

Developing Librarians as Teachers: A Study of Their Pedagogical Knowledge

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ABSTRACT

The widespread involvement of librarians in information literacy education has raised concerns about their development as teachers, but there is little research on their acquisition and application of pedagogical knowledge. A questionnaire was used to collect mainly quantitative data about the teaching roles, pedagogical knowledge and professional development of subject librarians in 82 UK higher education institutions. Two expert interviews and a literature review informed the design and contextualised the findings. The survey showed postholders were engaged in a variety of teaching-related activities, regarded as central to their work. Contrary to assumptions, most felt confident about teaching and thought their knowledge sufficient, giving examples of pedagogical theory gained via courses informing their teaching practice. Although on-the-job development was common, the majority had undertaken a short course and/or extended programme. Respondents favoured incorporating a teaching module into initial professional education and providing tailored programmes for librarians with substantial teaching roles.

KEYWORDS: academic libraries; pedagogy; professional education; subject librarians; teacher training; university libraries.

INTRODUCTION

The teaching role of academic librarians has expanded and diversified over the past two decades in tandem with socio-demographic, technological, economic and political developments that have transformed higher education (HE) globally. Key features of the contemporary HE landscape include a renewed focus on skills development for graduate employability; the recognised need for continuing professional development (CPD) and lifelong learning to match changing employment patterns; massive expansion of the sector, with larger numbers of students and entrants from non-traditional social groups; technological transformation of institutional infrastructure, manifested particularly in the shift from print to digital resources and from physical to digital delivery of information and learning; and moves towards independent student-centred resource-based learning, with obvious implications for libraries as learning (resource) centres (Abson, 2003; Brophy, 2005).

Such developments have resulted in a blurring of boundaries between previously distinct institutional activities and convergence of the operations and responsibilities of computing/information technology, library and learning support services, giving rise to notions of 'converged services', 'hybrid libraries', 'hybrid librarians' and 'blended librarians' (Abson, 2003; Bell and Shank, 2004; Brophy, 2005; Feetham, 2006). The concept of convergence extends beyond merged services to changed understandings of the contribution of libraries and librarians in facilitating learning, particularly in showing students how to navigate the electronic information environment, leading to discussion of the 'academic convergence' (JFC, 1993) and 'academic integration' (Heery and Morgan, 1996) of libraries and depictions of librarians as information literacy (IL) educators and teachers (Bundy, 2001; Duskatsch, 2003).

Despite widespread acknowledgement in professional literature of the importance of the teaching role of librarians (e.g. Bell and Shank, 2004; Biddiscombe, 2001; Bundy, 2001; Duskatsch, 2003; Hepworth, 2000; Lupton, 2002; Peacock, 2001; Powis, 2004), there has been little empirical research into their pedagogical knowledge, its development and application, particularly in the UK. There have been some studies of the education, training and development of librarians as teachers in the US: Albrecht and Baron's (2002) multi-method survey of IL librarians, instructional job advertisements and professional education programmes is a recent example and Walter (2006) cites other work dating back to the 1980s. However, the UK lacks comparable research in this area: recent studies either cover the whole of the subject librarian role (e.g. Hardy and Corral, 2007) and thus lack the required focus or offer an expert perspective (e.g. Powis, 2004) rather than gathering experiences and opinions from practitioners.

Against this backdrop, the present study aimed to investigate existing and required levels of pedagogical knowledge among UK subject librarians, their approaches to developing such knowledge and its contribution to their professional practice. The term 'subject librarian' is used here as a convenient label for 'library-based professional-level posts with designated responsibility for meeting the needs of staff and students in [identified] disciplinary areas' (Hardy and Corral, 2007:80), irrespective of postholders' job titles. Alternative titles used in the UK often substitute 'information' or 'liaison' for 'subject', while 'reference librarian' is more common in the US (Hardy and Corral, 2007).

Conducted as a Masters research project, mainly over a three-month period, the study was necessarily small-scale, but nevertheless sought to cover institutions across the whole of UK HE, in an effort to survey the situation nationwide. Its specific objectives were to:

- determine the extent and nature of teaching undertaken by participating librarians;
- identify the level of pedagogical knowledge possessed and development undertaken;
- establish whether participants felt they had adequate knowledge to fulfil their roles;
- explore the impact of their pedagogical knowledge on their teaching practices;
- gather opinions on potential needs and opportunities for CPD in this area.

Around the time when plans were being finalised, a parallel survey of UK teaching librarians covering similar areas was announced, but further investigation indicated that although targeting a larger sample, its scope was more limited, aiming to profile teaching activities of librarians and to determine how they were developing their skills (Conroy, 2007-2008). It therefore lacked the distinctive focus of the present study on the type, level and use of pedagogical knowledge, but subsequently provided useful data against which our results could be compared.

The next section of the paper provides a selective review of literature on themes relevant to the study. Subsequent sections describe the methodology adopted, analyse the results obtained and discuss them in relation to the literature, concluding with a review of the findings and suggestions for further research. This paper is based on an unpublished dissertation, which provides further details of the study, including the research instruments and data collected (Cox, 2007).

LITERATURE REVIEW

Subject librarian roles

Feather and Sturges (2003:624) describe the subject librarian as 'a librarian with special knowledge of, and responsibility for, a particular subject or subjects', but this definition fails to reflect the strong user/customer focus that pervades current literature and has inspired alternative titles for the role, such as information consultant (Donham and Green, 2004;

Frank et al., 2001), liaison librarian (Hardy and Corrall, 2007; Pinfield, 2001) and learning advisor (Biddiscombe, 2002; Pinfield, 2001).

