
Title:		Username:	edusocjobloggs
Forename:	Jo	Account type:	Personal
Surname:	Bloggs	<div style="border: 1px solid black; padding: 5px;"> <p>This is the MyAthens interface. The box on the left here tells you about the account holder (i.e you), and the name and address of the associated institution.</p> <p style="text-align: right;">CONTINUE</p> </div>	
Position:			
Identifier (e.g. staff or student number):			
Email:	jo_bloggs@nomailhere.ac.uk		
Department or administrative unit:	University of Edinburgh		
Postal address:	Main Library George Square Edinburgh EH8 9LJ		

BACK CONTENTS PAGE REPLAY THIS PAGE NEXT

Figure 3 List of services available via MyAthens

Using the MyAthens Interface **Library Online**

Fax:

You have access to these services

- BIDS Education Service**
OVID interface to ERIC and BEI
- BIDS IBSS Service**
BIDS interface to IBSS - The International Bibliography of Book Reviews
- BIDS SilverPlatter PsycINFO Service**
The American Psychology Association's PsycINFO
- BioMed CancerLit** SSO
Ovid interface to the US National Cancer Institute cancer therapy, hosted by NISS.
- BioMed Cinahl** SSO
Ovid interface to CINAHL Information systems, The Cochrane Review, hosted by NISS.
- BioMed ClinPSYC** SSO
Ovid interface to a clinical subset of PsycINFO. Pr...

A list of services available to you through **Athens** is also here, and you may follow the links directly to those sites. The list may not be complete, and if you cannot find what you want, the tutorial on **Logging into a DataService with Athens** will show you where all the sources are available.

CONTINUE

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services available to them, and, in addition, alert them to the existence of another tutorial that may also be of some use. Finally, in Figure 4 we scroll up and right on the page to show the account and administrator information for Athens. At the same time as this, you will notice that the instructor window moves from the right to the left-hand side of the screen. In this way, we effect graceful transformations between relevant areas of the page, avoiding clutter and maximising the use of the displayed area.

6. Usability and accessibility

Any materials being designed for Web-based delivery should be usable (i.e. easy to navigate and to locate and retrieve information) and accessible (i.e. no one is barred from access

Figure 4 Account and administrator information for MyAthens

Using the MyAthens Interface **Library Online**

Personal Information		Account Information	
Username:	edusocjobloggs	Account type:	Personal
Account expiry date:	31 October 2002	<div style="border: 1px solid black; padding: 5px;"> <p>Finally, the panel on the right tells you your username, the account expiry date, as well as the contact details of the Edinburgh University Athens Administrator.</p> <p>You may also change your password from here, using the password link.</p> <p style="text-align: right;">CONTINUE SHOW ME</p> </div>	
<div style="border: 1px solid black; padding: 5px;"> <p>Would you like to change your password ?</p> </div>		Administrator Information	
Name:	Mr Simon Bains	Email:	athenshelp@ed.ac.uk
Phone:	0131 651 1825		

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due to hardware or software requirements that may be impossible to meet for reasons of cost, availability or user disability). Recent legislation in the UK requires that educational Web sites must be accessible to all (SENDA, 2001). In the UK academic library sector, there is evidence that more needs to be done to raise awareness of usability and accessibility amongst Web authors (Craven, 2003).

Usability guru Jakob Nielsen once famously wrote that "About 99 per cent of the time, the presence of Flash on a Web site constitutes a usability disease" (Nielsen, 2000).

Macromedia has since worked to develop Flash as a tool to create genuinely usable Internet applications, and in 2002 began working with Nielsen to this end (http://www.macromedia.com/macromedia/proom/pr/2002/macromedia_nielsen.html).

