Chapter 2
Finding the Evidence for Practice in Social Work

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ABSTRACT

The revolution in information technologies, in particular the growth of the Internet and greater access to computers, has given social workers unprecedented access to information resources. Researching such resources is crucial and it needs to be done efficiently. Planning an efficient search requires knowing which databases and other resources to use, knowing how to formulate an answerable question, identifying terms that inform the question, selecting the appropriate methodological filters, and being able to critically appraise evidence for its quality and relevance. This chapter, therefore, outlines some of the research sources available to social workers, it looks at some principles for finding information for practice in social work, and it outlines some criteria for evaluating the quality of that information.

INTRODUCTION

In 2001, a 24-year-old woman died from lung and kidney complications in a clinical trial. She died because the investigators performed inadequate preliminary research on the chemical she inhaled as part of the trial. Their search strategy failed to find material which would have cautioned them against its use (John Hopkins University, 2001; Perkins, 2001; Savulescu & Spriggs, 2002).

Although the investigators used an appropriate database (PubMed), their search strategy was poorly constructed and they did not retrieve those records which would have alerted them to potential difficulties. They also did not search widely enough. They used textbooks on pharmacology and pulmonary medicine and they used search engines such as Google and Yahoo, but there were other online databases they should have searched, in addition to a range of other resources (Perkins, 2001).

This sober illustration depicts a case in which someone may have literally died from a poor search strategy. It provides the caution that social workers also could, in principle, do more harm than good in their research. With this thought as background, this chapter will do three things. It will outline some of the research sources available to social workers (Sources); it will look at some principles for finding information for practice in

social work (Searching); and it will outline some criteria for evaluating the quality of that information (Selection).

As observed in the previous chapter, there are multiple sources of evidence available to the social worker. This includes empirical evidence, in addition to evidence derived from qualitative studies, professional expertise, judgement, and experience, theoretical knowledge, organisational guidelines, critical reflection, and evidence that arises from the particular practice situation, such as the client's cultural values, problems, situation, and strengths. This chapter focuses upon finding the research evidence (quantitative and qualitative) and, in particular, the searching of electronic databases and how the quality of such evidence is evaluated.

SOURCES

Rapidly evolving information technologies have given social workers unprecedented access to information resources. At some point, the social work practitioner will be faced with determining which sources will provide access to the most useful material. Squandering time and energy searching in the wrong place is disheartening.

There is little point listing in this chapter a comprehensive range of sources in social work available through the Internet. It is an interesting but discouraging exercise to explore such lists only to find that the organisations and groups no longer exist or the web addresses have changed. There is little that dates a text which includes such a list, so much as this.

Having said all this by way of qualification, below is something akin to a list. It also, however, provides some explanatory material describing the context and the utility of these sources and it has the virtue of identifying websites that are not likely to disappear. It includes sources for systematic reviews and bibliographic databases and concludes with some comment about grey

literature. Many of these resources may be familiar and well-utilised. This list does not pretend to be comprehensive. It is presented merely to give an idea of the range of sources available.

Prominent Search Engines

The advent of the Internet has given social workers access to a plethora of resources and types of evidence upon which to base practice. Search engines, such as Google, Alta Vista, and Yahoo, search across the Internet, although no one engine searches the entire Internet, there are no controls over quality, and authorship and currency are not always easy to determine. Using a general search engine is not, therefore, ideal. In fact, Szuchman and Thomlison (2011) take the view that "the Internet sometimes does contain suitable sources, but doing a Google or Yahoo search is likely to waste your time" (p. 64). They then comment on the results of a search on Google for the phrase "healthy aging" and advise that it would be better to have spent the time searching a database, such as PsychInfo, being assured that the material came from "legitimate sources" (p. 64). Nevertheless, one particularly well known Internet search engine is suitable: Google Scholar.

Google Scholar (www.google.com/scholar)

Released in 2004, this freely accessible web search engine indexes the full text of scholarly literature. It also includes selected web pages that are deemed to be scholarly. The full texts of articles in Google Scholar are not necessarily available freely to all searchers, however. Searchers with access through an institution may be able to freely access material and some records provide links to subscription or purchase options.

Google Scholar does not offer the searching, limiting, and filtering features available in databases such as PubMed (Boeker, Vach, & Motschall, 2013; Bramer, Giustini, Kramer, & Anderson,

2013; Shultz, 2007, p. 444). But because Google Scholar possesses an easy user interface it is a good place for an initial search for potentially useful material. Google Scholar also provides access to grey literature (i.e. preprints, conference proceedings, and institutional repositories) (Shultz, 2007, p. 444). In addition, its "cited by" feature provides access to other material that has cited the item, and its "Related articles" feature expands the field of related material.

Systematic Reviews

A systematic review will summarise data from the results of a number of individual studies which meet the review's eligibility criteria and will, therefore, enable readers to draw conclusions about the totality of research in a specific area. A systematic review uses a clear, reproducible methodology to find, evaluate, and synthesise the results of relevant research. If there are sufficient studies using similar methods measuring similar entities, a statistical method (called a meta-analysis) is used to combine the results from the individual studies. This will establish trends and differences across the studies (Shlonsky, Noonan, Littell, & Montgomery, 2011, pp. 363-364).

Systematic reviews are valued, in principle, because they can be used to identify or refine hypotheses, they may highlight the pitfalls of previous work, they can help formulate guidelines, and they increase the statistical power of the studies because they involve many studies and increased sample size (Mulrow, 1995, pp. 2-5). Littell (2010) asserts that "the synthesis of results across studies is essential to evidence informed practice….since empirical knowledge is not static, we need periodic syntheses of ever-expanding bodies of evidence" (p. 162). Nevertheless, systematic reviews and meta-analyses vary in quality and credibility. Clearly, the value of a systematic review will only be as strong as the studies it incorporates

and as strong as the critical appraisal conducted by reviewers. Systematic reviews themselves, therefore, require evaluation (see below).

Some of these evaluative issues are addressed by the Cochrane and Campbell Collaborations, two reviewing organisations which occupy a particularly prominent place in the creation of systematic reviews.

The Cochrane Collaboration (www.cochrane.org)

Founded in 1992, the Cochrane Library is a subscription-based database but in many countries it has been made freely available to all residents by their respective governments. All countries, however, have free access to the abstracts of all Cochrane Reviews and to short plain-language summaries of selected articles.