The literature on subject librarianship covers five decades and has been reviewed extensively (e.g. Gaston, 2001; Feetham, 2006). A recurring theme since the 1990s is the changing nature of the role, which has evolved in response to changes in the wider environment. The Fielden report (JFC, 1993) forecast significant role development, highlighting the librarian's changing role in learner support, defined as 'the activities within library/information services that exist to support individual learners'. Fielden forecast closer working with academic colleagues, including some convergence of roles as librarians became more involved in educational and tutorial activities, depicted in a useful grid model, enabling librarians to measure their progress in this direction (Abson, 2003). Subsequent literature has emphasised the training and teaching activities of such librarians: Hepworth (2000) notes increasing involvement in training students; Pinfield (2001) similarly mentions greater emphasis on information skills training; Biddiscombe (2002:231) comments that many have 'heavy teaching loads', while Doskatsch (2003:111) identifies 'a shift in emphasis from that of librarians who teach to librarians as teachers (and learning facilitators)' and Hardy and Corrall (2007) report development of IL support for both students and staff.

Developments in information and communication technologies have had a substantial impact here, affecting both the information resources provided by libraries and the way in which services and support are delivered. Key trends include the shift from print to electronic resources and growing use of virtual learning environments (VLEs), giving librarians opportunities to promote their technological abilities to academic staff and reposition themselves as key players in e-learning developments, directly supporting both students and staff (Biddiscombe, 2002; Cipkin, 2002).

Information literacy developments

The Chartered Institute of Library and Information Professionals (CILIP) defines IL as 'knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner' (Armstrong et al., 2005:24). Professional interest in information literacy can be traced back over several decades, although earlier writers used different terms, such as bibliographic or library instruction and user education (ACRL, 1977; Lester, 1979). Alternative terms with similar scope used more recently include information competence and information skills, as well as other forms of literacy, such as digital literacy and media literacy (Bawden, 2001; Clay et al., 2000; Webb and Powis, 2004; Williams, 2006).

In addition to variant definitions and terminology, academics and practitioners around the world have articulated different frameworks and models to support IL development, notable examples including Bruce's (1997) 'seven faces' model, the Society of College, National and University Libraries (SCONUL, 1999) 'seven pillars' and the Association of College and Research Library's (ACRL, 2000) competency standards. IL models and frameworks have been used to promote the concept in HE and to stimulate discussion about its integration in the academic curriculum. The desirability of embedding IL in discipline-based courses is a central theme of the literature, discussed by both academics (e.g. Hepworth, 2000; Johnston and Webber, 2003) and practitioners (e.g. Lindstrom and Shonrock, 2006; Stubbings and Franklin, 2006). A related and pertinent issue here concerns who should teach information skills: although Lester (1979), Peele (1984) and Asher (2003) have argued that teaching should be left to academics, others such as Webb and Powis (2004) suggest this debate is somewhat redundant, given the large number of librarians actually teaching IL and likely to continue doing so. Another current concern is the use of web-based

tutorials and VLEs or course management systems to deliver IL education (Getty et al., 2000; Shank and Dewald, 2003; Stubbings and Brine, 2003).

Teaching and learning

The educational literature offers a spectrum of definitions for the term 'pedagogy'. Zukas and Malcolm (2002:215) interpret the concept broadly as 'a critical understanding of the social, policy and institutional context, as well as a critical approach to the content and process of the educational/training transaction', but the focus is usually more specifically on the teacher and his/her styles or strategies of instruction, exemplified by Simon's (1999:39) definition 'the science of teaching' (taken from the *Oxford English Dictionary*).

The HE literature notes a recent move away from traditional lecture-based models of teaching towards more student-centred approaches, using methods which 'foster critical thinking and reflective skills' (Andretta, 2005:60), a shift nicely captured in the memorable title of King's (1993) frequently-cited article, 'From sage on the stage to guide on the side'. Prosser and Trigwell (1999) discuss how teaching styles impact significantly on student learning, arguing that when teachers focus on their students rather than on themselves, students are more likely to engage in deep learning. Webb and Powis (2004:4) describe teaching as 'the process of when a teacher shapes a learning experience for an individual or group' reflecting this changed focus in the IL context.

Jarvis et al. (1998) identify several theories illuminating how people learn. Kolb's (1984) experiential learning theory is a widely-used model, which suggests that learning is a cyclical process, with ideas formed and re-formed through a continuous spiral of concrete experience, reflective observation, abstract conceptualisation and active experimentation. Webb and Powis (2004) note the use of this approach with adult learners and its potential to create reflective learners who can solve problems has particular relevance for graduate employability. Constructivism, strongly promoted in the UK by Biggs (2003), similarly emphasises learners using reflection on experiences to construct their own understandings, seeing learners as active participants in creating their own meaning, thus supporting independent learning. Levy (2005:29) identifies constructivism as an appropriate basis for 'the principled development of information specialists' educational practice'.

While many authors emphasise the importance of librarians' educational role and their need for pedagogical understanding, few discuss this in detail. Levy (2005) explains that putting pedagogical principles into practice involves moving from broad assumptions and understandings to applying design and facilitation strategies that fit the needs and circumstances of specific contexts. Webb and Powis (2004) discuss ways of doing this, advising a mixture of approaches to appeal to students with different learning styles, also advocating clarification of a rationale for the learning and provision of feedback. In common with Lupton (2002) and Peacock (2001), they argue the need to design learning environments that encourage deep learning, rather than the surface learning typically associated with skills training, reinforcing the shift in librarians' role from trainer to educator. However, Kilcullen (1998) sees value in both approaches, asserting the need to integrate tool-based and concept-based instruction to develop transferable competencies and create lifelong learners.

