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Student Use of Electronic Information Services in Further Education

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STUDENT USE OF ELECTRONIC INFORMATION SERVICES IN FURTHER EDUCATION

ABSTRACT

This paper presents a profile of user behaviour in relation to the use of electronic information services (EIS), information skills, and the role of training and wider learning experiences in UK further education colleges. The research was conducted under the JISC User Behavior Monitoring and Evaluation Framework. Work was conducted in two strands, by two project teams, JUSTEIS and JUBILEE. JUSTEIS profiled the use of EIS and assessed the availability of EIS. JUBILEE objectives focussed on understanding the barriers and enablers, with a view to developing success criteria. JUSTEIS used a multi-stage stratified sampling process, and collected data from 270 respondents from 17 departments in the baseline survey (2001/2002). JUBILEE conducted in-depth fieldwork in five institutions and snapshot fieldwork in ten institutions, collecting data from 528 respondents. Information skills and experience develop across work, home and study. There is a growing use of EIS in curriculum, but practice varies between institutions and disciplines. Tutors express concern about student's ability to evaluate and use the information that they find. Assignments can promote EIS use. The main categories of EIS used by students are search engines, and organisational web sites. Search engines are the preferred search tool, and search strategies are basic. Information skills are acquired through a variety of routes, with peer instruction, surfing and personal experience, instruction from tutors, and LIS induction and training all making an important contribution. The solutions to improving students' information skills may include use of the Virtual Training Suites, but librarians need to adopt different roles in promoting and evaluating use of such tools.

KEYWORDS

User behaviour: digital information resources; digital libraries; electronic information services; further education; information literacy

1.INTRODUCTION

1.1 Background

The research described in this article was conducted under the JISC User Behaviour Monitoring and Evaluation Framework, during the third annual cycle of the Framework in 2001/2002. The first two cycles of the Framework focussed largely on the use of electronic information services (EIS) in higher education (HE), and identified a range of barriers and facilitators associated with the development of the use of EIS within disciplines and institutions. During the second cycle (2000/2001) a pilot study in further education (FE) demonstrated that it was possible to develop a parallel methodology to assist in the understanding of the integration of EIS into learning and teaching in further education. It was however evident that developments in further education both in learning resources and ICT had been much more modest and variable than in higher education. It therefore seemed appropriate not just to survey 'what is' but to explore whether research could also intervene and thereby facilitate change, using action research approaches that involved co-operation between researchers and information professionals and lecturers. This led to proposals for two studies in further education during the third cycle of the Framework:

1. a full scale user study of barriers and facilitators to the use of EIS in further education, in parallel with the study in higher education.
2. a modest action research study to investigate the impact and transferability of action research interventions.

This article describes the first of these studies. The study was conducted as two separate but linked projects by the JUSTEIS project team, based at the University of Wales Aberystwyth and the JUBILEE project team based at the University of Northumbria. The aims of the paper are to describe the baseline study, and discuss the implications of the findings for later developments in electronic information provision in further education, including the introduction of managed and virtual learning environments. It was not the intention of the project to focus on the development of managed learning environments or the provision of information literacy programmes, although the survey work, covering general tertiary and specialist colleges, of all sizes, and across a range of locations, inevitably revealed projects in progress and planned. Relevant findings from later cycles in the project support the discussion.

1.2 Further Education Context

On 1 April 2002 the Learning and Skills Council (LSC) formally replaced the Further Education Funding Council and Training and Enterprise Councils. The LSC was made responsible for all post-16 education and training excluding higher education, and that included further education, work-based training, adult and community learning and (from 2002) school sixth forms. It operates through 47 local Learning and Skills Councils (in 2002), and these councils strongly reflect business and commercial interests. The key priorities are to encourage young people to stay on in learning, increase the demand for learning by adults, maximise the contribution of education and training to economic performance and raise standards (DfES, 2002a). The Green Paper stresses the need for a coherent 14-19 phase, that allows greater choice, high quality vocational opportunities, while implementation of the Connexions Service was intended to support young people in the choices they make (DfES, 2002b). For adult learners the priority was to increase learning opportunities, and the mechanisms included use of a full network of UK online centres, and expansion of e-learning. A workforce development strategy was planned.