The Cochrane Library includes access to all the peer-reviewed systematic reviews and protocols prepared by the Cochrane Review Groups, quality-assessed abstracts of systematic reviews by non- Cochrane groups, details of controlled trials and other healthcare interventions from bibliographic databases and other published and unpublished sources, and details of completed and ongoing health technology assessments from around the world.

The Cochrane Collaboration is useful to social workers interested in learning about the most up-to-date information pertaining to the assessment and treatment of various health matters, including mental health issues.

The Campbell Collaboration (www.campbellcollaboration.org)

Founded in 2000, this is a voluntary network of scholars, educators, practitioners, policy-makers, and consumers producing systematic reviews in the social sciences. It focuses on three major fields:

social welfare, criminal justice, and education. All titles, protocols, reviews, and user abstracts are freely available. Like Cochrane, the Campbell Collaboration encourages researchers to update their respective reviews to maintain relevancy. The Campbell Library includes research on psychosocial treatments like family therapy and mentoring programs, as well as research on issues such as juvenile delinquency and substance abuse.

Databases

Resources addressing practice questions are not always available in a summarised form. In such cases, practitioners must seek individual research articles to address practice needs. This material is locatable in databases. Most databases have certain advantages over Internet search engines. They employ subject headings, they possess search builders for incrementally conducting a search, and they provide a search history facility which enables comparison and combination of search sets. They also have the ability to search in a much wider range of fields beyond author and title.

Gray, Joy, Plath, and Webb (2014) have found in their survey of social work practitioners that the databases most frequently searched were Medline (40%), Social Work Abstracts (17%), and the Cochrane Collaboration (15%) (p. 34), and Shlonsky, Baker, and Fuller-Thomson (2011) are convinced from their study that PsycINFO "is the best database for finding rigorous studies in social care" (p. 398). But of course there are many more databases. Below is a list of some useful databases with brief annotations.

Cinahl

The Cumulative Index to Nursing and Allied Health Literature (CINAHL) is an index of English-language and selected other-language journal articles about nursing but also allied health, including social work.

EMBASE

This database is similar in scope and content to Medline but provides greater coverage of European and non-European language publications. It also has a broader coverage of such topics as psychiatry and alternative medicine.

PsychInfo

International in scope, this is an indexing and abstracting database of peer-reviewed literature in the behavioral sciences and mental health.

PubMed

This U.S. government website provides access to Medline, the U.S. National Library of Medicine's bibliographic database of journals published in the United States and beyond. Medline is the largest subset of PubMed and includes material on the delivery of health care, nutrition, psychiatry, and psychology.

PubMed contains citations and abstracts with links to freely accessible material where available. But it also contains PubMed Central (PMC), a repository of freely accessible, full text, peer reviewed articles. Although for many, there is no functional difference between PubMed and Medline the appearance of an item in PMC does not mean the journal has been accepted for indexing in Medline.

One of the significant benefits of searching PubMed is the ability to utilise the MeSH (Medical Subject Headings). Subject headings enable more precise searching. In a comparison of PubMed and Google Scholar, Scholar did not retrieve a number of records appearing in PubMed because PubMed used appropriate MeSH terms, although these terms might not have appeared in the title or abstract of the records. Also even if the word was not searched as a MeSH term, PubMed automatically mapped it to a MeSH term (Shultz, 2007, p. 443).

Social Services Abstracts

This database provides bibliographic coverage of current research focused on social work education, practice and policy, community and mental health services, and social welfare and social policy.

Social Work Abstracts

Produced by the National Association of Social Workers (NASW), SWAB provides extensive indexing and abstracting coverage of social work and human services journals.

Sociological Abstracts

This resource abstracts the international literature in the social and behavioural sciences.

Professional Organisational Websites

This is but a small sample of professional and organisational websites on the Internet including clearinghouses and guidelines.

California Evidence-Based Clearinghouse for Child Welfare (CEBC) (http://www.cebc4cw.org/)

The primary goal of this website is to provide a searchable database of programs that can be utilised by professionals who serve children and families involved with the child welfare system.

ClinicalTrials.gov (http://www.clinicaltrials.gov/)

This is a service of the U.S. National Institutes of Health. It provides access to information on publicly and privately supported clinical studies on a wide range of diseases and conditions. Information is provided and updated by the sponsor or principal investigator of the clinical study. Each record includes details regarding the disease or condition, intervention (medical product, behaviour, or procedure), and outcomes of the study.

Information for Practice (IP) (http://ifp.nyu.edu/)

IP began in 1993 and is a freely accessible international resource for social work and related professionals. It focuses on aggregating news and new scholarship for professional practice and it is constantly updated, although it does not pretend to be exhaustive. A "primary focus" is to provide access to the full text of documents in the grey literature (Holden, Barker, Rosenberg, & Cohen, 2012, p. 168).

Inter-Center Network for Evaluation of Social Work Practice (http://www.intsoceval.org)

This network, which began in 1997, is currently made up of research centres attached to governments or universities from Denmark, England, Finland, the Netherlands, Scotland, Sweden, and Switzerland, as well as two U.S. based centres (the Center for the Study of Social Work Practice at Columbia University; the Hamovitch Center for Science in the Human Services at University of Southern California). The network is a forum for the members of these centres to exchange information, discuss each centre's research-related ideas and activities, and encourage international collaboration through research projects and exchange visits.

Joanna Briggs Institute (JBI) (http://joannabriggs.org/)

This is an international research and development arm of the School of Translational Science at the University of Adelaide, South Australia.

The Institute collaborates internationally with over 70 entities across the world supporting the use of evidence to assist in the improvement of healthcare outcomes.

National Guideline Clearinghouse (NGC) (http://www.guideline.gov/)

An initiative of the U.S. Department of Health and Human Services, this is a publicly available resource for evidence-based clinical practice guidelines and information on medication and concerns about medications.

SAMHSA Registry of Evidence-Based Programs and Practices (www.nrepp.samhsa.gov/)

The Registry is a searchable online database of mental health and substance abuse interventions. Its purpose is to make available information on evidence-based programs and practices to help inform decision-making. NREPP rates the quality of the research supporting intervention outcomes and the quality and availability of training and implementation materials. It does not provide an exhaustive list of interventions or endorsements of specific interventions.