It is of utmost importance to consider carefully the factors that influence usability and accessibility of online learning tools. For example:

- Is the interface intuitive? The user should not have to learn to use the system before learning the content. A simple example is the use of icons: if possible these should be avoided in favour of words. The word "contents" was felt to be better than an icon designed to represent it, as this is always open to misinterpretation. It is also important to note that visual representations that might seem obvious to the developers may not be to the users, especially if they are from different cultures or have low levels of computing experience.
- Is the structure sensible? i.e. is it easy for the user to navigate through the module? It is vital to be clear about what it is intended to achieve: are beginners being targeted, or more expert users, or both? If both, is it possible for expert users to go directly to the areas that interest them, and skip basic material? How are users expected to use the module? Will it be part of a bigger learning package? Will it be within a classroom-based tutorial? Will it be on demand, via the Web site? If it needs to meet a variety of needs, does it do so?
- Has the content been prepared with this environment in mind? It is not simply a case of taking existing material used for traditional delivery and converting it into an electronic format; the style used for

online materials should be very different. For example, it was decided to make the modules very visual, with text kept to a minimum. This meant considering how material previously communicated in words should be communicated in animation.

- Is the material accessible to all? For example, can someone with a visual impairment, using a screen reader, access it? Can someone with an old version of a Web browser use it? Can someone with a small monitor use it? It is important to test the system in as many ways as possible. If there is a chance it cannot be accessed by some users, there may be a legal obligation to produce an alternative that can. Even if a case can be made for restricting accessibility, it should be made clear what requirements are necessary to access the material.
- Delivery of the modules to the desktop needs to be done in a convenient and sensible way. So that the modules may be resizable, and may fit on any conceivable desktop, EUL modules are delivered in their own browser window that can then be manipulated by the user. It is an advantage in Flash to be able to use vector graphics to represent text, as this scales smoothly.
- Usability testing suggested that users are more inclined to go directly to a contents page if one is available, and use this as the basis for the tutorial. Thus, it was decided to deliver the user directly on to a contents page immediately after the module has been introduced.
- To provide the contrast necessary for partially sighted users, the colour scheme must be chosen appropriately. Although there may be no control over the content of screen-shots, it is important to ensure that customer information is presented in such a way as to distinguish it from the screenshot, and to make it clearly readable. For this reason, it was decided to fade screenshots in and out, whilst customer information slides in and out of the page in yellow windows with black writing. For general information on usability and accessibility, the World Wide Web consortium's Web Accessibility Initiative has produced a set of guidelines (www.w3.org/TR/WAI-WEBCONTENT).

Towards the end of the development process a small-scale usability survey was conducted with the help of the learning technology officer. The results were helpful in providing information about issues that needed careful consideration. For example, there was much confusion concerning where it was possible to enter text during the tutorial. It had initially been felt that this would be a good idea, making the learning process more interactive; in fact, it served to confuse people. During the testing of the Athens registration module, some users felt that they had actually registered for Athens, rather than being shown how to do it. Because of this, the decision was taken to make the tutorials a purely passive experience. Other feedback was also useful in driving the final interface design and alerting us to other issues requiring further consideration:

- the need for single-screen contents pages;
- size of navigation buttons;
- linking of modules within the Web site; and
- the need to avoid generating multiple browser windows.

The end result was the creation of 21 modules, within five subject areas:

- (1) Using the library catalogue.
- (2) Athens.
- (3) Searching for articles in your subject.
- (4) Searching outside Edinburgh university library.
- (5) Electronic journals.

The modules are freely available on the EUL Web site (www.lib.ed.ac.uk/howto/flash). It was not originally intended to develop this many modules. But one discovery made during the course of the project was that it is more sensible to break areas down into as many discrete modules as possible, than to include everything in a single module, which becomes lengthy and difficult to navigate. Another factor affecting this approach is the expected time taken to complete each module. The modules are designed to answer users' quick queries and so each module is intended to be completed within five minutes. For example, the library catalogue introduction module simply shows the user where to find the catalogue, and the options available from the home page. This can then be used as a prerequisite to any of the other modules. The advantages of this approach are:

- simplicity of navigation;
- granularity – modules are very specific, and can be used as independent modules or as part of a full “course”, as appropriate;
- reduction in size of each individual module – without doing this, download times are too long; and
- ease of design, as development may focus on a linear story flow.