The British Educational Communications and Technology Agency (Becta), a government funded agency, has a key advisory and development role to play in further education developments in IT. Becta's National Grid for Learning Directorate provides expertise in computing and networking, Web development and technical research, and the Lifelong Learning Directorate supports initiatives in further and higher education. The National Learning Network (NLN), the information and learning technology (ILT) investment programme in further education, is being developed by the Learning and Skills Council (LSC)'s Further Education Information and Learning Technology Committee (FEILT).

Becta played a part in the planning of the NLN and led the programme for the ILT Champions Programme. In a programme which started in Summer 2000, selected members of staff from each further education college were designated to encourage and lead ILT initiatives within each college, and be 'ILT Champions'.

Other initiatives included the Regional Support Centres (funded by JISC) (JISC, 2004). RSC Wales, for example, aims to provide curriculum staff in Wales with the support they need to make the best use of ILT and to develop e-learning. Such centres usually act through the ILT champions in each college, and centre staff make site visits and offer training, as well as providing e-mail discussion lists and help desk support.

In 2001/2002 some higher education institutions were using virtual learning environments, but development in further education was at a very early stage (JISC, 2000). The different organisational and funding structure in further education was likely to affect the way MLE and VLE development progressed, as a later study (Social Informatics Research Unit, 2003) confirmed.

2. METHODOLOGIES

The first two cycles of the Framework activity focussed primarily on user behavior in higher education, through two parallel projects. The JUSTEIS project was a sector wide survey that aimed to profile user behavior, and identify trends. The JUBILEE project aimed to provide a longitudinal understanding of user behaviour and the barriers and facilitators to the effective use of EIS. In the second cycle (2000/2001) both projects pilot tested adaptations of the methodology for further education, and in the third cycle (2001/2002), the methodology was rolled out to a full-scale survey in further education. The objectives of the baseline study in further education were to:

- To examine uptake and use of EIS among academic staff and students (JUSTEIS)
- To provide, through an understanding of the context of use, a basis for the longitudinal tracking of users to determine success criteria for information seeking from the users' points of view (JUBILEE)

JUSTEIS used a multi-stage stratified sampling process with a randomly selected list of FE institutions. On the basis of 17 participating departments, 122 students, 12 academic staff and 2 library staff were interviewed (usually face to face), 2 academic staff and 132 students provided questionnaires, for the study of user behaviour. More of the respondents in JUSTEIS were full-time than part-time, and more were studying for qualifications (over half were studying for BTEC) than would be the case for all further education students.

The JUSTEIS methods used comprised:

- Critical incident interview/questionnaire, with use of a critical success factors technique and vignette (to assess use of EIS, attitudes towards EIS, awareness of EIS and searching strategies among further education students).
- Critical incident interview/questionnaire, with use of a critical success factors technique and vignette (for the interview), plus some additional questions, for academic staff.

- Interviews with other stakeholders to assess awareness and attitudes towards use of EIS in the curriculum, and the status of IT/information skills support.

JUBILEE conducted in-depth fieldwork in 5 institutions, and snapshot fieldwork in 10 institutions. Target disciplines were law, art & design, geography/environmental science and business. 43 questionnaires from LIS staff and academics, 401 from students, plus 65 interviews/focus groups with academic staff and students, and staff in library and information services, together with 19 students providing e-mail interviews, comprised the data gathering activities.

JUBILEE research methods comprised:

- Questionnaires, in paper and e-mail versions, sent to academic, LIS/IT staff, and students, in target disciplines to collect background data on information behaviour, especially in relation to EIS.
- Face-to-face interviews with key informants in disciplines and LIS service personnel at case study sites were supplemented by the use of e-mail and telephone interviews;
- Face-to-face interviews with other academics in target disciplines snowballed by LIS staff and other academics;

In addition 14 themed snapshots were successfully completed by students who volunteered to be interviewed by email or telephone.