Professional development needs

Commentators increasingly highlight the importance of pedagogical knowledge and skills to the modern subject librarian (e.g. Bell and Shank, 2004; Biddiscombe, 2002; Powis, 2004). Heery and Morgan (1996) argue that the knowledge and skills required to formulate and deliver effective teaching and learning experiences should have an essential, rather than desirable, place in the librarian's portfolio. McNamara and Core (1998:5) go further, asserting that to participate fully in providing quality learning environments for students,

librarians ‘must become trained and qualified educationists as much as their academic colleagues’, a point echoed by Biddiscombe (2002). Brophy (2005:20) agrees that librarians need to be ‘pedagogically aware and to design services to meet the whole learning environment’, while Hepworth (2000) argues that they need to understand how people learn, echoed by Bundy (2001:4), who asserts that they need to become ‘conversant...with pedagogical concepts, issues and how people learn’ during their initial professional education. Markless (2004) reinforces this emphasis, arguing the need to focus on insights into learning, rather than teaching techniques, but Kilcullen (1998) sees both as essential.

Peacock (2001) explains that librarians now need a multi-faceted understanding of education and training, with teaching skills clustered in three main areas (relating to design, delivery and evaluation of teaching and learning), but notes these are only part of the skillset needed to function successfully as an educational professional, which also requires strategic skills, content knowledge and technological competence. Powis (2004) also emphasises the importance of technology-related abilities in the contemporary environment, seeing the skills and knowledge required to develop online learning as essential for librarians who want to extend their teaching roles amid the growing popularity of e-learning. Bell and Shank (2004:374) introduce the term ‘blended librarian’ to describe professionals who ‘combine the traditional skill set of librarianship with the information technologist’s hardware/software skills, and the instructional or educational designer’s ability to apply technology appropriately in the teaching-learning process’.

There are evident shortcomings in meeting the needs identified, with on-the-job learning, supplemented by conferences, peer support and personal reading, reported as the predominant method (Albrecht and Baron, 2002; Kilcullen, 1998), though Walter’s (2006) review of ‘instructional improvement’ initiatives in US academic libraries notes widespread use of in-house and external workshops, along with teaching meetings and retreats, identifying orientation and mentoring of new entrants as the area needing additional work. McNamara and Core (1998) outline how the UK EduLib programme championed the development of pedagogical skills and understanding for 250 librarians through a series of workshops in 1996-1999, intending that training would then be cascaded institutionally; Peacock (2001) outlines how one Australian institution adapted the programme to provide mandatory training for librarians, recommending this as a model.

Peacock (2000:3) also notes that ‘few graduate librarianship courses provide the requisite basics’. Walter (2006) observes that teacher training is still a minor part of the US professional curriculum, though Albrecht and Baron (2002) found some schools were offering pedagogy electives and providing coverage in other modules, such as reference courses. Dale et al. (2006:28) assert that no CILIP-accredited library/information studies programmes cover learning and teaching, though short courses are offered by CILIP, Aslib and other professional organisations, such as the HeLIN network of health libraries (Palmer, 1996). In addition, some librarians take credit-bearing courses within their own institutions alongside lecturers (Smart, 2005), though others are excluded from such programmes and only offered modified versions (Stubbings and Franklin, 2006).

RESEARCH METHODOLOGY

The investigation adopted a primarily quantitative approach, using a questionnaire survey, administered online to a sample of subject librarians drawn from the 191 HE institutions listed on the UK Higher Education and Research Opportunities (HERO) website. Two electronically-mediated interviews with expert practitioners and a review of related literature were used to inform the questionnaire design and contextualise the survey findings.

This approach was chosen as appropriate for a relatively small-scale real-world investigation, offering the possibility of using statistical methods to make inferences from a

substantial sample. A questionnaire survey was selected as particularly suitable for gathering information and opinions in a standardised format from a geographically dispersed population within a limited timeframe, enabling data to be collected from a much larger number of participants than would have been possible through interviews. Evidence from previous research, practitioner literature and email lists indicated interest in the topic and a climate likely to yield considered and honest answers, but also highlighted the many demands on librarians' time, suggesting they would prefer to respond to an online questionnaire at a time convenient to them, rather than schedule a telephone or face-to-face interview.

Two research interviews were conducted and evaluated qualitatively to feed into the questionnaire design and provide additional validity to the study. Leading practitioners in the field were identified through the literature and approached by email. Email interviews were chosen for pragmatic reasons, to save time in the limited project schedule. This medium has drawbacks as it demands more time of respondents, questions must be self-explanatory and answers cannot be probed directly, but offers participants flexibility and more time to consider their responses. The interviews served to strengthen investigator knowledge of the area and also helped to scope the research topic effectively, as well as identifying particular ways of framing and phrasing questions.

The questionnaire contained 35 questions covering participants' employment details, teaching activities, knowledge and skills, professional development methods and opinions on these and other areas. Questions were deliberately simple, mostly closed with pre-determined answers to facilitate completion and analysis. The design used mainly multiple-choice tick-box questions of varying types (selected, specified, ranked and scaled) to maintain interest, but also incorporated a qualitative element with a few open questions and some comment boxes for both factual content and opinions. It was piloted thoroughly, before and after input to the Survey Monkey tool, then distributed via email to the sample population with a covering message explaining the purpose and nature of the study.

The sample comprised one subject librarian (or equivalent postholder) from each UK HE institution offering a web-based listing of such librarians ($n=137$). Participants were selected using a pragmatic procedure designed to achieve a spread of subject responsibilities, by taking names systematically from different positions on the lists (first, second, third, etc). Survey Monkey allowed personalisation of emails and automatic identification of non-respondents for transmission of reminder messages. Responses were received from 82 recipients (60%).

Questionnaire data were analysed and results cross-tabulated using statistical software (SPSS) and selected tests (Chi-square and Kolmogorov-Smirnov) performed to check whether identified differences between respondent groups were significant. Interview data were analysed using open coding to identify concepts and themes facilitating comparison with the literature. Open-ended questionnaire responses were similarly analysed into categories, using spreadsheet software (Excel) to sort frequently recurring topics and identify themes.

