



IFLA
2005
OSLO

World Library and Information Congress: 71th IFLA General Conference and Council

"Libraries - A voyage of discovery"

August 14th - 18th 2005, Oslo, Norway

Conference Programme: <http://www.ifla.org/IV/ifla71/Programme.htm>

June 13, 2005

Code Number:

111-E

Meeting:

85 Social Sciences Libraries

Evidence Based Librarianship: A case study in the social sciences

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Abstract

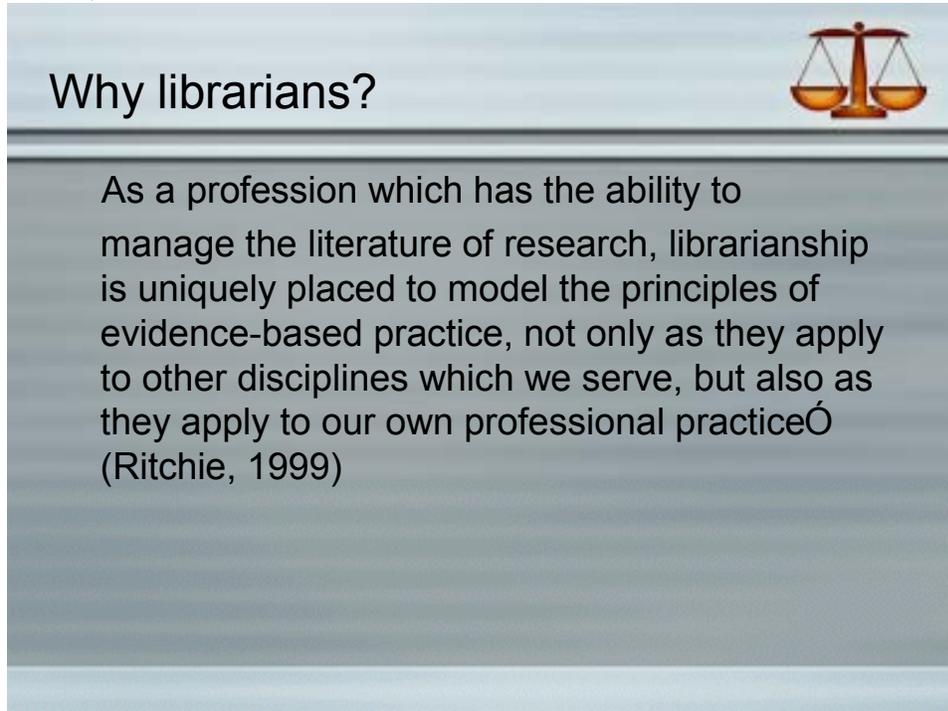
Evidence based practice began within healthcare but has recently migrated to such fields as social work, education, and human resource management. It involves applying results from rigorous research studies to professional practice in order to improve the quality of services to clients, customers and users. Familiarity with these methods has caused an increasing number of information professionals to turn a critical eye to their own practice.

Evidence Based Librarianship aims to increase librarian skills in reading, interpreting and applying their professional research literature. This session provides a practical introduction to evidence based information practice, in order to equip participants with the skills required to practise evidence based practice in their workplace. A scenario, based on the social sciences, is used to identify evidence in support of a library management decision. Concepts such as formulating focused questions, understanding research design, and critical appraisal are applied. Library and information staff need to consider, and plan for, some practical steps that could be taken to introduce the concept of evidence based practice in their workplaces.

Evidence Based Librarianship: A case study in the social sciences

Background

Evidence based practice began within healthcare but has recently migrated to fields such as social work, education, and human resource management. It involves applying results from rigorous research studies to professional practice in order to improve the quality of services to clients, customers and users.



Why librarians?

As a profession which has the ability to manage the literature of research, librarianship is uniquely placed to model the principles of evidence-based practice, not only as they apply to other disciplines which we serve, but also as they apply to our own professional practiceÓ (Ritchie, 1999)

The slide features a title 'Why librarians?' in a large, bold, black font. To the right of the title is a golden icon of a pair of scales of justice. Below the title, a horizontal line separates it from the main text. The main text is in a smaller black font and discusses the unique position of librarianship in modeling evidence-based practice. The slide has a light blue background with a darker blue gradient at the bottom.