Qualitative data for JUSTEIS were entered into a QSR NUD*IST database. Questionnaire responses were coded and entered into SPSS files. JUBILEE analysis collated interview data into pre-identified themes. The results presented in the next section synthesise these findings, in such a way as to present a coherent picture of user behaviour in relation to digital information resources, information skills and the role of training and wider learning experiences in shaping use behaviour.

3. RESULTS

3.1. Purposes of EIS use

Respondents were asked about a recent search for information which had involved use of a computer, and were asked to indicate the reasons for the search. For students the need to complete assignments is the major reason for using EIS, and similarly further education staff

are using EIS to help in the preparation of teaching materials (Table 1). There is some evidence that EIS are used for non-academic, vocational and work-related reasons; this is presumably a reflection of the number of part-time students included in the sample (23.8% of interviewees, 36.4% of questionnaire respondents). For the interviewees, a substantial proportion of EIS use was for leisure, travel and domestic purposes.

Purpose of search (interviews)	Frequency n=136 (students n=122 staff n=14) %	Purpose of search (questionnaire survey) NB more than one purpose possible on questionnaire	Frequency n=130 %
Coursework and assignments (students only)	69	Coursework and assignments	92
Recreational, shopping or travel	18	Recreational, shopping or travel	18
		Work-related duties	6
Teaching support (staff only)	43		
Job search or application	2	Job search or application	5
Other	3	Other	6

Table 1 Purposes of information search using EIS (critical incident)(JUSTEIS)

'I had an assignment to do for my electrical engineering course and uhm..., there was a question about diodes in it and I couldn't get an answer for it so I went onto the Internet because I knew that it would be easy access. I was pretty sure that I would be able to find something to do with the diodes'

'I had to do a presentation a few weeks ago for college and it was a group presentation and we chose to do 'headlice' - interesting. I actually got the website address off a leaflet from the treatment bottle.'

Students considered that using EIS expanded the availability of resources, improved the speed and access of gaining information, enabled them to find useful information and improved the quality of their work:

'It has helped me improve my studies because I have been able to get lots of information to help with assignments'

The majority of students (JUBILEE) found using EIS interesting, enjoyable and thought they learned from it, although nearly 30% found it frustrating. Over half of students (JUBILEE) preferred to download or print out material rather than reading from the screen and less than half said they used EIS more than print. The students also noted some of the negative features of using EIS. These included difficulty finding information, information overload, a lack of confidence, time constraints, and the slowness of the network

3.2 EIS in the Curriculum

Use of EIS in teaching and learning varied among the academics and among the colleges. Some examples of use of EIS in teaching include academics recommending specific web sites to students, the inclusion of relevant web addresses on assignments, the requirement for EIS to be used when completing assignments, and using the Internet to research material for class hand outs.

'We're expected, basically most of our modules, not so much when I did the BTEC but with this one (HND course) you have to do a hell of a lot of research.'

Tutors may tell students about websites during class or post details up on noticeboards.

'The one thing I do benefit from is new websites in magazines and journals and what have you. So, (name) or somebody tell me a website that they've discovered so it's a sort of sharing of relevant websites which I find very useful...I'm introducing that to the students. I've got a notice-board up, have you seen this website.'

Some assignments, such as extended bibliographies specifically require students to produce bibliographies of a certain size, and they expect to use the Internet and other EIS for such purposes.