RESULTS

Sample characteristics

The 82 respondents included a spread of institutional types, professional experience, job titles and subject responsibilities, but with slightly higher representation of 'old' (pre-1992) universities, experienced staff and humanities disciplines. The vast majority (71 = 87%) worked full-time. Table 1 summarises key characteristics, which were used as cross-tabulation groups in analysis, but combining some time-in-post categories to form three main groups: up to 3 years (15 respondents = 18%), 4 to 10 years (36 = 44%) and more than 10 years (31 = 38%). Where percentages are given in the following analysis, these are calculated

with reference to the total sample ($n=82$) irrespective of the number of respondents who answered the particular question.

	Number of respondents	% of respondents
Time in post		
10+ years	31	38
8-10 years	18	22
4-7 years	18	22
1-3 years	13	16
New entrant	2	2
Type of institution		
Pre-1992	48	59
Post-1992	32	39
Don't know	2	2

Respondents recorded a variety of job titles, conforming to patterns identified in the literature, namely variants of Subject Librarian (24 instances, including examples where the subject name was added to Librarian), Liaison Librarian (12 instances, including several prefaced with Academic) and Information Librarian (11 instances). Only 4 had an explicit learning, teaching or tutoring focus (e.g. Learning Advisor). Fourteen had generic titles (e.g. Assistant Librarian) and some had titles reflecting other specialist roles (e.g. Systems Librarian).

Figure 1 shows numbers of respondents supporting different disciplinary fields: responses were assigned to four broad subject areas, with the cross-discipline category used where responsibilities covered more than one subject area.

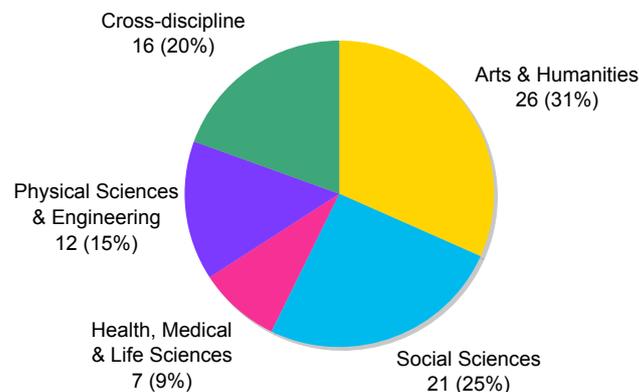


Figure 1. Disciplinary spread

Teaching activities

Responses indicated significant variation in the hours per week spent preparing and delivering IL teaching (formally or informally), ranging from 0 to 25 for full-time and 0 to 12 hours for part-time staff, with the average (mean) calculated as 7 and 4 hours respectively. Eleven respondents (one-fifth of the full-time staff answering this question) spent 40% or more of their time teaching. However, these figures can only be used as a rough guide as the standard deviation in the sample was high (5.71) and several respondents commented on their

difficulty in providing this information, because of workload variations over the year and other factors.

A sharper picture emerges on the types of teaching activity undertaken. Table 3 shows each task specified was performed by a high proportion (at least 79%) of the sample. Six respondents mentioned preparing material for VLEs among other tasks undertaken. (Three participants did not answer this question.)

Tasks performed	Number of respondents	% of total sample
Providing on-the-spot support	77	94
Writing guides/training materials	76	93
Teaching small groups	75	91
Giving pre-arranged one-to-one instruction	74	90
Teaching large groups	65	79
Other	12	15

In contrast, very few respondents reported involvement in assessing the IL skills of their students, with almost two-thirds of the sample (53 = 65%) stating that they were not involved in any form of assessment. Responses indicated that 12 participants (15%) were involved in providing formative feedback, 9 (11%) in assessment for diagnostic purposes and 7 (9%) in formal unit assessment. However, the numerical data on types of assessment undertaken probably give an incomplete picture, as an error in the technical set-up of this question prevented respondents from selecting more than one option (despite text stating 'Please select all that apply'). Twenty-five respondents (30%) provided comments on the nature of their assessment activities. Examples included post-session questionnaires, pre-session audits or quizzes and assessments administered via VLEs, as well as various types of practical and formal assignments.

Pedagogical development

Table 4 shows that more than half the sample had attended short courses and almost a third had undertaken an extended education or training programme to develop their teaching knowledge and skills, but the predominant approach was less formal, namely on the job or via trial and error, although only 2 respondents ticked the last as their only method. Other methods or experiences identified as contributing to pedagogical development included peer observation or shadowing colleagues (8 responses), personal reading or research and various types of public performance (e.g. acting, music and public speaking). Many respondents had also participated in conferences, working parties, peer support groups and committees relevant to their development in this area, with more than half the sample (46 = 56%) reporting conference participation and only 15 (18%) recording no activity of this type.

Methods used	Number of respondents	% of total sample
On-the-job development	62	76
Trial and error	50	61
Short course (1-2 days)	44	54
Extended programme (several weeks)	24	29
Other	16	20

Responses on types of short courses and extended programmes attended showed a varied mix of titles and providers. There were inconsistencies in the way participants interpreted the terms used (e.g. CILIP, City & Guilds and EduLib featured in both categories) and in the specificity of their answers, making it difficult to quantify the situation in a meaningful way. Short courses recorded included 7 with a focus on presentation/training skills and 3 specifically concerned with IL, as well as those concentrating on teaching skills; interestingly, one respondent listed a postgraduate diploma in librarianship as an example of an extended programme in this area. CILIP and EduLib were the most frequently named providers, with 6 responses each; Netskills was another provider identified. Short courses included a high proportion of in-house provision (15 responses) and extended programmes were predominantly university-run (13 responses), though not necessarily by the respondent's own institution.