Familiarity with these methods has caused an increasing number of information professionals to turn a critical eye to their own practice. Is it possible to adapt this model to information practice? Are the skills and techniques of evidence based practice directly transferable to our profession? Is it practical, desirable and useful for information professionals to integrate research findings into their day-to-day decision-making? Which topics from within our professional practice are most open to an evidence-based approach? These and other issues have recently been the subject of wide-ranging discussions, conferences and publications, as well as the focus of continuing professional development opportunities, and an Evidence Based Librarianship website (<http://www.eplib.net>).

Evidence based librarianship is



- an approach to information practice that promotes the collection, interpretation, and integration of valid, important and applicable user-reported, librarian-observed and research-derived evidence. The best available evidence moderated by user needs and preferences, is applied to improve the quality of professional judgements .

Evidence Based Librarianship (EBL) therefore, aims to increase the skills of librarians in reading, interpreting and applying their professional research literature. It has been defined as "an approach to information practice that promotes the collection, interpretation and integration of valid, important and applicable user-reported, librarian observed, and research-derived evidence. The best available evidence, moderated by user needs and preferences, is applied to improve the quality of professional judgements" (Booth & Brice, 2004).

This case study will provide an introduction to evidence based information practice applied to the social science setting. Using an evidence based practice approach, it will introduce such concepts as formulating focused questions, understanding research design, and critical appraisal in support of a library management decision.

Evidence Based Practice Process



- Define problem
- Find evidence
- Appraise evidence
- Apply results of appraisal
- Evaluate change
- Redefine problem

The evidence based practice process

The evidence based practice process can be described as consisting of the following stages:

- Define the problem or question
- Find the best evidence to answer the question
- Appraise the evidence
- Apply results of appraisal
- Evaluate change
- Redefine the problem

For research to be put into practice, it needs to be both valid and relevant. In order to investigate whether this process could be applied to information professionals in the social sciences, a practice-based scenario was developed, on which the search for, and appraisal of a relevant study was based.

Scenario

You are a librarian who has just started work at the Social Sciences Library in the University of Buenos Aires, Argentina. Your Library Manager tells you that she would like to find out whether the lecturers in the Social Science department actually use the electronic journals and electronic databases to help them in their work. She has decided that she hasn't got the time or staff available to conduct a survey herself, but wonders if anything has been published in the literature about the use of electronic resources by social science lecturers. You wish to make a good impression and so you volunteer to search for such an article.



Eldredge (2000)

- Questions drive the entire EBL process. EBL assigns highest priority to posed questions with greatest relevance to library practice. The wording and content of the questions will determine what kinds of research designs are needed to secure answers

Formulating a question

The first stage of evidence based practice, focusing or formulating your question (Richardson et al, 1995), involves converting a precise, yet possibly vaguely expressed, information need

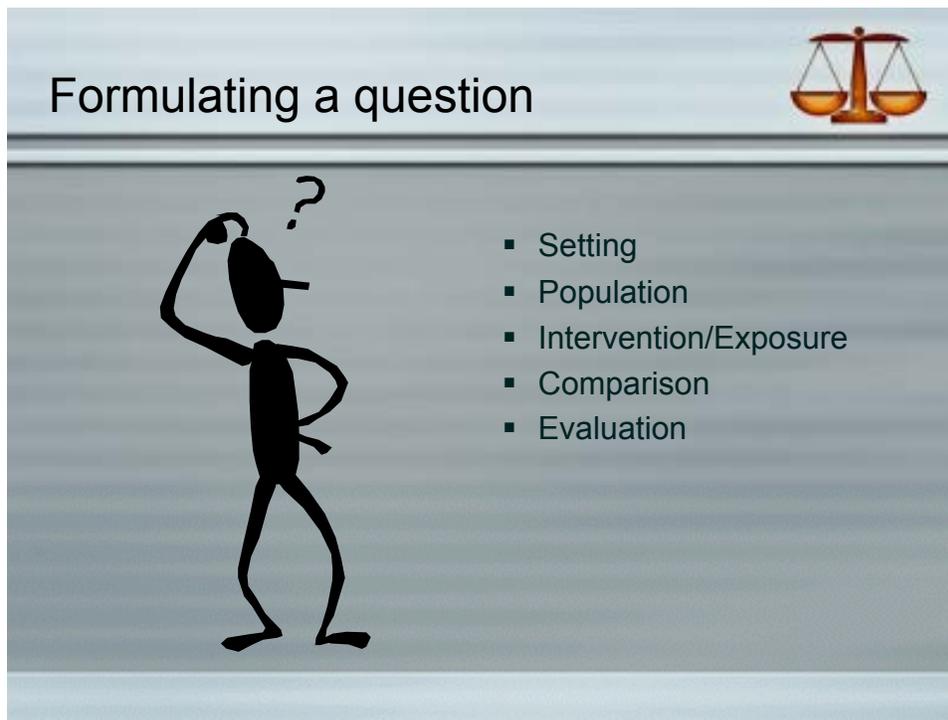
from practice into an answerable, focused, structured question (Rosenberg & Donald, 1995; Sackett & Rosenberg, 1995). The proponents of evidence based medicine, developed a model known as PICO, which consisted of breaking down the question into the following components:

