Integrating Digital Resources into Online Learning Environments to Support the Learner

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ABSTRACT

This paper describes an investigation into the ways in which tutors and students identify and obtain online resources and examines some new tools and services which are being developed to enable tutors to integrate the information resources which support their teaching into online learning environments in more efficient ways than are currently possible. Such resources might be found for example, in digital libraries, on university library websites, in electronic journals or books, in reading lists, on the Internet, in existing VLEs, or indeed in any kind of paper-based resource. They could be text, images, speech or music. Current needs and difficulties are explored from the tutor and student perspectives, and what the tools are aiming to provide to help with these issues is described. The paper concludes by suggesting why the need for such tools will be come more urgent as the Government's initiatives to push teaching and learning out into work and community contexts gathers pace.

Keywords

learning resources, learning support, online information resources, e-learning, user behaviour, user needs

INTRODUCTION

As part of its evaluation of the JISC Information Environment (IE), the EDNER project conducted a series of studies into the ways in which tutors, researchers and students identified and acquired the resources they needed to support their teaching, learning and research activities. Previous JISC-funded studies such as the HyLife Project (HyLife 2000) and the INSPIRAL Project (INSPIRAL 2001) had identified a need for closer integration between the library and teaching communities, and more particularly for a clearer understanding of the link between online learning activities and the digital learning resources needed to support them. How such integration was to be achieved was as yet unclear. These investigations then were motivated by JISC's need to know whether the online resources provided in the JISC IE were being used and valued among the teaching and learning communities, or whether tutors were turning to other kinds of resources to fulfil their needs.

The key objectives of these initial exploratory studies were

- to find out how tutors learned about online information resources to support their teaching

- to explore what kinds of online information resources they were choosing to integrate into their VLEs

- to identify the role played by the resources in the JISC IE in their choice of resources

- to identify any difficulties or problems which they were experiencing as they tried to integrate the resources they needed to support learners into the online environment.

and

- to explore how students go about finding the resources they need to support their academic work

While the evaluation of the JISC IE was still in progress, JISC also funded another Programme, known as Linking Digital Libraries with VLEs (DiVLE). The formative evaluation of this new Programme, the Link[ER] project, was carried out by the EDNER team, and thus there were synergies between the two projects. The DiVLE Programme aimed to explore the technical, pedagogical and organisational issues of linking digital library systems and VLEs. Its specific objectives were to

- explore the issues of linking VLEs with local institutional digital library resources and services

- implement curriculum focussed pilots, based upon units of learning, linking VLEs to digital library systems

- provide models and guidelines for other institutions about the cultural and organisational issues related to joining up these systems in an institution

This Programme then was essentially exploratory and experimental; an opportunity to try out ideas which might lead to the development of practical tools and techniques which would help the tutor integrate a range of online resources into the VLE at the point of need. Thus it began to address some of the issues highlighted in the EDNER studies and elsewhere.

METHOD

The studies which form the first part of this paper used well-established qualitative research methods, namely interviews with individuals and focus group discussion to study "the behaviour of individuals in all the complexity of their real-life situations" (Bawden, 1990, p27). Strategies involving artificially-constructed experiments or large-scale questionnaire surveys were rejected, because although these may reveal patterns of behaviour, insights into the reasons behind the behaviour are more difficult to identify. What was sought was closer to what Taylor and Bogdan (1984, p5) describe as "research that produces descriptive data: people's own written or spoken words and observable behaviour". Fifteen tutors and fifteen students at Manchester Metropolitan University took part in the interviews during Summer 2002 and Spring 2003. They represented teaching staff from a broad cross section of teaching Departments, and both the undergraduate and postgraduate student population. Interviews were recorded and transcribed, and then in order to capture the richness of the data it was decided to present these as vignettes. Vignettes have been described by Stenhouse (1981) as the evaluator (or researcher) interpreting a particular incident and using it to illustrate a more general situation. The individual vignette 'speaks' as if from one person's experience, though it may in fact be based upon the experiences of several interviewees, who together represent a particular type or group. What is reported here is a synthesis of these vignettes, and some key messages for those addressing the integration of online learning support resources into online teaching environments.

RESULTS

How tutors and students find information to support teaching and learning

Tutors and Online Resources

The objectives of the interviews with tutors were to explore how they learned about online information resources to support their teaching, what kinds of resources they were selecting to support their online teaching, the role of JISC IE resources in their choices, and what problems they were encountering in integrating resources into the online environment.