The modules were loaded on to *Library Online* on a single menu page, and linked as appropriate throughout the site. They were loaded in such a way as to allow them to run in separate windows, independent of the Web site. This is not always regarded as good practice in Web site management, but it was done in this case for three reasons:

- (1) The windows are resizable, which allows the modules to be viewed properly on a variety of monitor sizes. This would not have been possible if they had remained embedded in a library Web page.
- (2) The stand-alone nature of the modules emphasises their role as discrete learning blocks, rather than another part of a large and complex Web site.
- (3) Their independence from the library Web site allows, if desired, for their provision in different ways, e.g. launched from a Windows Start menu.

7. Training and documentation

The developer's last task was to ensure that EUL staff had the skills to maintain and develop the modules. No one was available within EUL with experience in using Flash, and little experience of capturing and manipulating screenshots. Three members of EUL staff attended training sessions with the developer, to learn what to do if, for example, a screenshot needs to be updated, or instructional text needs to be changed. It became clear during the course of the project that the modules dated quickly, and to ensure they remained useful it would be necessary to update them on a regular basis. For example, during the creation period there was a library system upgrade, a change to the Athens Web site and a change in the cost of interlibrary loan charges. These changes all meant that the modules needed to be amended to remain accurate.

Flash is a complex and powerful utility if used to its full capacity, and working comfortably in it is not a skill that can be obtained quickly. For this reason, two recommendations are made: keep the design and operation of modules simple and clean – ideally use standard templates (see below); invest some time in staff training, even if it is just to the level where the staff can use Flash only within the context of the project. It is vital to consider the maintenance of modules, as Web content is often updated quickly and with no notice.

Finally, since it is both good practice and useful for any future developers, it is a good idea to provide documentation. Readers should note that what follows is of a slightly technical nature, and familiarity with Flash and some associated jargon is useful. Flash is an awkward platform that does not lend itself to documentation, and finding a good method is extremely difficult. It was found that it was only due to the simple methods that had been used to design the EUL modules that made it possible to produce something practical. Table I provides a short example.

This method employs a series of shorthand notations which allow the documentation to be kept readable and short, whilst describing exactly what is happening in the module at any point. The above is the documentation for a single layer in the scene containing the instructional text presented over a screenshot as shown in Figures 2-4.

The “section” column refers to a label given in a layer in the movie to make navigation easier, and the “symbol” column refers to the element of the movie which is present. The “position” column is defined if relevant, using horizontal (x) and vertical (y) co-ordinates and is in pixels, whilst “tween” (the way that the developer indicates how the animation in Macromedia is to be achieved) tells what the “symbol” is doing during that

“section”. Thus, in section “start”, the symbol “Page2InstructorText1” tweens from (x, y) position (292,-90) on the stage, or screen, to (292,25). For completeness, “AO” stands for “alpha out” meaning that the “symbol” fades away, and “AI” stands for “alpha in”, meaning the “symbol” fades in (both names coming from the graphical effect applied). This documentation refers to one of the 21 modules developed at EUL.

Figure 5 is a sequence of symbolic images that help clarify what the documentation snippet describes. For a greater understanding of this process, refer back to Figures 2-4 to see the evolution of page elements over time.