A **P**opulation - recipients or potential beneficiaries of a service or intervention;

An **I**ntervention - the service or planned action to be delivered to the population, and optionally;

A **C**omparison - an alternative service or action that may or may not achieve similar outcomes.

The **O**utcomes - the ways in which the service or action can be measured to establish whether it has had a desired effect



The slide is titled "Formulating a question" in a large, bold, black font at the top left. To the right of the title is a small icon of a golden scale of justice. Below the title, a black stick figure is shown in a thinking pose, with its hand on its head and a question mark above its head. To the right of the stick figure is a bulleted list of five items: Setting, Population, Intervention/Exposure, Comparison, and Evaluation. The background of the slide is a light blue gradient.

Formulating a question

- Setting
- Population
- Intervention/Exposure
- Comparison
- Evaluation

A number of alternative models have been developed to help structure the question for different types of information need and different subject areas. We applied a variant of the PICO model, namely SPICE, to our investigation, as it was developed specifically for questions generated from information practice:

- Setting – Where?
- Perspective – For Whom?
- Intervention – What?
- Comparison – Compared With What?
- Evaluation – With What Result?

In this case the population component is subdivided into the Setting (or context of the service) and the Perspective (User, manager, carer, information professional) which combine to moderate the impact of any intervention. So, an example could be, *from the perspective of a University lecturer (PERSPECTIVE) in the Chemistry Department (SETTING) is provision of*

links to electronic journals from a catalogue (INTERVENTION) as compared with a Web-based subject list (COMPARISON), a quicker route to identifying relevant journals (EVALUATION)?

A worked example



- From the perspective of an undergraduate student (PERSPECTIVE) in a University Library (SETTING) is provision of a short term loan collection (INTERVENTION) more effective than a general collection (COMPARISON) in terms of the percentage availability of recommended texts (EVALUATION).

Exploration questions typically begin with the word “why?” or imply a “why” inquiry (Eldredge, 2002). They are characterised by ‘open-endedness’ when compared to intervention alternatives. Exploration questions are useful for exploring users’ views, attitudes and values. It may not be possible to focus exploration questions into the question formulation models described above, but some breakdown of the scenario is always useful. So, from our scenario above, our question could be:

Do University lecturers (PERSPECTIVE) working in a social science department (SETTING), use electronic journals and electronic databases (INTERVENTION) to inform their teaching or research (EVALUATION)?

Once the question has been set, the practitioner will have more clarity in deciding what type of research design is most appropriate for their questions, and what type of information sources they should search.

Searching the literature



- LIS databases
- Databases in relevant disciplines
 - Social Sciences
 - Management and Marketing
 - Education
 - Computing

Searching the literature

The second stage in the EBP process requires a comprehensive and thorough search of the literature, to identify evidence relevant to the topic in question. Finding evidence to answer questions in the domain of library science is a complicated task, due to the fact that the evidence base is contained in multiple and varied information sources. This means that information might appear in the literature base of many other disciplines, as well as in the main library and information science databases. This may require searching the management and marketing literature, or the education or computing literature. Also, in terms of research quality, LIS research typically utilises designs of limited applicability, such as the user survey. The most appropriate study design will vary according to the topic under investigation.

For our question a search of Library and Information Science Abstracts (LISA) was conducted using free text words such as social sciences, faculty, university, lecturers, electronic, survey etc. LISA also contains a thesaurus, and 'Descriptors' such as 'Social Sciences', 'Searching', 'Information Seeking Behaviour', 'University Libraries' and 'Online Information Retrieval' were also included in our search. Both free text and thesaurus terms are combined with Boolean operators (AND, OR) to maximise retrieval of relevant articles. Indexing of articles in LISA is not as specific as that in other databases such as Medline, so relying on thesaurus terms only can restrict your results. A potentially relevant article was selected from the citations obtained: "The information-seeking behaviour of social science faculty at the University of the West Indies, St. Augustine Campus" (*J Academic Librarianship* 2005, 31(1), p67-72).