Grey Literature

The Third International Conference on Grey Literature (GL '99) in Washington, DC, in 1999, defined grey literature as that which is "produced on all levels of government, academics, business, and industry in print and electronic formats, but which is not controlled by commercial publishers" (Farace, 1998, p. iii).

The primary benefit of using electronic databases is the ease of searching and recovering material. It also seems intuitive to restrict searching to peer-reviewed journal articles. But relying solely on electronic database searches to find relevant published studies risks what has been termed "publication bias." Studies have demonstrated that journals are less likely to publish statistically non-significant results, researchers are less inclined to submit for publication statistically non-significant results, and published studies are more likely to conclude that an intervention is effective. This can artificially inflate results and conclusions (Bronson & Davis, pp. 33, 35; The Cochrane Collaboration, 2002; Littell, 2010, p. 165; Wilson, 2009, pp. 431-432). This means that important information regarding efficacy may be missed if sole reliance is placed on published literature. In fact, "a large number" of trials presented at conferences and scientific meetings never reach full publication (Hopewell, McDonald, Clarke, & Egger, 2008, p. 6).

The assumption that an unpublished study must have been rejected by the peer-review process is precisely that, an assumption. Many studies are simply not submitted for publication because the authors deem the results uninteresting or non-significant, or for a whole host of pragmatic reasons. Since studies may be rejected for reasons which are entirely unrelated to methodology and quality, their non-publication status tells us nothing about methodological status (Wilson, 2009, pp. 435-436). To present an accurate picture, then, it is necessary to go beyond the published literature. In fact, the contribution from grey trials is particularly important when there have only been a few intervention trials involving small samples (Hopewell et al., 2008, p. 7).

Grey literature is not always easily locatable, although with the advent of the Internet this problem is increasingly less significant (Luzi, 2000, p. 106). Libraries themselves have had difficulty acquiring and making accessible grey literature. The New York Academy of Medicine has, however, made an effort to acquire materials from various organisations producing grey literature. The Grey Literature Report http://www.greylit.org/ is an effort to collect these items for the Academy's collection and provides lists of organisations producing grey literature.

Grey literature can also be located in conference proceedings. The British Library (Boston Spa) is probably the most comprehensive and easily accessible collection of conference publications in the world and is found at: http://www.bl.uk/reshelp/atyourdesk/docsupply/collection/confs/index.html

In addition, grey literature can be found by contacting relevant organisations and perusing the websites of government or state agencies, research centres, and reports from non-governmental organisations. Some of the sources described earlier in this section provide access to grey literature.

SEARCHING

This section will look at how to construct what is generally called the "search strategy." Databases will invariably include guides on how to search and since most searches, however, poorly constructed will retrieve results of some sort, simple searches of most databases are always possible. But the quality and relevance of results is important, as is clear from the earlier reference to the John Hopkins University trial.

The intent of this section is, therefore, to lay down some important principles behind creating effective searches which once understood can be applied to most databases. These principles can be grouped into three main steps: formulating the search question, identifying the appropriate search terms, and constructing the search strategy.

Formulating the Search Question

The first issue confronting the researcher involves that of formulating the search question. This involves converting the information need into a specific, answerable question. Gibbs (2003) explains that "if you can learn to pose a specific question, you have hope of finding a specific answer" (p. 53). Shlonsky and Gibbs (2004) point out that posing a question that can be answered

by a database requires that the "database must be given information in a format and language that it can interpret" (p. 142).

Sackett, Richardson, Rosenberg, and Haynes (1997) have suggested that a "well-built" clinical question designed to search for the best available research evidence consists of four elements (pp. 27-29). These elements are often referred to by the acronym PICO with each letter representing an aspect of the practice question. In many cases the PICO components will be present without being labelled as such.

- 'P' identifies the patient or population and their particular problem(s), that is, their condition or need.
- 'I' stands for intervention. This refers to treatments or preventative measures.
- 'C' represents comparison. Are there alternative treatments or interventions that would fit the client's needs? This enables the practitioner to suggest a range of options to the client assuming research-supported alternatives are located. This is important because it allows clients to voice any concerns about the intervention and to select among options when they are available.
- 'O' stands for outcomes. What are the specific outcomes or goals sought by the practitioner and client?

Sometimes a further acronym 'T' is used. It variously stands for type of problem or question being asked, for example, diagnosis, treatment, or prevention (Drisko, 2014, p. 125; Drisko & Grady, 2012, pp. 35; Schardt, Adams, Owens, Keitz, & Fontelo, 2007, Background), best type of study design for the question (Schardt et al., 2007, Background), or time-frame associated with the question (Fineout-Overholt, & Johnston, 2005, p. 158).

Gibbs (2003) has referred to this structure as "Client-Oriented, Practical, Evidence-Search

Questions (COPES)" (p. 57). Gibbs points out that the COPES framework renders the question specific enough to find answers in an electronic search (pp. 57-58). He also observes that COPES questions fall into five types: "effectiveness, prevention, risk, assessment, and description" (p. 58). He suggests that each one of these question types meets the "four elements in a well-formulated question": "client type and problem," "what you might do," "alternate course of action," and "what you want to accomplish" (p. 59).

Shlonsky and Gibbs (2004) have found that many practitioners struggle with posing answerable questions. They have delineated what they term "common pitfalls" (p. 142). Among these they include asking questions involving interventions which are unavailable or which would be rejected by the client; asking vague questions in which the concepts, intervention, or outcomes are not clearly defined; failing to label the problem or intervention correctly; or "asking two or more questions within one question….making it unwieldly" (pp. 142, 144).

Identifying the Appropriate Search Terms for the Electronic Search

Having established the search question and the key concepts comprising that question, the next step is to consider the search terms.