The introduction of EIS had not affected teaching within some disciplines and some colleges although as more staff become aware of what's available use is likely to increase:

'I don't think EIS is integrated into the curriculum yet to anything like the extent that perhaps it should be. The college makes use of it in some areas but not in anything as many areas as it should be'

One of the academics noted that use of EIS in teaching is subject dependent and can be counterproductive especially if it is used to drive the curriculum:

'I think in some ways it's [IT] inappropriate, and I think in some ways it actually takes students away from what they should be doing...I think IT should be a useful tool for the curriculum to use and teachers and as a department should have that decision devolved to them rather than IT driving the curriculum'

It was noted that it is particularly important at this level to ensure that when students are recommended to use EIS they are directed to relevant sites to ensure they don't waste time. It is also important for students to be guided through their use of electronic resources and encouraged by academic tutors to use the available services:

'It has to be fairly directed otherwise they are just going to go and play'

'I don't think it's a help for the students to send them into a huge library with loads of books and say find something and it's exactly the same with the Internet. You have to say to them "Look, this is the site and this is what you're looking for"

It was generally felt that use of a VLE would help to integrate EIS into the curriculum and focus the staff on a new way to deliver the curriculum. In the case of weaker students staff can be confident they have received reliable information whilst they can set more stretching tasks for the more able students.

3.3 Search Tools Used (Critical incident search)

Most of the searches used search engines, and the organisational websites are important sources of information. Less use was made of specialised services, although gateways are mentioned by the questionnaire respondents. This may be related to the interpretation of the term gateways, which can be viewed as referring to general entry points to lists of various resources, including sites which may have their own search engine. Only one of the interviewees mentioned use of a JISC gateway (SOSIG) for the critical incident. Another student was using the Museum of Modern Art site which provides access to a variety of resources. Use of OPACs was comparatively low. Some journal resources which were previously published as CD-ROMs (e.g. newspapers) are now more commonly available via the Internet. Reference materials have always been quite costly to update for libraries, and students are using EIS for directory, dictionary and reference purposes. Railway timetables and catalogues were cited as sources that they need by several students.

EIS	FE Student interviews n=122 %	FE: questionnaires n = 127 %
Search engines	73	94
Institutional Websites (excluding own HEI)	21	49
E-mail, newsgroups, etc.	1	11
Gateways	2	10
General e-journals	3	9
Web EIS (reference sources, timetables, dictionaries, and shopping etc.)	12	8
OPAC (own HEI)	1	7
Own Web site	0	2
Local EIS(CD-ROMs, etc.)	2	2
Named database, but mode of supply unknown		1
Other EIS categories	3	0

Table 2 EIS used by FE students for the critical incident search (JUSTEIS)

Several of the students interviewed mentioned that they were using the search engines just to locate the Web site of an organisation which would provide the information they required.

'Used the Internet – used odd search engines...Yahoo and Lycos. Typed in like the university and clicked search...just 'university in UK'..it comes up with a list, doesn't it?... You just pick the ones you want. So I picked [name] and that was it.'

Google, Yahoo, Ask Jeeves, and then Lycos, and MSN were the search engines mentioned most frequently in interviews. Initial success with one recommended search engine often leads to continued use of that search engine, just as initial problems deter students from using other types of search engine. Television advertising also works, as does recommendations from friends. Many students did use more than one search engine to locate information.

3.4 Search strategies

Of those interviewed, around half (53) (JUSTEIS) claimed to have modified their search, against 46 who claimed no modifications were made. Habits in searching patterns vary. Some use books to help in choosing appropriate keywords. In a few instances students experimented with combinations of search terms when exploring the topic. Others used a combination of search engines. Some have learnt that different strategies work best in different search engines. Training in more efficient searching makes students aware of other approaches, though they may not necessarily apply what they have learnt.

'It was during the lessons and that...we were searching...I did during the lesson and then after that, not really. I mean I do define my searches a bit better now, but not exactly in the same way as they told us in the lesson,... I can't be bothered to do that! I just type it in.'

It would be unwise to assume that all the younger students are computer literate, as some seem to have slipped through school with minimal IT training.

'Well before I come to college I never had to use them at school because we didn't have, well we had them but didn't use them that much so...Probably the IT lesson is the only time I've started using computers... I probably will still use books and stuff but yeah I think I will use the Internet. [Interviewer: Do your tutors advise you to?]....Yeah. It's easier a lot because we have IT lessons anyway so we can just do it while we're there.'