Before exploring the results obtained it is worth noting some contextual conditions. First, the use of a Virtual Learning Environment (VLE), in this case WebCT, was relatively new within the institution, and although all of the interviewees had undergone training in how to use the VLE and how to design and develop teaching materials, the issue of embedding resources to support learners had not been addressed in any greater depth than indicating that it was possible to link to the institution's library website. Staff appeared to be well-motivated to use the VLE and the possibilities that online resources offered. Most of those interviewed for the study were keen to provide links to online resources to support students' learning; one said this overcame the excuse that her students couldn't do the work because they couldn't get hold of the resource, 'if it's online they can get it when they need it' she said.

The kinds of resources selected by staff were varied. Several staff members had set up a 'mini digital resource' listing links to recommended websites which students could explore for materials to underpin their assessed coursework, and had placed these in a discrete location within the online teaching module. There were also examples of tutors extracting a particular website from a JISC subject gateway or the URL of a favourite web page and placing it at the point of need within a narrative, of the creation of new resources such as a glossary of scientific terms with hyperlinks from the text in the teaching materials to the glossary whenever a difficult or new term appeared, and of the creation of course modules around particular websites.

Tutors praised the facility with which they could include new types of media within their teaching, such as images or audio files, games and interactive sites, and how this gave them new and different ways of approaching syllabus material. For example, one History tutor remarked upon the value of online historical

maps. 'When I talk about decolonisation' he said 'they can actually look at a map of where the countries were, where the empires were'. They liked being able to access very current information and to incorporate this into their learning materials immediately before the lesson, and this was a particular asset to subjects such as Law or Modern Politics. Almost all of the tutors interviewed associated 'online' with 'websites'. None had looked for ways of integrating direct links to full text online journal articles or to individual items of material within bibliographic databases provided by the university's traditional resource provider, the Library, nor had they discussed this type of resource need with librarians. 'I do liaise with librarians' said one, 'but not for online resources or websites. I mostly go to them for training for myself and my students, and also when I need information about new passwords'

Regarding their students, some claimed that the student library induction session gave sufficient knowledge of the library and its services to equip students for their academic careers. The most that was usually provided for students within the VLE was a high level icon link to the Library web page, or at best a pointer to the appropriate Subject Resources section. Some had not realised that this was possible. There seemed to be a 'discreteness' about all the resources available through the library, whether paper based or online, as if accessing these was a separate activity from working in the online learning environment, and not something that might be integrated into learning materials at the precise point of need.

Apart from the Virtual Training Suite, few tutors were using resources from the JISC IE, although several claimed to know about them. There were examples of tutors extracting a particular website from a JISC subject gateway, but for the most part these resources did not feature. This may be partly explained as an awareness issue, with the point above about the lack of contact with librarians regarding online resources being significant.

The kinds of problems and issues faced by tutors can be summed up as currency, quality, and effects on working practice. Several tutors had had problems when integrating websites. They noted how frequently URLs were relocated, though few made regular methodical checks to ensure that links were still live. 'I do housekeeping during the summer vacation' was the only example cited of such behaviour. None mentioned using link checking software. Some complained of the impermanence of websites and the impact that this had had upon their use of online resources. One had lost a whole course module because of this. They were also unhappy that information seeking on the Internet was such a time-consuming process compared to searching through on-line journals and bibliographic resources. 'Online is a lot of work' said one. 'It's invisible work, and my colleagues think I do less.' One noted a decline in the availability of free content on commercial subject gateways saying that he now had to pay to access high quality materials upon which he had previously relied. None seemed aware that copyright law applied to web-based materials as well as to print based.

Some interesting discussions on the quality of learning resources obtained from the Internet were triggered. All of the tutors were confident of their own ability to evaluate the quality of the content of websites, and one claimed to be 'impressed by the web explosion', but there was anxiety about the skills of their students. 'They might love it for chat and their own personal ends, but I'm not sure for work' being a typical comment. Several quoted instances of students incorporating inappropriate online material into their coursework. One described students as 'confused' about what 'quality' meant when it came to online material, claiming that this was 'a bit like not discerning the difference between a popular magazine and an academic journal'. Several were surprised that while students seemed able to evaluate the academic quality of paper-based resources, they were less able to transfer their skills to the online environment. There were discrepancies between how tutors had responded to this anxiety. One approach was to offer 'ad hoc' advice to individual students when the need arose, usually in response to the selection of an inappropriate resource. Other tutors integrated information skills training into their teaching, but usually only when this formed part of the curriculum of the subject area. A few tutors had made use of JISC's Virtual Training Suite for this activity because the training modules are subject based, and when there was no appropriate subject module available, a generic package such as Netskills was used instead. It was not uncommon though for tutors to take the view that this sort of training was not their responsibility. One pointed out that she had neither the time nor the skill set to teach her students evaluation skills, which she described as 'an add-on for which I wouldn't be paid' and also suggested that students may be reluctant to undertake training which did not carry with it the reward of 'counting towards their degree'.