Fifteen respondents had gained formal qualifications from their programme, a postgraduate certificate being the most common example (7 responses), others including BTEC, City & Guilds and masters-level qualifications. In addition, 17 respondents (21%) had gained membership of the HE Academy, 15 at Fellowship level. When asked whether they were considering gaining a formal qualification, 6 ticked 'Yes' and 20 ticked 'Maybe'. Cross-tabulation of responses showed those with the least experience were most likely and those with the most experience least likely to answer positively here.

Knowledge transfer

Respondents were asked to state the three most valuable things they had learned from their education or training, irrespective of whether it was credit-bearing. Fifty-three participants responded, some at length, with a few offering more than three points. Responses were separated and categorised to identify common themes. Table 4 shows the most frequently recurring points.

Knowledge gained	Number of respondents
Awareness of different learning styles and abilities	37
Use of different techniques and methods of delivery	29
Contribution of preparation and planning	27
Need to embed in curriculum/make delivery timely	16
Importance of communication	15
Need to make session interesting and varied	14
Adopting an interactive/participative approach	11
Importance of feedback, evaluation and reflection	11

Participants were then asked what teaching practices they had developed from their knowledge of teaching and learning theories. Thirty-nine responded, with around a third offering more than one example and one commenting 'Lots – far too many to put in this box!' Interestingly, three answered 'N/A' or 'None' here, with one of these commenting 'I'm more interested in practical tips and examples than theory'. Another questioned the applicability of such theories in a situation where a 'one-off short presentation' was the norm.

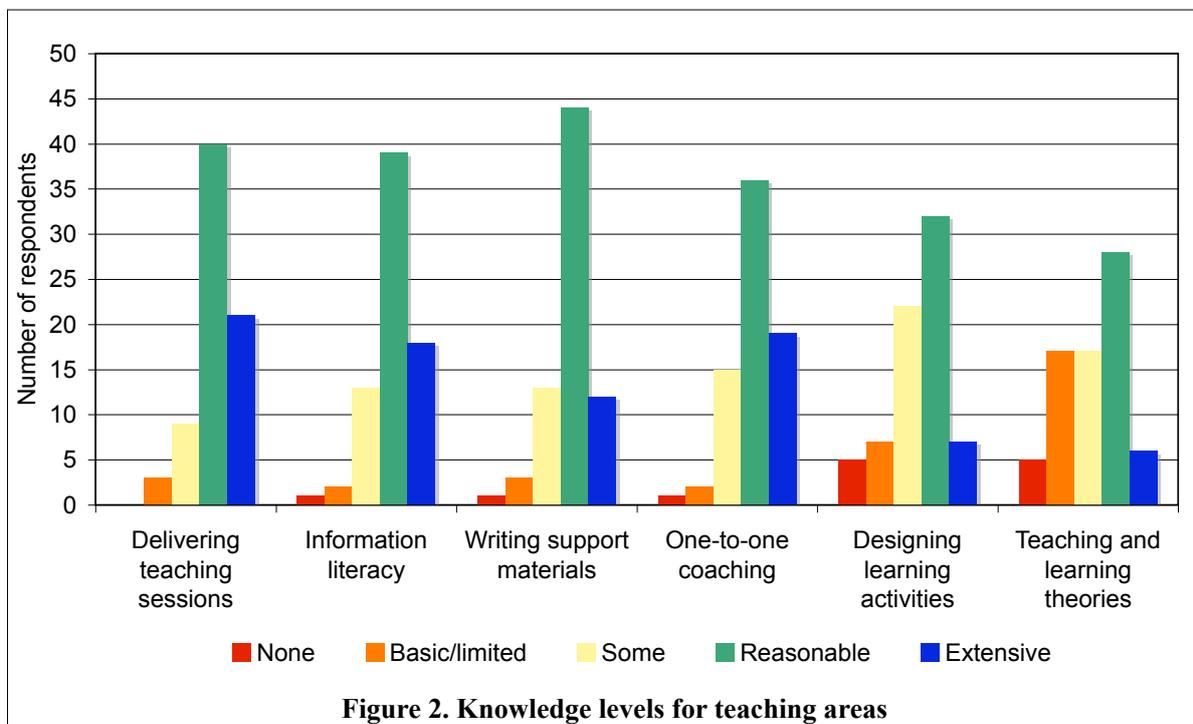
The positive answers resonated with responses to the previous question about learning gained, with 10 references to varied sessions and 8 comments on learning styles. Some mentioned particular concepts (e.g. active learning, resource-based learning, enquiry-based learning, scaffolding) and two mentioned specific influences, namely Kolb's model (cited earlier) and Mortiboys's (2005) book, *Teaching with Emotional Intelligence*.

Practitioner opinions

Respondents were asked how important teaching knowledge was for subject librarians, whether they felt they had sufficient knowledge to fulfil their role, how confident they felt about delivering teaching sessions and whether they thought taking a course would increase their confidence. Seventy-four responses were received to each of these questions. Only 3 respondents thought teaching knowledge was ‘not important’, although opinion was fairly evenly divided as to whether it was ‘important’ (37) or ‘very important’ (34). The vast majority (53 respondents) felt they had sufficient knowledge for their role, with only 9 answering negatively and 12 unsure. Cross-tabulation found that more experienced respondents and those in post-1992 institutions were more likely to answer positively here. The same number (53) felt ‘confident’ in delivering teaching sessions, with 16 ‘very confident’ and only 5 ‘not confident’.