In some cases they are aware that their searching could be more proficient technically, but what they do suffices for most purposes.

‘Yes basically, it was just a case of actually entering in the right words into the search engine, rather than picking too many words and getting non-relevant information. I mean actually entering questions into the search engine is not a very good idea. Just basically entering the key word, there's obviously ways that you can enter them using speech marks and things like that, that throws up different kinds of data, I'm not 100% sure of all the ways of doing that but I know there are other ways.’

3.5 Awareness of EIS

Students were aware of, and had used a wider variety of EIS than those they opted to use for the critical incident search. Two different methods were used to check on the general awareness of possible sources. As well as asking students whether they used certain EIS regularly or not, students (if interview time permitted) were asked about the approach they would take to solving a particular information problem. The information problem varied according to the subject area.

EIS – use and awareness	FE Interviews n=122 %
Search engines	87
CD-ROM	42
E-reference materials	22
OPAC	18.
Gateways	9
Other HEI, FE websites	5
Bibliographic databases	4
E-books	3
BL, COPAC (Other OPACs)	3
Subject indexes	1

Table 3 EIS used by FE students (JUSTEIS)

Unsurprisingly, search engines topped the list of popular sources, but CD-ROMs came second, indicating possibly that CD-ROM use is focused on particular purposes in the courses. Sometimes CD-ROM use was associated with use of Encarta, often at home to help with course work.

E-reference material included dictionaries, and thesauri, as well as travel and timetable information, and product catalogues. In the digital world classifications of 'format' – e-book or e-journal were blurred to many of the interviewees. For example, journals mean online diaries to some students.

Students browse the Internet for shopping and use catalogues of various products, including electronic products.

The pattern of book usage was more apparent when asking students about the sources they would use to solve an information problem when presented as a vignette. For many of the students the first resort was printed sources, and many would resort to the library and books first. A slightly higher proportion would turn to the Internet first, and a substantial number would only use the Internet (Table 4). The age distribution of the sample might help explain this apparent divide between those preferring to use the Internet and those preferring to use books, although the nature of the problem might also have been a factor.

Search strategy for the vignette problem	Number of students choosing strategy, or source N=122
Internet first	39
Internet ONLY	36
Library and Books first	31
Ask someone (personally)	9
Organisations	4
Intranet	2

Table 4 Search strategies adopted for the vignette (JUSTEIS)

The pattern indicated in the critical incident search of reliance on search engines is confirmed by the search strategies revealed in the vignette, although there is a reliance on books as well. Interestingly, most students might seem to prefer finding out about organisations through their Web site in preference to approaching them direct.

3.7 Students' skills

The majority (nearly two-thirds) (JUBILEE) of student questionnaire respondents were confident users of EIS and found it 'fairly easy' or 'very easy' to find information using EIS. Three-quarters (75%) of the sample (JUBILEE) considered they had intermediate IT skills. Despite this however 17% thought they had beginner IT skills.

It was generally felt that age affected students' ability to use computers. One lecturer described mature students as being fearful about using IT and initially required staff to help them learn how to use the systems:

'The younger students are more comfortable using IT anyway...it is the mature students that it's a bit difficult to come to terms with it and how to be critical'

Differences in student skill level may also be attributed to those with access at home having the opportunity to practice in privacy rather than in a possibly intimidating situation such as the college environment:

'Those who have access even if it's through grandchildren at home are not quite as scared of it as those who haven't got access at home'

While academic staff thought students had the ability to retrieve information using EIS most staff – academic and LRC – thought that students were poor at evaluating sources of information and were uncritical of the information they gathered using EIS:

'You see the work they do and you know they have copied it straight off a CD or website...They haven't even read it properly because they are putting in the wrong examples'

'It's difficult for students to filter out useful information'

'They think everything they see on the Internet is the truth so we have to try and get them away from that'

3.8 Training and Development in EIS use

The students' own experience remains the prime factor in influencing user behaviour in relation to EIS. This experience may have been developed through from work, previous

school experience and home use, as well as training and support provided by the FE institution. Although most of the interviewees were full-time further education students, a substantial minority was part-time and therefore the influence of home and work is to be expected.