Our search was undertaken on major UK or European databases due to access issues, and databases that may also have been useful for our question are the educational sources such as ERIC and the British Education Index, social science databases such as ASSIA (Applied Social Sciences Index and Abstracts) or computer science databases such as INSPEC.

Databases and other sources from other international sources could be searched if available. Other methods of obtaining additional relevant articles include citation pearl-searching, which involves using a known highly relevant article (the pearl) to identify free text and thesaurus terms from which a search can be based, and using a Citation Index to identify those authors that have cited a particular reference since it has been published. Browsing for specific named authors or hand-searching relevant journals are other techniques that can be used to help identify useful articles.

When constructing a search strategy to answer a LIS question, it is important to plan your search carefully, and to ensure that search parameters are clearly defined. Generic principles of literature searching, such as focusing your question, free text searching, thesaurus searching, Boolean and proximity operators, can be applied to the LIS databases. However selection of the most appropriate sources is a key activity and the searcher should be aware of the limitations within individual sources such as problematic indexing.

Evidence based practice requires that the type of question being asked determines selection of the most appropriate research methodology. Randomised controlled trials, although offering the most reliable results for effectiveness questions, are not always the most appropriate study designs for other types of questions. They are also less likely to be available in the library and information science field. Cohort or case control studies can be found in librarianship, but often case studies, case series or opinion pieces will be the best available evidence you can find. Qualitative research is common in librarianship, and often the studies found will include questionnaires, focus groups or interviews. Audits and surveys are also used to obtain data on user groups, for example.

Finally, it will be necessary to evaluate the search results and modify them accordingly, and to remember to document the search process thoroughly, so that it can reproduced if needed.



Critically appraising



- Validity - are the results sound?
- Reliability - what are the results?
- Applicability - will the results help me?

Critical Appraisal

Although many practitioners can identify the features of a good research article these may bear little resemblance to the factors that determine what we read. Foremost in the latter is interest - does the title or abstract address a current preoccupation or professional concern? Like professionals in other disciplines, librarians tend to favour the new and exciting, such as description of new technologies, over the less dramatic, but more worthy, descriptions of tasks such as enquiry desk or interlibrary loan procedures. Extrinsic factors, therefore, are more often used to filter articles, such as whether the author is well known, whether the article is published in a peer-reviewed journal, or emanates from a reputable institution. Although these factors bear some relation to the quality of an article they are not automatic indicators of research quality.



What is critical appraisal?

To weigh up the evidence critically to assess its validity (closeness to the truth) and usefulness (clinical applicability). [Adapted from Sackett & Haynes *EBM* 1995; 1 : 4-5].

Critical appraisal uses **intrinsic** (design etc) **not extrinsic** (author, journal, institution) factors.

Critical appraisal uses intrinsic (design) rather than extrinsic (author, journal, institution) factors to help the practitioner decide whether an article is worth reading. The more rigorous intrinsic factors that relate to research design and aspects of methodology are the focus of critical appraisal, described by David Sackett, a founder of evidence based medicine, as the need to “weigh up the evidence critically to assess its validity (closeness to the truth) and usefulness (clinical applicability).” (Adapted from Sackett & Haynes, 1995; 1 : 4-5)

In other words we put aside our prejudices regarding the source or nature of a research study and judge it entirely on its own merits. To do this we need to take into account the three important factors of *validity*, *reliability* and *applicability* (Booth & Haines, 1998).

How is appraisal done?



- Problem or scenario
- Determine appropriate source
- Identify relevant article(s)
- Use appropriate checklist
- Assess relative merits/demerits
- Make overall assessment (*strength of evidence*)
- Apply findings (*strength of recommendations*)

Having developed our question, and identified good quality studies by systematically searching the literature, we can then use a checklist to assess the relative merits or demerits of the study, to help us to make a judgement about its quality (*strength of evidence*) and whether we can then apply the findings (*strength of recommendations*).

Appraising a paper



Three broad issues need to be considered when appraising a paper:

- A/ To what extent is the study a close representation of the "truth" (**validity**)?
- B/ Are the results credible and repeatable (**reliability**)?
- C/ Will the results help me in my own information practice (**applicability**)?