The value of the PICO (or COPES) framework is the ability it gives to set out clearly the information need. The framework serves to steady and control the researcher's thinking. In creating a search strategy, it becomes necessary to think about the words or phrases that represent elements in the structure. It is important to keep in mind, however, that some questions are not naturally accommodated in a PICO structure, such as questions seeking information on the possible causes of a condition. It is also frequently not possible to complete every aspect of the structure. Comparison may not be relevant in some questions. In fact, many qualitative questions consist of but two components: the population and their cir-

cumstances or experiences. Pearson and Hannes (2013) point out that in qualitative questions the 'I' would denote "interest" or "issue" rather than intervention (p. 227)

It also may not always be possible to search on every element of the structure even if the question lends itself naturally to doing so. The particular populations, settings, or outcomes may not be well described in the title or abstract of an article and they may not be well indexed with subject headings. Very specific questions may not as yet produce quality research results. Nevertheless, none of this can be known until the search has been tried and results canvassed. Therefore, it is best to define practice questions in detail and search in light of that. Only then is the researcher in a position to determine whether they should search on fewer concepts and are, therefore, obliged to search more broadly.

There are a number of approaches which can be taken when searching a database. It is possible to search for a specific author, or title, or publication source. It is also possible to use these as a basis for further searching. This is often called "citation pearl searching" and involves using a known relevant item(s) as a basis for tracking further material, perhaps more material by the same author(s), or even more commonly, using the reference list or the keywords found in known relevant items (De Brun & Pearce-Smith, 2009, p. 95-99). There are, however, two main approaches taken when looking more widely for material to address a question: free text searching and subject heading (controlled vocabulary) searching.

Searching with Free Text

This first approach is called "free text searching." It is also often called "natural language" searching. The database will search across records for the particular term or phrase that is entered. Google, for instance, uses free text searching.

To guide free text searching, it is necessary to develop a list of terms which are expected to appear in material of relevance. Free text searching gives

scope to introduce alternative words or phrases for the concepts. These are called *synonyms* but they are not what could be labelled "dictionary synonyms." They might include singular and plural words, alternative terms, spelling variations, possible hyphenation, but even in some cases, antonyms. Of course, not all the appropriate "synonyms" may come to mind until after an initial search.

Truncation and wildcards are used in free text searching. These expand search options and speed up the search process. The truncation symbol is usually an asterisk but the database help facility will provide that information. Taking the stem or root of a word and adding the truncation symbol will retrieve variant endings of words. *Alcohol** will yield *alcohol*, *alcoholic* and *alcoholism*. This would circumvent the need to search for all these separate options. Clearly, care is needed about where the term is truncated. If the stem is too short it will retrieve too many irrelevant records. The search for *alco** would also retrieve *alcove*.

The wildcard symbol which is often a question mark (?) is useful when faced with different spelling. It can be inserted into the word when an extra letter is sometimes used. *Behavio?r* will search for *behaviour* (British English) and *behavior* (American English). Of course, the truncation symbol (ie. *behavio**) could be used but that would yield *behaviourism*, *behaviorism*, *behavioural*, *behavioral* as well and those terms may not be required, The wildcard symbol cannot be used at the start of a word, which means that words such as *etiology* would require entering both spellings (*etiology* and *aetiology*).

Searching with Subject Headings (Controlled Vocabulary)

The second main approach to searching is to use subject headings or thesaurus searching. Databases describe subject headings in different ways. The Medline and Cochrane databases, for instance, use the term MeSH (Medical Subject Headings), but subject headings may be described as "Descriptors" or even simply "Subject Terms." Some databases will describe them as "Keywords," which can be a little confusing because when constructing a free text search the researcher thinks in terms of key words to describe their information need. Subject headings are technically called "controlled vocabulary."

Subject headings are designed to identify the subject(s) of the article. In principle, material which covers the same subject matter will be assigned the same subject terms even if those terms do not themselves appear anywhere in the material. Subject headings are valuable because search results are not contingent on the researcher thinking of the right free text terms for the search, and they have the potential to retrieve articles that may use different words to describe the same concept.

There are two ways to establish the appropriate subject headings for a topic of interest. The first is to conduct a free text search, find a record that is useful, and use the subject headings assigned that record as a basis for a fresh search. The alternative is to locate the appropriate headings by searching through the database thesaurus. Searching the thesaurus is valuable because it often suggests other terms that would also inform the search and it overcomes problems associated with different spelling and terminology. Databases use different subject headings, so subject headings need to be adapted to suit each database. Fortunately, PubMed users do not need to be familiar with the MeSH terms that are the basis of MEDLINE searching. PubMed contains a sophisticated search engine that maps entered terms to the MeSH.

Many databases offer the option to "explode" subject headings to also include more specific or narrower terms in the search. This expands the search options. Below is an example from PubMed showing part of the MeSH structure in which the MeSH term *Alcoholism* appears:

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Substance-Related Disorders
   Alcohol-Related Disorders
       Alcoholism
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In PubMed the MeSH terms are automatically exploded unless that option is turned off. Using the example above, this means that a search for the MeSH term a*lcohol-related disorders* would explode to also include a search for the MeSH term *alcoholism.*

It is important when employing subject headings to determine the year when the heading was introduced. This was one of the failings in the preliminary research for the John Hopkins University trial. The MeSH for the chemical was introduced in 1995. By using that MeSH (and not others also), the investigators missed material that was published prior (Perkins, 2001). If it is not otherwise clear, the year can be determined by looking at the search results for that heading and checking for the oldest dates. Even if the records have been retrospectively assigned headings these earlier records will be a useful guide.

There is a caveat regarding the use of subject headings, however. They are not always adequately or consistently applied. The indexing in Medline, for instance, has undergone criticism in the past (Dickersin, Scherer, & Lefebvre, 1995, p. 28), although there have been improvements in the period since (Glanville, Lefebvre, Miles, & Camosso-Stefinovic, 2006, pp. 131-132, 135), and as a general rule Medline indexing surpasses that found elsewhere. It can be frustrating, however, to look for the subject headings assigned a relevant article in the hope of finding precisely the search terms that might recover similar material only to find that the subject headings so allocated are not helpful. Indexers are not always expert in the subject area or methodological aspects of the articles they are indexing, and authors themselves do not always make their research methods or objectives sufficiently clear for indexers to assign subject terms at an appropriate level.

Searches only using subject headings are, therefore, dependent on the indexing of the databases and since this might not be comprehensive there is a risk of missing relevant material. This risk can be estimated by conducting sample searches using free text and subject headings together and then sample searches using subject headings only and comparing the results. If using subject headings only sees a marked decrease in relevant results, then clearly a search using subject headings alone may be a liability. In light of these various considerations, it is usually best to select a combination of free text words and also subject headings when identifying search terms.