8. The future, and learning points

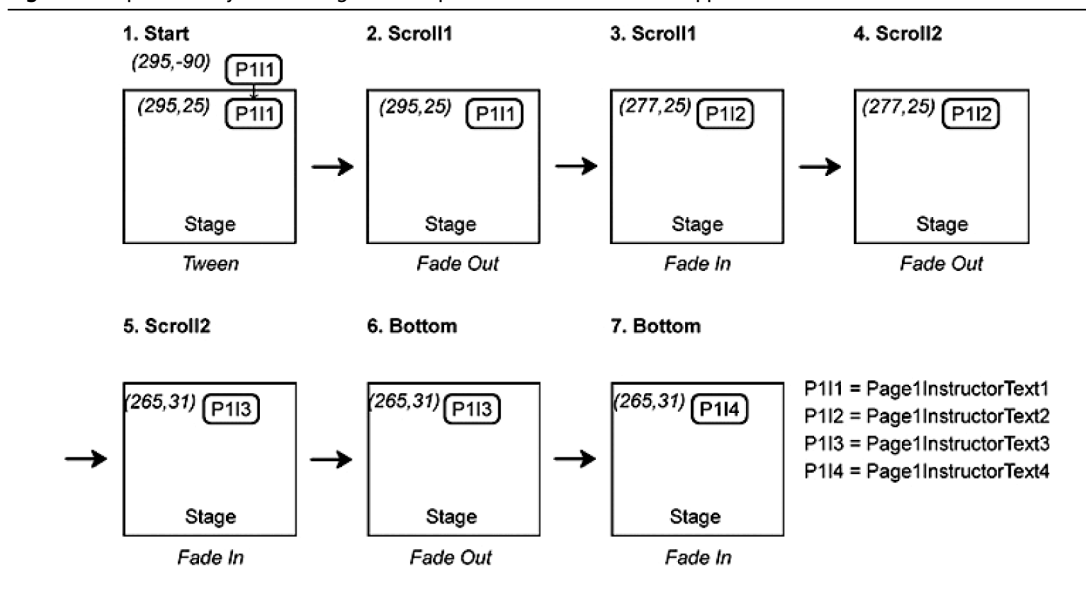
Future plans now focus on how this approach can be embedded into more elaborate online information skills environments. The approach of using animation to demonstrate parts of the service can complement text-based tutorials so that VLEs can benefit from both approaches, each being used where most appropriate. It is also still necessary to gather feedback on the value of these modules to users, so responses via *Library Online* will be encouraged. No formal feedback mechanisms are planned presently, but it is hoped that these modules can be included within wider user surveys. Statistics show that the directory of Flash modules on the EUL Web site is being accessed between 200 and 300 times a month, with the most popular modules being accessed up to 70 times a month.

Aside from the possibility that new versions of Flash will bring additional functionality, there are a number of other technical improvements that are feasible for future development. Using current versions of Flash, more involved programming would allow content to be delivered on the fly out of a database, potentially making maintenance and creation of new modules easier – this is unfortunately out of the scope of a low-budget project. The same server-side technology such as PHP or Perl, mentioned earlier, could then go on to provide not only dynamic content, but a new degree of interactivity.

As well as the actual technology used, there is also scope to advance the delivery method. Flash modules can be built into stand-alone executables to run on the Windows desktop,

Table I Example of documentation produced at EUL

		Position	
Section	Symbol	(x, y)	Tween
(1) Start	Page2InstructorText1		M(292,-90)(292,25)
(2) Scroll1		292, 25	AO
(3)	Page2InstructorText2	276.6, 25	AI
(4) Scroll2			AO
(5)	Page2InstructorText3	264.5, 31.4	AI
(6) Bottom			AO
(7)	Page2InstructorText4		AI

Figure 5 Sequence of symbolic images to complete the documentation snippet

allowing students in a VLE to have the modules immediately available. Other improvements will follow from listening to the feedback of users, and collecting more usability information.

Finally, the main learning points to consider if embarking on this sort of venture are:

- The time it takes: conversion of content used for other purposes is unlikely to be straightforward.
- Costs: if you lack the skills to use Flash, or similar software, then you will need either to employ someone with the skills, or fund training. For this sort of venture, a one-day introduction to the software is insufficient.
- Usability and accessibility: it is easy to focus on the possibilities instead of what is actually needed. Flash has been used badly in the past, and has become a barrier to usability and accessibility. Careful attention to these issues is vital to create useful materials, which adhere to

legal requirements and do not exclude sections of the user community.

- Pedagogical skills: there is a real skill to creating/converting content for this medium, and it is quite different from creating content for classroom delivery, or print.

References

- BUILDER (2001), *BUILDER Final Report. Section 2.1.6*, Birmingham University Library, Birmingham, available at: <http://builder.bham.ac.uk/officialdocuments.asp>
- Craven, J. (2003), "Accessibility and usability of Web site", *Library and Information Update*, Vol. 2 No. 5, pp. 46-7, available at: www.cilip.org.uk/update/issues/may03/article2may.html
- Nielsen, J. (2000), "Flash: 99% bad", *The Alertbox: Current Issues in Web Usability*, 29 October, available at: www.useit.com/alertbox/20001029.html
- SENDA (2001), *Special Educational Needs and Disabilities Act 2001*, Ch. 10, The Stationery Office, London, available at: www.hmsso.gov.uk/acts/acts2001/20010010.htm