The level of reported engagement with formal ICT or information use training is very variable, and students were often vague about the content of LIS induction sessions.

'We were shown where the library was and basically we had one lesson on using it but to be honest with you it's been trial and error more with me.'

Course tutor and LIS/IT induction were both important in developing information skills. Those respondent who were offered a different range of training sources (JUBILEE), also cited support from other students and surfing as important in contributing to the development of their skills in the use of EIS.

Type of training	Students receiving training: Questionnaires n = 127 %
Course tutor	28
LIS/IT induction session	26
LIS/IT specialist session	7
Specialist external consultant	6
Other training	2
No training	42

Table 5 Type of information skills training received by FE students (JUSTEIS)

If IT skills are integrated carefully into the curriculum then the effect may not be obvious to the student, and interviews indicated that Internet research often formed part and parcel of classroom work, with support provided as and when necessary.

'Last one (search) I did was for school work which was last Monday and we had to go on and research into fashions, we had to find images to use for the next lesson. That involved us'

'going into web pages which we'd already...told how, if it's WGSN which is a fashion site which all the big companies use, we were told quick ways to find the information we want...we all went around her (tutor's) main computer...our lessons are an hour and forty five minutes and sometimes we spend over half a lesson just'

Formal IT and information skills training feature in some courses, though some courses may not specifically cover Internet searching.

'We're still doing it at the moment. It's just basic skills on how to use the Internet and word processing, stuff like that...What to go into and how to search, things like that. We get a hour and a half every week...[Interviewer: And this is to show you how to research your subject?]... Yeah, and we have exams in it as well.'

Other colleges provide support on an 'open access' policy – there if required, and personal help provided. Students are appreciative of this approach.

'The IT room here, two or three guys work up there and they're there permanently so if you're ever stuck you just ask them...There's one of them who'll tell you anything about everything. Seems to have swallowed a few books. They're interested '

The role of the ILT champion in FE means that a different approach may be taken to support of IT and information skills. In addition, every full time student takes the IT Key Skills course through which they learn general IT procedures.

'There is a central team of ILT champions. They are support-staff and are not specifically allocated to individual departments... They did start to work on a central library Website but staff preferred to stick to the department-based route... The library site no longer contains the list of resources; it is focused on more general information about the library with photos of the staff, etc.'

LRC's were not offering skills training on a regular basis, since they did not have the staffing base to make this possible. On the other hand, they were providing induction sessions, guides, one to one support, and any sessions requested by academic staff.

Some FE colleges do make specific efforts to provide facilities for the more mature student, and also help students who are part-time to feel comfortable and confident using the library despite just coming one or two days a week into college.

'It's all open access and they have a "mature" area ...you can only go in if you're over 21...it's a nice quiet area...because it's bedlam down the other end where there's loads and loads of computers'

Some of the more advanced short-cuts and techniques may be acquired through hints from friends.

'Uhm, taking graphs as well, I didn't know about... you know the way you can print screen, the alt and print screen, I didn't know about that until a friend showed me. You know, because I was taking it off Acrobat Reader and it wouldn't let me cut and paste just the graph on its own, so I didn't know about that but then I found out about that so I use it now too.'

Although teaching staff are often responsible for introducing students to EIS many academics did not feel sufficiently confident to teach students how to use or evaluate EIS sources. It was also a matter of available time making it more difficult to incorporate this into the curriculum. As computers were not always being available in teaching rooms, academic staff sometimes used EIS to find relevant information for their lessons, but distributed this to students, hence turning the session into a paper based exercise:

'I haven't got a computer...to come down here I'm going lose half of them - small group that they are - between the classroom and here'

Time for developing their own IT skills is a problem for many FE staff, as teaching demands often clash with the skills training sessions offered.