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The paper we identified (Francis 2005) was appraised using the CRiSTAL User Study checklist (Booth & Brice, 2003). The paper aimed to see how social science faculty are using library resources, especially electronic resources, and the characteristics of their preferences in information seeking. The data collection instrument was a questionnaire containing mainly closed questions, sent to 55 social science faculty members, from which they received 26 responses (a response rate of 47%). Their main findings were:

- textbooks were the preferred source of information for teaching, followed by journals
- the most used current awareness methods were current issues of journals, followed by searching online databases
- EbscoHost was the most used electronic database, with 50% of respondents indicating greater than 5 times use over 6 months; more than a quarter of respondents had not heard of OCLCFirst search, and more than a third had not heard of Proquest, Emerald or ERIC

The paper concluded that amongst social scientists, there is a strong reliance on textbooks for teaching activities, they rely on journal literature to support their research and current awareness activities, they show a preference for journal articles in electronic format over print, and they make some use of electronic databases but usage is not well distributed over all the databases available.

Our appraisal identified some issues for consideration. The paper addressed a well-focused question, and the author compared their findings with similar studies in the literature. However, a copy of their data collection instrument (a questionnaire) was not included, neither was there a reference made to where a copy could be obtained. Without access to details about the questions used, it was not possible to assess the reliability of the questionnaire, or whether it could be applied to our own scenario. Also, the paper does not tell us whether all respondents answered all the questions, and whether some respondents selected more than one answer to a particular question.

The response rate of 47% is quite good; we are given some demographics of these respondents, but we do not know how representative these respondents are of the whole faculty. Some data about usage of electronic resources, which were discussed in their conclusion, have not been shown in detail in the results section, making it difficult to assess their reliability.

These issues do not make the paper unusable, but must be considered when applying the results to our own scenario. The applicability of the study to our scenario is reasonable – our scenario included social science faculty in a University from a similar developing world country. However, we would need more information about the questionnaire used in the paper before we could replicate the study exactly, we might wish to include some more detailed questions regarding the use of electronic databases and journals, which were not necessarily included or published in this paper, and we would need to consider local issues such as the availability of particular databases and journals.

Useful statistics for appraisal



Two main concepts:

- P-values
- Confidence intervals (CIs)

We don't need to understand how these statistics are calculated, just what they mean !

Statistics

An investigation into the use of critical appraisal by librarians has demonstrated that although the techniques can be used and valued, there is a perceived lack of confidence and competence in the understanding and interpretation of basic statistics (ref crystal). The practising librarian must understand two main concepts; p-values and confidence intervals (CI). We don't need to understand how these statistics are calculated, just what they mean.

P-values



- A p-value is a statistical value that indicates the probability that the observations are due to chance alone
- So p-values can be used as a benchmark of how confident we are in a particular result

P-values



- Many researchers use a p-value of less than 0.05 as the cut-off for "statistical significance", i.e. when the result seen in a study would occur by chance less than once in 20 studies.
- p-value can only take values between 0 and 1.

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Confidence Intervals (CI)



- Confidence Intervals indicate the spread or range of values which can be considered probable i.e. it gives the range in which you think the real answer lies with a given degree of certainty
- Most studies use 95% confidence intervals, i.e they give the range where we expect the true result will lie 95% of the time (only in 1 in 20 studies, on average, will the real value lie outside the confidence limits)

CIs



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e.g. 0.18 to 1.16 CI
- CIs become narrower as sample size increases
i.e. large sample sizes in studies produce
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So to summariseÉ

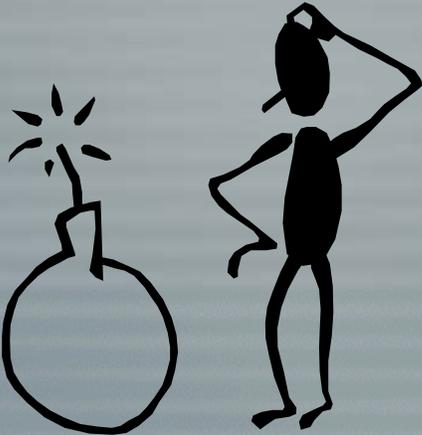


- In papers showing an effect or a difference between interventions, look to see if p-values are given
 - Remember that a result is significant (did not happen by chance) if $p < 0.05$
 - If no p-values are given be suspicious, and if p value is greater than 0.05 this means the result is NOT significant and could be due to chance
- Look to see if 95% CIs are given
 - Remember that the smaller the CI (narrower the range), the more precise we can take the findings to be. This is why larger sample sizes in studies are preferable.