Students and Online Resources
The objective of the interviews with students was to discover the processes they would use to find resources to inform a piece of assessed coursework, and to see what role online resources played in this activity. There were three clear favourite strategies; either they took a reading list of recommended books and journals to the library, or they searched the library OPAC and web page for journal articles and online databases, or they went to the internet and carried out a keyword search using Google. The only difference between students was which strategy they chose first.

Their heavy reliance upon a reading list proved a double-edged sword. On the one hand students were confident that the list contained high quality key resources because their lecturers had recommended them, and as one remarked, "Lecturers will tell you where to go, and it saves legwork". Yet at the same time there was a definite "down side" to reading lists consisting mostly of books and journals. Students complained and even seemed to panic when the particular recommended book was already out of the library on loan or was missing, and although they might browse other books with the same shelf mark, they were not confident that an alternative would be just as good. There was also a marked reluctance to visit other academic libraries in the search for books and printed journals despite the fact that there are several within a radius of a very few miles from their home site library. Convenience was the major factor here, and also familiarity with the layout of the physical library. One student remarked that she was sure that the main Manchester public library held good material, but "it's so big and scary and I can't find my way round. I always end up asking someone and feeling like a fool because I couldn't find it myself."

Despite the concern which tutors expressed about the ability of their students to evaluate what they found on the Internet, there were some encouraging messages from the conversations with the students themselves. All of them were aware that there could be problems with the quality of the information they might find on the Internet in the context of using it for academic work. They had evaluation strategies such as finding out whether sites had been 'vetted', or judging on the basis of domain names, by using sites recommended by their peers, or by finding out who the author was. They were concerned about whether Internet resources were 'reliable', and complained of being overwhelmed by the volume of material available, much of which was irrelevant to their learning needs. In fact they emerge as quite cautious and conservative in their selection of resources.

Despite these encouraging signs the strongest reasons given by far for using the Internet were not good academic ones. They were the speed with which information could be retrieved, and the convenience of working in this way. These were perceived as definite advantages in an online resource and outweighed arguments for quality. As one said "I use the internet because I'm lazy, because I don't want to have to get up and go to the library and you know if you find an article on the internet you can just print it straight off instead of having to search through journal issues and photocopy them."

Summary

The picture which emerges is one of enthusiasm within both the teaching and learning communities for using online resources to support and underpin learning. The reasons for this enthusiasm are both good and bad, and there is some cause for concern. Reading lists emerge as a key source of materials to support learning, but when these contain mostly paper based resources, the amount of effort required to access them seems to lead to a trade off between getting the recommended resource or uneasily making do with an alternative. It appears that the processes that tutors use to find out about online resources do not draw upon all the support available to them, with a lack of use of the traditional support services such as the librarians in this context and as yet no sign of impact from the new learning support services both within and without the institution There is also concern that it is impossible to predict the permanence of websites which impacts upon their usefulness as resources to support learning. Quality is a major issue, with a critical tension between the desire of staff to maintain control of the standard of resources and that of students to get easy access to resources.

The samples in these interviews were small, but the use of interviewing as a technique ensures a rich picture of user behaviour and attitudes. The sample may not be generalisable to the wider population, but the results do indicate some clear messages which are very relevant to the kinds of questions to which the JISC was seeking answers.

Some emerging solutions - evidence from the Link^ER project

Certainly within the library community there has been an awareness for some time now that the move to teaching in the online environment presents great opportunities to integrate library based resources into the VLE to enhance the learning experience at the time and point of need. What has proved difficult is making this happen. A review of published library and education literature on this subject, (Markland 2002) which identified practice and experience in the UK and elsewhere showed that much of the initiative for integration was coming from the library community. Examples of initiatives in which library and teaching staff had worked together to integrate specific digital library resources into a particular teaching module in a virtual learning environment were not numerous. Mostly these seemed to emanate from situations where learners were working at a distance, rather than providing for online learning for campus-based students, a model which is becoming familiar in Higher Education Institutions.