Selecting the Appropriate Methodology Filters

Methodological search filters enable the researcher to select the most useful evidence for each question type (effectiveness, prevention, risk/prognosis, assessment, and description) into which a search can be categorised. These filters should search for studies with the most rigorous methodology (Gibbs, 2003, p. 99; Shlonsky & Gibbs, 2004, pp. 141, 146). Gibbs (2003) uses the label MOLES ("Methodology-orienting locators for an evidence search") to describe these filters (p. 98), and he has provided a table listing in descending order of utility the filter terms for each question type (p. 100). The same table is also conveniently listed in his book's website: http:www.evidence.brookscole.com

If, for instance, the researcher were looking for material addressing effectiveness or prevention questions, then adding MOLES terms such as *random**, OR *controlled clinical trial**, OR *control group**, OR *evaluation stud**, OR *study design*, OR *double blind*, OR *placebo* would be appropriate. If looking for synthesis studies, such terms as *meta-anal**, OR *meta anal**, OR *systematic review** would be suitable (Gibbs, 2003, p. 100).

These MOLES terms are designed for free text searching. With the exception of Medline, which has a policy of carefully indexing research methodologies, indexing is often variable and imprecise. It is better, therefore, not to rely solely on a search of methodological terms in the subject headings but to use a free text strategy. Such a search will then detect these terms in the title, or abstract, or subject headings (if they are indeed indexed), or in the full text of the document (if the full text is searchable). Of course, an article's title or abstract may not contain methodological terms either. Shlonsky, Baker, et al. (2011) found in their study that when the use of methodological terms did not retrieve an article this was often because the subject headings, title, and abstract lacked those terms. They do note that such terms are occurring with greater frequency in more recent publications (p. 397) so this will become less of a concern but clearly this does mean that employing methodological terms in a search may still sometimes miss relevant material. It is, therefore, best to experiment.

Methodological search terms can also be used to search for qualitative studies. These can be described according to the method used to collect data (e.g. *interview*, *audio-recording*, *focus group*, *participant observation*), or according to the methodology that was used (e.g. *grounded theory*, *ethnography*, *phenomenology*, or *action research*). Adding these terms to the keywords that identify the question may home in on qualitative studies. And, of course, adding such terms as *experience**, or *attitude**, or the word *qualitative* itself should locate qualitative studies.

Constructing the Search Strategy

Once the researcher has established the search question, identified the search terms (key concepts and their synonyms, although the search itself may suggest more search terms), and selected the methodological filters, they are in a position to construct a search strategy.

This section will focus on how to construct a search strategy so that it can be interpreted by a database. Databases provide their own easily accessible tutorials and guides on the mechanics of searching their interfaces. There is no need to duplicate that information here and since databases undergo interface changes from time to time it becomes even less necessary to do so. This, then, will serve as a guide to principles of searching which can be applied across databases. Although this section will be largely familiar to skilled searchers, it may still serve as useful revision in some cases.

Constructing a search strategy involves pulling together the search terms and methodological filters (should these be used). This involves combining the search terms using the terms AND, OR, and NOT. These are called Boolean operators.

- AND is used to connect concepts. These are the ideas that must be present in the document for it to be relevant. AND requires that all the search terms appear in the same record. The more concepts connected using AND, the smaller the search result will be because of the requirement that the records contain *all* the concepts.
- OR is used to connect synonyms. OR requires that at least one of the search terms appears in the record. The more synonyms linked using OR, the larger the search result will be because of the requirement that the records contain *any* of the synonyms. The OR search need not merely be used for retrieving precise synonyms. If, for instance, the researcher were searching for material on two different interventions, they could conduct two separate searches but they could rather search for them both in the one search by linking them with the OR operator.
- NOT requires that the term not appear at all in any of the records, although clearly this operator needs to be used with caution.

Invariably, if the Boolean operator is not being used the system will default to AND. This means that a search for *alcohol abuse* will be interpreted as *alcohol* AND *abuse*. It is probably better, though, to enter the AND operator so that the relationships between the search terms are explicit.

Databases will also frequently offer proximity operators. This enables the searching of words within a certain range of each other or in the same paragraph. The operator NEAR in the Cochrane Library database, for instance, will find the search terms within six words of each other. This provides more control over the search strategy than use of the AND operator.

It is important when searching an unfamiliar database to check the help file. This will establish what Boolean operators are available and whether they must be in upper case, although it would appear that consistent use of the upper case regardless of the database is safe. The help files will also explain what the truncation and wildcard symbols are and whether the database provides for proximity searching.

The principles considered thus far can now be put in a structured search in a database.

Applying a Search Strategy to a Case Scenario: Some Examples

Let us assume a 16 year old male presents, suffering from alcohol addiction. We are faced with looking for studies which might suggest a suitable intervention. We might consider cognitive behavioural therapy. We may understand from previous reading or from comments from colleagues that this therapy has been successfully applied but we wish to know what its current status is. We may also consider that studies of its efficacy may suggest other (better?) interventions. We could frame the question in this way:

If an adolescent male suffering from alcohol addiction undergoes cognitive behavioural therapy or not, then will they reduce their drinking?

This is an effectiveness question. It is framed in an *if/then* format which Gibbs (2003) suggests for effectiveness questions. These kinds of questions can be answered through a process of testing or verification (p. 67). As an aside, we may have found that the adolescent is suffering from depression and after interviewing or investigation of the background, we may have reason to think either that the depression is alcohol-induced or that the depression is itself the cause of the addiction. We have, then, become aware of other issues which we might consider building into our search. But we do need to be careful about utilising too many concepts because of the risk of reducing our search result too markedly. Such complexity in a case scenario brings to the fore the fact that social work is a complex activity and ready solutions in the literature which can be directly applied will only sometimes be forthcoming. The literature may give insights and prompts, but the practitioner will need to bring their skills and experience to bear in interpreting the usefulness of the literature.

There are clearly five concepts in our scenario: adolescent, male, alcohol addiction, cognitive behavioural therapy, and treatment. If we were using the PICO framework to structure our question, the concepts *adolescent, male,* and *alcohol addiction* would inform our P (population) search. *Cognitive behavioural therapy* would appear as the I (intervention). We have no specific concept(s) for the C (Comparison). O (outcome) would be defined by terms suggesting efficacy.