So to summarise, in papers showing an effect or a difference between interventions, look to see if p-values are given. Remember that a result is significant (did not happen by chance) if $p < 0.05$. If no p-values are given be suspicious, and if p value is greater than 0.05 this means the result is not significant and could be due to chance.

Look to see if 95% CIs are given, and remember that the smaller the CI (narrower the range), the more precise we can take the findings to be. This is why larger sample sizes in studies are preferable.

Using critical appraisal



- Reduces uncertainty
- Allows you to focus on important issues
- Helps unravel complex problems
- Harnesses group perspectives, **but** does not provide simple answers

Using critical appraisal reduces uncertainty, and allows you to focus on the most important issues. It helps to unravel complex problems, and when done in a group or work based setting it can harness group perspectives. It does not, however, provide simple answers.

Final important steps



Apply results in practice

- Range of behavioural and educational interventions to facilitate culture of change

Evaluate your performance

- Audit
- Accreditation
- Benchmarking
- Ongoing evaluation alongside innovation

Applying results in practice

It is important that the final stages of the EBP process, applying the results and evaluating your performance are followed through. A range of behavioural and educational interventions exist to facilitate a culture of change, which although observed in the health environment, are transferable to other settings (Iles & Sutherland, 2001), such as audit, accreditation, benchmarking, and ongoing evaluation alongside innovation.

Why aren' t we doing it now?



- The profession?
 - librarians place a great emphasis on anecdote and experience
- Lack of evidence base?
 - Paucity of studies with transferable results impacting on daily practice
- Lack of skills and techniques
 - Critical appraisal and research design

A number of issues have been hypothesised to explain why barriers to evidence based practice remain for library and information staff (Booth & Brice, 2004). It has been suggested that as a profession librarians place a great emphasis on anecdote and experience. There are also problems inherent in the lack of a high quality evidence base, as described by Booth (2002) as a “paucity of studies with transferable results impacting on daily practice”. The lack of competence in the skills involved in critical appraisal and research design will need to be addressed. However, this paper has demonstrated that the processes of evidence based practice can be applied to the social science setting.



Possible barriers

- time constraints
- limited access to the literature
- lack of training in critical appraisal skills
- emphasis on practical rather than intellectual knowledge
- work environment (structural barriers)
- lack of knowledge about sources of research evidence

Barriers and enablers

Barriers that have been identified include: time constraints; limited access to the literature; lack of training in critical appraisal skills; emphasis on practical rather than intellectual knowledge. Other structural barriers may be present in the work environment itself or in lack of knowledge about sources of research evidence.

Enablers?



1. Local journal clubs
2. Evidence based roles in job descriptions
3. Structured abstracts to research articles
4. Practitioner research secondary journal
5. More systematic reviews
6. Critical appraisal training
7. Access to LIS databases
8. Evidence Based Guidelines
9. Research methods training
10. Protected reading time

Possible enablers to help practitioners apply the skills identified above could include the use of local journal clubs; the inclusion of evidence based roles in job descriptions; the provision of structured abstracts to research articles; secondary journals where research is synthesised and aimed at practitioners needs, and more systematic reviews. The introduction to critical appraisal training included in this paper could be supplemented by further training in statistics, and further basic training in research methods.

Finally our investigation using these methods took approximately xx hours – protected reading time, or time for journal clubs could greatly facilitate the application of these skills. Recent research on the information seeking skills, and application of research findings by nurses found strong statistical significance in the correlation between employer attitude and practitioner activity in finding and applying research finding (Royal College of Nursing, 2004).

Conclusion

Librarians need to be able to identify key areas of library practice that can be informed by research evidence; to understand how to articulate questions from common library practice which are answerable either from the literature or from good practice; and to work in teams to appraise and implement evidence from the research literature within the workplace. Above all they need to cultivate a culture of reflective practice, continually questioning what they do, regardless of whether the stimulus is published research, user feedback or their own professional observations.

Evidence based librarianship is one of the most significant contemporary developments in professional library practice. Library and information staff need to consider, and plan for, practical steps that could be taken to introduce the concept of evidence based practice in their workplaces. This process will provide librarians with the information for implementing the crucial first steps.

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