The Technical Challenges and The Divle Programme

In an attempt to address the difficulties of information seeking and integration into online learning environments, the DiVLE Programme took some first steps towards exploring ways of developing and providing easy to use tools to facilitate such activities. Nine projects were funded to develop and test software to provide, among other things, tools to

- make it easier for tutors to discover, evaluate and integrate digital resources into their online units of learning through 'online course packs'

- expand the traditional reading list into a mix of library based and web-based resources enhanced with the tutor's annotations, which could be placed anywhere within the VLE

- streamline access to online materials such that the number of steps between the citation of a resource and its acquisition is the lowest possible

- and to improve students' resource evaluation skills by integrating skills training focused upon a particular need at the precise point where the need arose.

The Programme aimed therefore to satisfy both the impatient student and the busy tutor. The Programme was of short duration, only ten months, but what was achieved is promising for tutors and learners alike.

Some Tools for Tutors

It was shown, for example, that it is indeed feasible to provide a tool within a VLE which can search across a mix of online resources simultaneously. The PORTOLE tool developed by Leeds University (Sotiriou et al. 2003) can search one or more library catalogues, the Resource Discovery Network (RDN), an in-house database of subject-based listings of electronic subscriptions, selected external websites, and Google, and then retrieve a single set of links. Next the tutor can select resources from the list, annotate these with supplementary information, sort and group them, mark them according to level of importance, and integrate the list into the VLE at the point of need. The list can be edited at any time by the tutor but not by the students, and at the outset the tutor can select which resources to search. What the student sees when working in any particular unit is a list of learning resources of various types which have immediate relevance to that unit; resources which will enhance his understanding and facilitate learning. The list might be a mixture of books, journal materials and websites, might encompass a range of visual and audio media, and will therefore bring together 'library OPAC searching' and 'internet searching' activities.

Other projects such as the EnCoRe project at the University of Derby (Keady et al. 2003) tested the possibility of linking directly from within the VLE to full text online materials such as journal articles or book chapters. So instead of the tutor simply 'flagging up' an electronic journal article which the student then had to retrieve through the library catalogue or other service provider, perhaps going through an authentication process to do so, there would be a seamless one click link between a point in the teaching unit in the VLE and the article. The underlying software would carry out the process of searching for the article and authenticating the student. Furthermore, if the student did not have the necessary permission to access the article from within university resources, the software would tell the student where else it could be obtained or bought.

A further facility which this project explored was the feasibility of linking tutors to a digitisation and copyright clearance service. This would enable the tutor, for example, to select a particular chapter in a print-based textbook, and have this converted into digital format for embedding within her VLE at the point of need. Some examples had been found of tutors carrying out this type of activity on an 'ad hoc' basis, and there was concern that this might infringe copyright law. A further problem was tutors paying to have texts digitised with copyright clearance when the University library had already done so. This tool therefore, would both ensure that copyright law was not infringed, and also match what was being requested with what was already available within the institution. It would also make tutors aware of the cost of their 'course packs' of digitised materials. In the event, this facility was not completed within the project timeframe, though it was clear that it was possible to provide this type of service.

Another focus was to test ways in which teaching materials created for use in one e-learning environment could be offered for reuse by others, perhaps using a different VLE platform, by means of the library catalogue. The Talking Systems project at the University of Wales College, Newport (Noyes 2003) for example suggested a scenario where a Computer Science lecturer might observe that her students were struggling with a particular mathematical concept that she was unable to cover during her teaching, and yet which they need to understand in order to complete an assignment. They suggest that she might collate her existing resources on the topic or

put together a list of library resources on the subject. She may suspect though, that her colleagues in the School of Mathematics have an e-learning resource to teach this particular concept, but without a username and password for their VLE she has no access to it. The project went on to explore how the metadata used to describe e-learning resources and library resources could be cross-mapped, so that the library catalogue could be made to present not just the usual library resources, but e-learning objects too. The Computer Science lecturer would be able to search her library catalogue in the usual way and retrieve from it a mathematics tutorial suitable for her students.

The people challenges: accepting change

The impact of technological change upon the working practices of tutors, students and librarians was something that all of the projects had to consider. As another DiVLE project, DEVIL reported "One cannot force systems on to users and expect them to be happy with them." (DEVIL 2003) It became clear, for example, that the annual practice of sending reading lists to the library so that resources could be made available for the start of the academic year would no longer fit with the concept of a resource list that was being constantly updated and revised. There may be a need for the digitisation of key book chapters at any time of the year, for copyright permissions to be obtained for online materials not held by the library, for newly created e-learning resources to be added to the library catalogue.