Our first task is to consider synonyms for these concepts.

The first concept is *adolescent* and the synonyms are *adolescents, adolescence, youth, youths*, *teenager, teenagers*. But we could express the variant endings as adolescen*, youth* and teenager* (assuming an asterisk is the truncation symbol in the database we are using), thereby removing the need to enter all these options.

The second concept is *male*. We will not include this concept in our search. The kind of health and social science databases we would be using

usually permit us to select gender as a filter. We can apply that filter (or enter the term itself) only once we have conducted our search and we have seen the number of search results. This strategy refers to our principle of not building too many concepts into our search.

The third concept is *alcohol addiction*, so this would also suggest the terms *alcohol abuse*, *alcoholic*, *alcoholism*. Once again, the truncation symbol (*alcohol**) will retrieve these options.

The fourth concept is *cognitive behavioural therapy*. The synonyms would translate as *cognitive behavioral therapy, cognitive behaviour therapy*, or *cognitive behavior therapy*. But we could express these variations as *cognitive behavio* therapy*. Clearly, the truncation symbol saves time. We could also consider using *CBT*, although invariably when an acronym or abbreviation is used in a record the full term appears at least once in a prominent place in that record, so it would probably be unnecessary. But to err on the side of caution we will also include the acronym in our search. Acronyms can, of course, represent more than one entity, but the acronym may be informed by other terms in the search.

The fifth concept is *treatment* and there are a host of synonyms we could use, including such terms as *effective*, *efficacy*, *rehabilitation*, *recovery*. It would probably be unnecessary to include this concept in our search since we can assume that most records including the terms a*dolescents*, *alcohol addiction*, and a therapy, such as *cognitive behavioural therapy*, will be looking at treatment outcomes.

We could set out our search terms as a sentence or a "search string," combining each concept with its synonyms and enclosing them in brackets, and then connecting the bracketed sets with AND. This is how that would look:

(adolescen* OR youth* OR teenager*) AND (alcohol*) AND ("cognitive behavio* therapy" OR cbt)

This would combine each individual word with its variant endings from the first bracketed set with the word *alcohol* and its variant endings from the second set and with the therapy option from the third set, thereby producing a very large number of combinations.

The advanced search facility in most databases will enable us to produce complex search sequences like this by providing a series of search boxes into which we can place our synonyms, whilst joining each box with AND. A portion of our search is below to serve as an example. Note that placing keywords in quote marks (i.e. "cognitive behavio* therapy") will search for the terms as a phrase.

```
adolescen* OR youth* OR teenager*
AND
alcohol*
AND
"cognitive behavio* therapy" OR cbt
```

Thus far, the search has been constructed using free text searching, considering concepts and synonyms and how these are best combined. We will, however, wish to consider subject headings. To do this we will use PubMed as our example because this database is one that is freely accessible to all.

In PubMed the subject heading (MeSH) for *adolescent* is indeed *adolescent.* We learn this by entering the term *adolescent* into the search box and selecting the MeSH option from the drop down menu. In examining the description for *adolescent* we also discover that *adolescent* will search for other terms such as *teens*, *teenagers*, *youth*, and *adolescence*. A key point to note is that if we are doing a free text search in PubMed and truncate a term which happens to be a MeSH term, the search will retrieve that MeSH term but not explode that term to include more specific or narrower MeSH terms in the search result. If, then, we entered the term *adolescent* as a free

text search, PubMed would retrieve this term as a MeSH heading along with narrower terms (if such exist) and it would also search for this term in the title and abstract. If, however, we truncated the term (i.e. *adolescen**) it would retrieve the term *adolescent* from the MeSH but not explode the term to include narrower terms. In this case, however, that is not a concern since there are no narrower terms under *adolescent*.

The MeSH for *alcohol addiction* is *alcoholism*. We learn this by entering the term *alcohol addiction* into the search box and selecting the MeSH option. Examining the description for *alcoholism* shows that *alcoholism* covers the terms *alcohol abuse*, *alcohol dependence*, and *alcoholic intoxication* amongst others. We are given a choice of almost 50 subheadings (under *adolescent* there are 13 subheadings). These are terms used to find frequently discussed aspects of a subject. The subheadings in this case include *diagnosis*, *drug effects*, *psychology*, *rehabilitation,* and *therapy*. This means we could narrow our search by looking for records assigned the specific subject heading *alcoholism-therapy*. We could certainly limit our search to such options, but it is usually wiser not to limit to specific subheadings until we see the results for the subject headings themselves, which in this case is simply *alcoholism*.

The MeSH heading for *Cognitive behavioural therapy* is *Cognitive Therapy*. It sits in the MeSH structure under a broader subject heading *Behavior Therapy* (see below):

```
Psychotherapy
   Behavior Therapy
      Cognitive Therapy
            Acceptance and Commit-
               ment Therapy
            Mindfulness
```

Cognitive Therapy includes two narrower MeSH terms, *Acceptance and Commitment Therapy* and *Mindfulness*. Searching on *Cognitive Therapy* will explode to include these narrower terms.

In common with many other databases, a free text search on PubMed will also search subject headings. This means a free text search for *alcoholism* will search for subject headings in which *alcoholism* appears. But PubMed's indexing, however, is particularly sophisticated and automatically maps to MeSH headings which may not even contain the free text term that was used. If we entered the phrase c*ognitive behavioural therapy*, it would search for this phrase but it would also map to *Cognitive Therapy* as a MeSH and retrieve records assigned that heading. Since the MeSH function is complex, it is wise to read the help files to ensure that maximum use is made of this facility.

Below is another example.

Assume we are tasked with managing the return of a 12 year old Australian Aboriginal boy from foster care to his family of origin. We have seen instances of re-entry to foster care following unsuccessful reunification, and we wish to know what strategies exist to avert this. Our question is

… if an Australian Aboriginal child has been returned to their family of origin what factors will prevent successful reunification?

Rephrasing the question can yield different search terms and this may add to our pool of results. Another way of stating the question, then, is to ask: what are the strategies to mitigate re-entry to foster care of an Australian Aboriginal child? Or perhaps, what are the causes and risks of re-entry to foster care of an Australian Aboriginal child?