'Periodically they have training events for lots of things like interact whiteboard and internet and computer skills but most of the time it's when you're in class.'

Staff are teaching themselves, and passing on their experience to students.

4. DISCUSSION

The pattern of EIS use observed in the following cycle of JUSTEIS was almost identical. Of the 151 students interviewed, 72% described a search related to coursework, 17% described a search concerned with recreation, shopping or travel. The electronic information services used in their research were predominantly search engines or organisational websites, often known to them. As far as awareness of particular electronic information services there may be greater awareness and use of e-reference resources. A higher proportion of FE students (27% as opposed to 18%) claimed to use the college OPAC in the next cycle. While it might be expected that students would be prompted to think of a college example for the search

described to the interviewer, the influence of experience gained using the Internet at home or at work affected their confidence and feelings of competence.

The evaluation report on the National Learning Network (NLN, 2002) found that ILT champions played an important role, but their success depended on having a supportive culture in the college. Focus groups reported that information and learning technologies could help learning 'by bringing theory to life by researching company websites, online news etc.) (p.11). No figures are given, and the evaluation reports concentrates on potential uses and some of the steps required (such as staff development). The report notes that students mentioned word processing as the main use of ILT, and awareness of the use of CD-ROMs very limited. No other use of electronic information services or the Internet is mentioned.

The JUSTEIS findings in the baseline survey (2001/02) and the following academic year (2002/03) confirm that use of specialised resources is limited. One reason is that resources for FE colleges usually have to be spread thinly across a large number of students. Libraries are expected to supply set texts, and there have been few generalist collections of use to FE tutors and students, although JISC's deal on Infotrac was expected to be popular (Eales, 2002). FE students make little use of OPACs, as many prefer to browse the shelves. They usually know where their subject books are, and browsing seems faster. Comparison of habitual information seeking routines, in the baseline and the following year, suggests that an initial rapid rise in the use of the Internet is slowing, as students are turning to other resources, such as their course books, as well – the Internet is not now viewed as the sole answer to all information problems. In 2002/2003, 42% (63/151) of the students interviewed would use the Internet first, compared to 32% (39/122) in 2001/02. However, only 11% of FE students interviewed in 2002/03 would only use the Internet to solve a routine study problem, compared to 25% in 2001/02. A study (Stacey, Stacey & Chapman, 2003) using remote observation software to analyse students' Internet searching routines, found, for the 1300 queries studied, that students' searching strategies were simple, with negligible use of Boolean operators, and around a third of searches included incorrectly spelled words. Some of the problems may be less severe than indicated, as JUSTEIS findings illustrate how Internet searching is often a guided classroom activity and it is possible that the basic problems with unsuccessful searches will be resolved in the classroom.

One difficulty for many students is the gap between Key Skills in IT stage 2 and 3. For stage 2 the emphasis is on technical aspects of IT use and Internet searching, but searching the Internet effectively is not covered. Evaluation of information retrieved is not covered until Key Skills stage 3, unless tutors specifically encourage this. The influence of the tutor is more

pervasive than the questionnaire results on information skills training suggest, as the interviews revealed that class activities often provided the opportunity for informal help in searching. Such subtle integration of information skills into the curriculum could be the most effective route, but it is much harder to track and measure than counting, for example, the number of college learning resource centres with online study skills resources incorporated into the VLE. JUBILEE's toolkit aims to assess the integration of electronic information service use into learning and teaching.