Opinions varied on whether taking a course would increase confidence, with 33 answering ‘Yes’, 27 ‘Maybe’, 12 ‘No’ and 3 ‘Don’t know’. Cross-tabulation again revealed higher proportions of positive answers from participants with least experience. (These figures need to be seen in the context of the numbers that had already taken such courses.)

Participants were then asked about their knowledge of particular areas relevant to their teaching roles. Figure 2 shows that ‘reasonable’ or ‘extensive’ levels of knowledge were recorded by at least three-quarters of respondents here for four of the six areas specified, with ‘delivering teaching sessions’ as the area with the highest overall level of knowledge recorded, but much lower levels of knowledge reported for ‘designing learning activities’ and ‘teaching and learning theories’. Cross-tabulation against responses on formal development undertaken indicated that respondents who had taken a short course or extended programme had much higher levels of knowledge of these two areas and statistical testing (using the Kolmogorov-Smirnov test) found a 97.4% chance that participation in formal development of this type has a significant impact on knowledge levels for designing learning activities and a 100% chance that it impacts significantly on knowledge of teaching and learning theories.



Participants were also asked to identify which two of these knowledge areas were most important for subject librarians. Table 5 shows a broad correspondence between perceived levels of importance and claimed levels of knowledge.

Knowledge areas	Number of respondents
Delivering teaching sessions	46
Information literacy	32
Writing support materials	18
Designing learning activities	16
One-to-one coaching	13
Teaching and learning theories	7

In addition, they were invited to identify other areas of knowledge needed to fulfil their IL teaching role effectively. The 36 responses here covered a wide range of topics, with the most frequently mentioned areas being subject knowledge (8 responses, often coupled with knowledge of information resources in the field) and knowledge of e-learning/new technologies (7 responses).

Views were sought on the best way of developing the knowledge and skills required to be an effective teacher, offering the participants four options. Opinion was split here, with 30 respondents preferring a formal education programme, 21 favouring on-the-job development, 16 opting for a short course and 4 offering other suggestions, typically combining the specified options, e.g.

‘a mixture of a formal education programme to gain theories, but on the job development is also essential’

‘all of the above solutions will apply to different people at different times and I think that Library School courses should have modules relating to this area so we come into the profession already equipped with the basics’.

Views on formal education were explored further, asking respondents to choose between different types of specialist provision in a library/information studies context or to specify an alternative approach. Table 6 shows strong support for incorporating pedagogical knowledge and skills as a core module in the professional education curriculum.

Programme options	Number of respondents
Core module within LIS programme	16
Designated pathway/set of modules within LIS programme	11
Whole programme aimed at preparing LIS professionals for teaching	9
Elective module within LIS programme	3
Other	3

Responses recorded under ‘other’ also supported this approach, but used the comments box either to elaborate their preference or to avoid choosing just one option, e.g.

‘Designated pathway within an LIS programme – special CPD course – but anything must be backed up with practice – as part of work experience sessions in different types of library, with different types/levels of students’

‘Either module within LIS education programme or course specifically aimed at LIS professionals or (as I did) course aimed at University teaching staff’.

When asked whether there were enough opportunities to develop their knowledge of teaching and learning, opinion was again divided, with 45 ticking 'Yes', 17 'No', 7 'Maybe' and 2 'Don't know'.

The final question gave participants the opportunity to comment further on any aspects of their teaching knowledge and development. Twenty-four substantive comments were offered, covering a variety of points, many reinforcing previous responses, but with several key themes emerging. The main concerns centred on the suitability of courses and programmes and the desirability of formal development and qualifications. The comments also revealed some contrasting views on the role of librarians as teachers.

There were some criticisms, direct and implied, of the quality of existing provision. One respondent commented that 'standard of delivery of training varies substantially' and another that 'too many teacher training programmes for librarians do not focus on the skills that are really needed', identifying outdated approaches to IL as a particular weakness. Respondents highlighted the need for teaching programmes aimed specifically at information professionals and tailored to their needs, with two favouring a postgraduate certificate of this type. Particular suggestions included practical sessions in libraries with different groups of learners and on preparing material for the web/VLEs, to reflect common modes of delivery. Three respondents flagged the need for flexible delivery of programmes, especially for part-time staff, favouring localised provision, e-learning and a portfolio-based qualification available on a modular basis over an extended period.

One respondent asserted that some formal knowledge of teaching should be mandatory for subject librarians and two argued that some form of teaching qualification should be compulsory where teaching is a substantial part of the job. Certification was also seen as demonstrating CPD for experienced staff. Three respondents confirmed the desirability of including teaching knowledge and skills in initial professional education of librarians, one arguing this would be best seen as an introduction to the subject, laying the foundation for further specialist education. The centrality of teaching to library work was emphasised by one participant:

'Everyone who has face to face contact with staff or students teaches in a library. It may just be one to one about particular resources or in a classroom environment. But we all teach.'

Another was evidently a reluctant teacher:

'I teach info skills because it is now where the job is focused, but still feel that we are primarily librarians who have trained as librarians. I did not choose to be a teacher and deliberately did not follow that path. There is a certain amount of resentment that we should feel we now have to do this on top of our library skills.'

The need to consider such attitudes as part of the development process was the main burden of another comment:

'Not all librarians, especially those of an older generation, accept that teaching is a core part of their role. We ignore this at our peril and tackling this reluctance is a necessary preliminary to developing knowledge and skills.'