This is different from our previous example because we do not have a specific intervention in mind. And as in the previous example there is no specific comparison. But even without an intervention component, we still have a population (Aboriginal foster child) and an issue (causes of re-entry). Thinking about concepts and synonyms, our search could appear as follows:

aborigin* AND ("foster child*" OR "foster care") AND (re-entry OR reentry OR reunification OR return) AND (risk* OR permanency OR stability OR "parent child relations" OR "family relations")

There are a number of observations to make about this search:

- The term *Aboriginal* does not solely apply to Australia's indigenous population. Adding the term *Australian* to the search would, therefore, make the results immediately more relevant. But to do so would be to omit a number of records which refer to Australian Aboriginals but which do not use the term *Australian*, so it becomes necessary to omit this term from the search.
- This is a free text search, although if we were to look at some of the search results we would find that some of the terms appear as subject headings as well.
- The term *re-entry* has an alternative spelling, so this is also included in the search.
- The words and phrases in each bracketed set are not necessarily synonyms. This is particularly marked in the last set but for the purposes of the question and given the terms appearing in the other sets they will have similar implications.
- In this example there is not necessarily a direct match between each of the PICO components and each of the bracketed sets, although some of the PICO components are represented.

- If no such studies involving Aboriginal ethnicity exist, then other studies more generally on risk of re-entry might provide the next best guidance on how to proceed.

Building the Search Incrementally

In the examples above, we constructed search strings of free text terms using a range of concepts and synonyms. Constructing the search in this way has the advantage of speed, although it may become confusing if it is a complex search requiring multiple groupings. But such a search also conceals important information about our search. It does not show where precisely the results are coming from. If our search retrieves few results, we do not know which terms are responsible for the low yield and which may require reconsideration.

We can avoid this difficulty if we build the search incrementally. Most databases enable the user to track the search history. This means we can conduct a search in manageable segments, and by viewing the search history we can see a list of the previous searches. We can then combine the results of the search sets as appropriate. Systematic reviews provide good examples of the manner in which reviewers search multiple combinations of free text truncated terms, subject terms, and subheadings, in addition to filtering by methodology, publication type, gender, date range, and so on.

Finding Too Many or Too Few Results

If the search retrieves an unmanageably large number of records, it becomes necessary to revisit the free text search terms and the subject headings. This may involve adopting more specific free text terms or even relying upon the subject headings alone for the search. If the database assigns subheadings to its subject headings, employing these would make the search more precise. Limiting the search by date range is also a possibility. This might, however, have the effect of omitting earlier

seminal studies, although it might be hoped that these would appear in the reference lists of the more recent relevant items.

If, on the other hand, an insufficient number of records has been retrieved to satisfy the need, then it becomes necessary to widen or expand the search. This would entail greater use of synonyms or perhaps even broadening the search question. "Exploding" the subject headings to include other narrower subject terms is a possibility, and if the subject headings have been refined with subheadings these headings might need to be removed.

Searching Broadly Versus Narrowly

In constructing a search strategy, it is necessary to find a balance which provides comprehensive results without also retrieving too many irrelevant items (Higgins & Green, 2011, 6.4.4 Sensitivity versus precision). The terms "sensitivity" and "specificity' (or "precision"), used in other contexts in statistics, have been used to describe this feature of database searching. Clinical Queries in PubMed has sensitivity and specificity filters. So also does the database Cinahl. These are search formula which will further inform the search.

Sensitivity refers to "high recall, low precision" searching (De Brun & Pearce-Smith, 2009, p. 59). A highly sensitive search will retrieve a larger amount of relevant material but also a lot of material which is irrelevant. It is more inclusive and is used to avoid the risk of omitting relevant material (pp. 59-60).

Specificity (or precision) means "lower recall, higher precision" searching (De Brun & Pearce-Smith, 2009, p. 59). A highly specified search will mean a higher portion of the results will be relevant, but some of the relevant material will be omitted (pp. 59-60).

Sensitivity searching requires greater time to sift through the results. Wilczynski, Haynes, and Hedges (2006) pointedly state that "researchers… will best be served by the most sensitive search strategy *when they have time* [emphasis added]

to sort through articles" (p. 5). Time, however, is not necessarily something that social workers have at their disposal. These authors found that specificity was "enhanced" when they combined methodological search terms with content appropriate keywords, thereby decreasing the number of articles that needed to be sorted through to find relevant material (p. 6).

The *Cochrane Handbook* (Higgins & Green, 2011) also endorses a sensitive search where practicable, recommending "the sensitivity-maximizing version in combination with a highly sensitive subject search" (6.4.11.1 The Cochrane Highly Sensitive Search Strategies for identifying randomized trials in MEDLINE). The handbook suggests that if this retrieves too many results, "the sensitivity- and precision-maximizing version" should rather be used. Interestingly, it then adds this comment, "It should be borne in mind that MEDLINE abstracts can be read quite quickly as they are relatively short and, at a conservative estimate of 30 seconds per abstract, 1000 abstracts can be read in approximately 8 hours" (6.4.11.1). Whilst reading 1000 abstracts may be necessary when writing a systematic review, it is less likely that the busy practitioner will be able to engage with the literature at this level. But the point does establish that broad searching does not necessarily imply careless searching.

In sum, whether the researcher chooses to adopt a broad or more narrow search will ultimately be contingent on the amount of time available, the amount of material available, and the reason for the search.

Documenting the Search

It is a good idea to document the search listing the date and the databases or other sources used, detailing the search strategy, the number of results, and any ideas that the search may have generated. This may be valuable information which could inform another separate search or provide useful information at a future date.