There was some discussion too of the issue of 'trust' or 'altruism' in the context of whether tutors were in fact willing to share the e-learning resources which they had created. A considerable reluctance was identified to doing this and a real fear surfaced among academics that they might not be recognised as the author of their work. It became clear too that asking tutors to place their learning objects on a library catalogue meant asking them to create the metadata needed to describe the object. The metadata creation process calls for certain skills which are very familiar to librarians but less so to tutors. Projects discovered that they could not assume that tutors were willing to spend time acquiring these skills or creating the metadata, and that when they did so, the metadata was often of insufficient quality. Librarians however, they found, did not always have sufficient understanding of the underpinning pedagogies to describe the learning resource accurately, and so they too were unlikely to create high quality metadata for this new kind of material without the assistance of a subject tutor.

It became clear that there was more to bringing new tools to tutors than simply presenting them with a technological possibility. Full account must be taken of how the tools would impact upon the workload and practice of the individual tutor, and of how the smooth integration of such tools might be affected by different institutional cultures.

Why It Matters

In the foreword to the UK Government's Department for Education and Skills publication 'Towards a Unified e-learning strategy' Charles Clarke, the Education Secretary stated that 'e-learning has the potential to revolutionise the way we teach and how we learn'. He goes on the present a vision of integrated learning opportunities which permeate not only the traditional centres of learning – schools, colleges and universities - but also the workplace, specialist colleges and the home, a vision which includes many learners who currently have difficulty accessing learning opportunities.

Students understand that underpinning resources from the online environment whether provided through their library services or by their tutors, bring with them a stamp of academic quality. So their general expectation is that high quality resources to support their learning will be provided for them, in locations convenient to them, whether online or place-based. They consider this an essential part of the university experience. Clarke however, has laid down the challenge of providing for new kinds of learners, and particularly those studying away from the 'safety' of the traditional environment with its efficient support network. Taking the learning environment to the learner wherever he or she is based means taking the resources to support learning too or providing access to them in some other way. It means taking learning to people who are preoccupied with their work or their home responsibilities as well as their learning, and few learning in the home or workplace will have the luxury of an academic library to visit and the time to go and browse the shelves. Such students in particular will benefit greatly from the kinds of facilities which these tools promise, and that promise is a much closer integration between their online course and all of the core resources which they need to support it as and when they need them.

CONCLUSION

The studies with tutors illustrated that few of the JISC funded resources within the JISC IE had yet made their way into individual modules within an online environment. What was uncovered though, was a great keenness among tutors to integrate a wide range of online resources into their VLEs and much enthusiasm for enhancing their teaching in new and exciting ways. However it also became apparent that this enthusiasm brings with it a need for new skills and new tools if the time-consuming and weighty process of integration is to be facilitated.

Students too like the online environment. They are keen to use digital resources. The internet is one of their preferred sources of information to support their learning, because they like the speed with which search engines can deliver information to them, this despite occasionally being overwhelmed by the sheer volume of material retrieved, or confused about the quality of what they find. It would appear that the ideal situation for the student would be to have resources to support their learning delivered to them online with the speed of a search engine, and the 'quality stamp' of their university library or their tutor's recommendation.

The projects in the DiVLE programme are a first step towards realising the kinds of services needed by the teaching and learning communities if these aims are to be achieved. Most projects produced explorations and prototypes; an opportunity to 'try out' ideas to see what might work and what might prove more difficult. They offered a chance to feed these new possibilities into the teaching and learning communities, and to solicit their reaction. Many of the projects have already had a favourable response from tutors, and indeed some have had expressions of interest from the international community. Others will require further development and refinement if they are to emerge as tools which will be taken up with enthusiasm. Whatever the outcome for the individual projects, this programme has contributed to both a body of technological knowledge and an enhanced understanding among tutors of how the resources they need to support their learners might be better integrated into their networked learning environments.

As government policy drives the expansion of an ever more widely dispersed student body, the need to understand the behaviour patterns of tutors and learners in the online environment and to provide new services to support them will become more pressing. New kinds of demand are already emerging and tools are being developed to address them.

Integrating digital resources into online learning environments challenges both the tutor and the technologist, and further study is needed to understand the needs of tutors and students and how these can best be served. Only by gaining such knowledge can the technologist ensure that the tools being developed meet these needs, and facilitate the integration of digital resources into online learning environments.

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