DISCUSSION

Teaching role

The results confirmed trends identified in the literature (Biddiscombe, 2002; Doskatsch, 2003; Hardy and Corral, 2007; Hepworth, 2000; Pinfield, 2001) in demonstrating that IL teaching forms a substantial part of the contemporary subject librarian's role, with time spent averaging around the equivalent of one day per week (7 hours for full-time staff) or one-fifth of their time and a significant minority estimating their weekly commitment at 14 hours or more. The figures reported are significantly higher than those recorded in the UK two years earlier by Hardy and Corral (2007), but broadly in line with the recent findings of Conroy

(2007-2008), who reported that almost half of her much larger UK sample ($n=463$) spent 20-40% of their time on teaching activities and that a significant minority (13%) spent over half their time teaching. However, data from both studies suggest time spent on this work by UK librarians is less than in the US, where Albrecht and Baron's (2002) survey of 80 instructional librarians found they were spending on average 50% of their time on library instruction and/or IL functions.

The importance and centrality of the teaching role was further underlined by the range of activities undertaken (Table 2) and many of the additional comments offered by respondents, with even the most reluctant teacher acknowledging 'it is now where the job is focused'. This is consistent with the prevailing view in the literature, which recognises that irrespective of the amount of time spent on it, 'Teaching has become a fundamental responsibility for librarians' (Kilcullen, 1998:11). Although not directly addressed by the questionnaire, comments for various questions also confirmed some major concerns reflected in the literature, including the need to embed IL in the curriculum (Hepworth, 2000; Lindstrom and Shonrock, 2006; Stubbings and Franklin, 2006) and engagement with VLEs (Biddiscombe, 2002; Cipkin, 2002; Shank and Dewald, 2003), with the latter mentioned in relation to both teaching and assessment activities.

Pedagogical knowledge

While commentators worldwide stress the need for librarians to acquire educational knowledge, skills and understanding, including technology-related abilities (e.g. Albrecht and Baron, 2002; Bell and Shank, 2004; Bundy, 2001; Kilcullen, 1998; McNamara and Core, 1998; Peacock, 2001; Powis, 2004), there is minimal published evidence on the extent and nature of pedagogical knowledge actually possessed by practitioners, a knowledge gap this study sought to address. Participants confirmed that teaching knowledge is important for librarians and the vast majority felt that they had sufficient knowledge to fulfil their role, which is interesting in view of the assumptions made by many commentators about significant deficits in this area and contrasts somewhat with Albrecht and Baron's (2002) finding that practising librarians felt they had not successfully acquired learning theory in their initial or continuing professional education.

A substantial number of our respondents claimed to have either 'reasonable' or 'extensive' knowledge of the six areas of teaching knowledge specified, with at least two-thirds of the sample reporting this for four of the six areas and 40% or more recording these levels of knowledge for the other two areas (Figure 2). It is worth noting that the two areas where competence appears to be weakest are teaching and learning theories and the design of learning activities, arguably giving some support to the emphasis placed on those particular aspects of pedagogical knowledge by Albrecht and Baron (2002), Bell and Shank (2004), Kilcullen (1998) and Peacock (2001). However, respondents generally rated these areas of knowledge as less important than the others (Table 5) and a few questioned their relevance and applicability to a teaching role characterised by relatively short one-shot sessions. Two participants commented further on this issue in the concluding section of the questionnaire, supporting the conclusion that for some at least it was more a matter of priority than disputing the value of theory:

'...my groups often consist of more than 200 people, for instance and I would be more interested in seeing how other people cope with this than in learning theory.'

'Many people are great on theory but rubbish at delivering training. Theory is useful as a backup but is not the be all and end all!'

Statistical testing showed that participation in formal pedagogical development courses had a significant positive impact on respondents' claimed knowledge of teaching and learning theories. Corroborating evidence of knowledge acquired in this way was provided by

participants' examples of how they had applied the theoretical knowledge gained via courses in their practice, several pointing to benefits in developing awareness of theory on learning styles, validating the arguments of Bundy (2001), Hepworth (2001) and Markless (2004). Participants also identified other points that suggest an understanding of the principles of instructional design, such as the need to maintain interest through the use of different methods of instruction and the value of interactive/participative approaches.

Participants' identification of the most valuable knowledge gained from formal development (Table 4) corresponds closely with Kilcullen's (1998) recommendations on knowledge needed by teaching librarians: she highlights different instructional techniques, learning and motivational theories, preparation and planning, use of varied methods to maintain interest and match diverse learning styles, use of technology and methods of evaluation. Technology did not feature strongly in our responses, with only 3 participants including technology-related points among their most valued learning. However, although authors such as Bell and Shank (2004) and Powis (2004) have previously flagged this as a development priority, this perceived deficit may no longer apply or may have been seen as a lower priority for respondents, whose main concern was pedagogical competence.

Development strategies

Respondents' reported use of on-the-job development and learning via trial and error is consistent with the emphasis on these informal methods reported in the literature (Albrecht and Baron, 2002; Kilcullen, 1998; Walter, 2006). Conroy's (2007-2008) concurrent UK survey similarly identified these as the predominant methods, but with 'trial and error' as the most common approach, differing slightly from our findings. Respondents' use of relevant conferences, peer groups and professional literature is also in line with practice reported by authors cited above; however, the identification of acting, music and public speaking as relevant personal development activities for teaching librarians was an interesting addition to the set of potential strategies for experiential learning.

Our respondents also reported significant levels of participation in formal development, with around one-fifth of the sample obtaining course-related qualifications and a slightly higher proportion gaining membership of the HE Academy. Correlation with other studies is difficult here as the data are not directly comparable: Albrecht and Baron (2002) report high levels of participation (74%) in continuing education and professional development among teaching librarians in the US, but related to maintaining (rather than gaining) proficiency and they do not specify types of courses. Conroy's (2007-2008) breakdown of 'accredited courses' taken includes both Academy membership and the postgraduate certificates in learning and teaching in HE which usually qualify participants for such membership, but the figures suggest that overall around one-quarter of her sample had undertaken courses leading to qualifications.