The baseline study indicated that staff development was critical to further development of managed learning environments and virtual learning environments. Teaching staff would need to be supported in their own use of ICT, and the next cycle (2002/2003) indicated that such staff development was happening, or about to happen. The second phase of the National Learning Network (NLN) evaluation (SHU, 2004) uses a case study approach to track the changes in attitudes to learning, and organisation of learning in FE colleges. Predicting the future of the library service is a little more difficult. Case studies posted on the Ferl site (Becta, 2004) suggest that librarians may move into learning technology support – e-learning advisors. College librarians, particularly in the smaller colleges, did not have the staffing complement to support information skills training in the same way as higher education has traditionally done. In some ways this can be an advantage as there is no legacy system to get in the way of planning. In other respects it is a disadvantage as the library can be totally sidelined if the emphasis in VLE development is on 'learning support' and the emphasis in staff development on teaching staff only. Emphasis has been placed on the technical aspects of VLE and MLE integration, for example, in the research on interoperability pilots in further education colleges (JISC, 2003). Although staff development needs are highlighted, traditional roles of librarian, and teacher, and IT support have to change to meet the needs of the 'flexible colleges' (FEU, 1991), in meeting the 'anytime, anywhere' ethos of learning.

Recent research in developing information literacy in higher and further education has focused on providing cost-effective solutions to information skills support, through development of computer aided learning packages, such as the Resource Discovery Network's Virtual Training Suites (<http://www.vts.rdn.ac.uk>). The evaluation of the INFORMS project (Anderson, 2003) indicated that library staff welcomed the opportunity to develop subject-specific tutorials, and that academic staff in some departments could see the benefits. The impact on students' use of information sources was mixed, although students' Internet searching skills improved, and their awareness of some information sources increased. For the further education sector, the more centralised approach to

support through the Virtual Training Suites (VTS) may be more feasible for many FE libraries, as they are not usually resourced to carry out this type of development individually. There are reservations, however, as an evaluation comparing courseware based user education with traditional personal contact teaching (Joint, 2003) showed that traditional face to face teaching was preferred by undergraduates. Perceived learning outcomes were greater with traditional teaching than with mediated courseware, although most students thought they achieved a minimum level of information skills with the courseware. The study did not, however, investigate information literacy packages that were integrated into the curriculum, and it is possible that information skills tutorials of the VTS variety may be successful for the majority of FE students if the package seems relevant to their student learning needs. If any adaptation of the package is the responsibility of the teaching staff, then the role of the FE librarian may be to help teaching staff on how such adaptation could be achieved, and assist in evaluation and refinement of the VTS packages.

5. CONCLUSION

The research for the Framework was a significant study of information use across further education in the United Kingdom, to build a profile of the key aspects of that use and to offer some pointers for the development of effective information use. The baseline study found that, despite a much later start in ICT networking in further education colleges than in higher education, further education students were using the Internet with a degree of confidence for their studies. Their confidence also came from general Internet use at home and at work. Teaching students the use of more specialised electronic resources, and how to evaluate the information retrieved, needs to build on everyday Internet use. The danger indicated in the baseline study that a Google search engine search would be seen as the sole answer to all information queries is tempered by the finding in the next year that students viewed the Internet as a resource, not the only resource. Further education students need to navigate organisational web sites successfully, as well as using some of the more specialised resources.

Staff development is key to successful implementation of electronic information services, both for teaching staff and those in learning support and library services. There are various models of e-learning support in the further education sector, but more research is necessary to delineate which models, and skill-sets are most cost-effective for particular situations. Some lessons from information literacy research in higher education can be transferred to further education but the situation is very different with the general FE colleges supporting a wide range of courses, which may change from year to year. This means that centralised

support, through the provision of Virtual Training Suites, should be cost-effective, allowing college library services to select the packages that need to be promoted to teaching staff. There is a developing role for FE college library staff in evaluating the effectiveness of VTS packages, as well as the role for some in developing the packages initially. This type of research requires in-depth case studies and qualitative research to investigate the learning outcomes of students, and identify any groups of students with particular needs for support.

Library services have tended to focus on survey questionnaires and quantitative methods of assessing user satisfaction with services. With the changing role of the library in promoting and supporting e-learning, greater emphasis on action research and qualitative research is necessary as roles and services develop in new and different ways.

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