There was substantial overlap between Conroy's (2007-2008) findings and ours in the types of credit-bearing courses taken, with City & Guilds and university-run postgraduate certificate and masters programmes featuring in both samples. Conroy's much larger dataset was further categorised into postgraduate certificates aimed at HE teachers and those aimed at school teachers, with the latter (PGCE) dominating her sample and revealing that a significant proportion of her respondents had changed careers from school teaching to librarianship. There were also similarities in the short courses named by both samples, with CILIP, EduLib, Netskills and FILE (a postgraduate module on Facilitating Information Literacy in Education) common to both, but the larger study identified additional courses, including offerings from MLA (the Museums, Libraries and Archives Council), NoWAL (the North West Academic Libraries consortium), SEDA (the Staff and Educational Development Association) and the Training Foundation.

Professional education

A striking finding of the present study was the strength of support for teacher education aimed specifically at librarians and in particular for its incorporation into the library and information science curriculum. The minimal coverage of learning and teaching in the professional curriculum is a recurring theme of the literature (Albrecht and Baron, 2002; Dale et al, 2006; Peacock, 2000; Walter, 2006). Conroy (2007-2008) also identified support for courses aimed at the library sector (such as the unit offered by NoWAL). The identified preference for making teaching a core, rather than elective, element confirms Albrecht and Baron's (2002:75) view that 'pedagogy is no longer an area of "specialization" in librarianship' and that 'graduate programs...must incorporate a vision of librarian as teacher', on the basis that instruction is a 'common job duty' in all types of libraries, not just for academic librarians.

Opinions varied on the best model for building pedagogy into the library/information curriculum, with an almost equal balance between those suggesting one module (core or elective) would suffice and those who favoured more substantial coverage, in the form of a designated pathway (a collection of relevant modules) or an entire programme devoted to this purpose. Other comments suggest the ideal model could be a combination of module-level and programme-level provision, with all library and information professionals taking a core module on learning and teaching as part of their initial professional education and those (such as subject librarians) for whom teaching formed a substantial part of their role taking a whole programme at a later stage as part of their further education/CPD. However, although there was a definite preference for teacher education tailored to professional needs, respondents were concerned about where and how programmes were delivered, which could push them towards a generic course if suitable specialist provision was not available locally or at a convenient time. Conroy (2007-2008) reinforces this point, noting cost and flexibility as key factors affecting course choice.

Limitations of the research

Time and resource constraints limited the scale and scope of this investigation. In addition, non-responder bias may have skewed the results towards librarians with higher levels of teaching activity, pedagogical knowledge and professional development, who may have been more interested than others to participate and pre-disposed to think this area is important. Questionnaires restrict the quantity and quality of data that can be collected and relying mainly on this method and solely on the postholders' own perceptions of their work and competencies were further limitations; interviewing both subject librarians and other stakeholders would have added depth and validity to the study. Finally, using categorised questions may have caused respondents to overlook or omit points not explicitly mentioned, even though space was provided for comments.

CONCLUSION

The literature of the field tracks the growing involvement of subject librarians in teaching student groups and supporting individual learners, showing how advances in information and learning technologies have provided opportunities to collaborate with others in facilitating IL development. Commentators argue that in addition to competence in teaching techniques and learning technologies librarians need an understanding of how people learn, preferably gained in their initial professional education; they report that the majority become proficient by learning on the job or through trial and error, supplemented by personal reading, though other methods (external programmes, internal workshops, peer support) are increasingly being used for CPD. Previous research in this area is limited and has generally not investigated the pedagogical knowledge possessed and used by librarians in their practice.

The study reported here has contributed significantly to our understanding of the development of subject librarians as teachers, particularly regarding their levels of pedagogical knowledge and how they acquire this knowledge and apply it in their work. It demonstrates that teaching is central to their jobs and involves them in a wide range of activities, but revealed that less than one-third of the sample was involved in assessment. Participants confirmed the importance of pedagogical knowledge for effective fulfilment of their responsibilities, though a few questioned the relevance of theory to their particular circumstances or assigned this a lower priority than more practical aspects of pedagogy. Contrary to assumptions in the literature, the majority of our respondents felt confident about delivering teaching sessions and thought they had sufficient knowledge for their role, with substantial numbers claiming reasonable or extensive knowledge for most areas identified. Although there was some evidence supporting authors who perceive instructional design and pedagogical theory as areas of weakness, the study identified many practical examples of librarians using knowledge gained in these areas to inform and enhance their teaching; it also showed a positive relationship between possession of such knowledge and participation in formal development.

Our respondents' approaches to their pedagogical development largely confirmed the picture presented in the literature of on-the-job learning supported by peer interaction and networking via conferences, committees and similar activities; but over half the sample had also undertaken more formal development, such as a short course or extended programme, with almost one-fifth obtaining a formal qualification by this route and a slightly higher proportion gaining membership of the HE Academy. The most valued learning from formal development was awareness of learning styles and abilities, with use of different teaching techniques/methods of delivery and the contribution of preparation and planning also frequently mentioned. Opinions varied on the best way to develop pedagogical knowledge and skills, but more than half favoured either a short course or formal education and there was a strong preference for teacher education designed specifically for librarians as a core element of the professional curriculum, with support for a specialist module, a designated pathway or a whole programme devoted to the subject. Additional comments pointed towards giving all library and information professionals the basics of the subject via a core module in their initial professional education and offering more extensive coverage in the form of a specialist programme to those with a substantial teaching role¹.

The present study achieved its objectives within the limitations noted, but several aspects of the investigation would benefit from further research, e.g. using diaries to collect data on time devoted to teaching-related activities and learning gained from development experiences over a whole academic year. A larger-scale study employing additional methods would also offer the possibility of more robust generalisable conclusions.

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NOTES

1. This development has now been realised with the launch of the University of Sheffield MA in Information Literacy.

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