Summarising Key Points

These points below serve as a checklist for searching:

1. Try to use subject headings (exploded if appropriate) and free-text terms for concepts, ensuring a wide range of synonyms.
2. Avoid too many different concepts, but use a wide variety of synonyms and related terms (both free text and subject headings) for the concepts that are used.
3. Combine different concepts with AND; synonyms must be combined with OR.
4. Avoid use of the NOT operator in combining search sets, unless there is little risk of inadvertently missing something.
5. Use truncation to ensure maximum use of free text terms.
6. Avoid language limiters. Although the article may be in another language and an English abstract may be all that is available, key parts of an article can be translated.
7. It is not always possible to search for every aspect of a question. The concepts may not be well described in the title or abstract and may not be well indexed with subject headings.
8. Ideally aim for high sensitivity to reduce the chance of missing something, although in a practice context where time is at a premium this may not be possible.
9. Avoid limiting searches to keywords in the title and abstract. In many databases not all the records possess abstracts. In addition, the researcher cannot be confident that the terms they have selected for their search are used by the abstractor. Authors and searchers often use different vocabulary to describe the same concept. As an example, a search for the phrase "quality of life" in PubMed retrieves over ten thousand citations where quality of life was deemed a major topic of the article by the indexer, but the term, "quality of life," did not appear in either the title or abstract.
10. Examine the subject headings and abstracts of useful material with a view to locating other search terms.
11. Query several relevant databases before deciding that there is sufficient material. That decision is usually only justified if sufficient material has been located satisfactorily addressing the question or if the same literature is recurring yielding nothing new in which case further investment of time is not worth the effort.
12. Avoid beginning with a conclusion and only searching for supporting evidence ("backward reasoning") (Gibbs, 2003, p. 7). Searching only for material that supports a favoured position is to engage in what has been labelled "an artfully concealed lie" (Gibbs, 2003, p. 89; Shlonsky and Gibbs, 2004, p. 142). Shlonsky and Gibbs (2004) advise the researcher "to search as diligently for *dis*confirming evidence as they do for evidence that supports their hunches" (p. 142).
13. Recheck the search strategy and perhaps broaden it if the search retrieves nothing of relevance. There may be little or no research available. Gibbs (2003) observes that "a well-planned and executed search that finds nothing *is* a finding — it means we may not now know given the state of existing knowledge!" (p. 93). But assurance is first necessary that there really is no evidence and that results are not simply being compromised because of failure to use the appropriate databases, or most appropriate keywords, or subject headings.

SELECTION

Once the search has been conducted, the next task is to sift through the records for those that will be most relevant.

Thomas and Hodges (2010) advise reading the clearly relevant material in some detail to clarify the ideas and arguments. Once that is done "possibly relevant" material is more easily identified (p. 116). This may seem obvious but it avoids stewing over a record unsure of its value and then making an almost arbitrary decision to retain or discard it.

What makes an article or study "relevant"? Clearly, material which addresses the question or provides insights which will inform a practice context, but once identified this material will require appraisal. The purpose of appraisal is to answer three questions: What are the results of the study? Are the results valid? How will these results help? (De Brun & Pearce-Smith, 2009, p. 103; Gibson & Glenny, 2007, p. 97). It is to establish which articles or studies are the most valid and applicable.

There are some basic criteria which will help in the initial appraisal of relevant material. This is a first level of evaluation. If methodology filters are used, homing in on research material, it is less likely that some of this evaluative criteria will be required.

First Level of Evaluation

- Is the author(s) identified and are the contact details available? Is the author(s) credentialed in the area? If the author is not an expert in the area they may draw extensively from authors who are, thus making the item of some use. Nevertheless, if the content appears useful, it will still be necessary to read the original authors to ensure they have been interpreted correctly.
- Has the author(s) a bias? Perhaps the study is compromised by its funders? Perhaps the writer has a particular ideology or experience which has unduly influenced them? Bias, however, does not necessarily mean the material is without merit.
- Is the article/report published in a refereed journal or from a well-known publisher? Even if it is not, the material can still be significant as is clear from the comments above regarding grey literature. Grey literature will require the same scrutiny as published literature.
- Is the material well referenced? Are sources cited credible? Can the information be verified elsewhere in credible sources? Even so, perhaps the references only support points which no one disputes, although the overall conclusion may remain unsupported.
- Is the material recent or is it dated? It may not be recent but it may still be valuable. After all, seminal studies only become seminal because they have been around for a while.
- How is the argument developed? Gibbs (2003) has helpfully described a number of fallacies: "uncritical documentation," "appeal to authority," (p. 28), "appeal to experience" (p. 29), "vague" or "poorly formulated" questions (p. 30), "vague quantifying adjectives" or terms (such as "generally," "most likely," "probably") (pp. 30-31), "appealing to tradition" or "precedent" (p. 31). Evidence of these shortcomings in a document is certainly grounds for discarding, although the material may prompt a particular research direction.

These criteria provide initial conditions that need to be met. As is clear, they cannot be applied in a knee-jerk manner for they each require qualification on a case-by-case basis. If, however, material fails the nuanced application of these criteria then, indeed, the material can probably be safely put aside without the need for closer scrutiny.

Crisp (2004) has also suggested nine questions which she encourages researchers to use when selecting research evidence. One question in particular, "Is the basis of this evidence methodologically sound?" (p. 81) requires rather close scrutiny of the content, so the issues this raises will appear in a discussion of second level criteria.

- "Why am I using this evidence?" (p. 81). If the evidence is being used to support an argument or practice decision, it must be relevant.
- "Am I only using this evidence because it is readily available to me or because I believe it to be credible?" (p. 81). Evidence needs to be credible, not merely available.
- "Am I using this evidence without considering how apt it is for the context because it comes from an eminent source?" (p. 81).
- "To what extent do personal factors impinge on my evaluation of this evidence?" (p. 81). Being conscious of how one's own experiences, background, and biases might shape the interpretation of research findings is important.
- "Will others be convinced by this evidence?" (p. 81). Research evidence needs to be perceived to be credible.
- "Is it possible that there is more appropriate evidence? If so, do I have the resources (including time) to search for other evidence?" (p. 82).
- "Are there reasons why this evidence cannot be applied?" (p. 82). Cultural or other contexts may raise issues of generalisability.
- "Is it possible that this evidence has been superseded?" (p. 82). New research evidence may confirm earlier evidence but it might also contradict it.

What is notable about this set of questions is that, although as in the first list it includes some external criteria, it also includes questions which probe the researcher's attitudes and motivations and has the effect of making the researcher more self-conscious about how they are evaluating the material and whether decisions are transparent. That makes this criteria very useful.

Material located on the Internet should be subjected to these different sets of criteria as well. But there is an additional evaluative filter available when encountering material on the Internet. The website's domain name which appears in the URL (web address) gives added information to aid evaluative decisions.

The domain name occurs before the first backslash (/). It will appear as edu, org, com, net, gov, govt, or a country code. Truncating the URL back to the domain name will establish the nature of the source. Domain names which include edu, org (they may be professional or charitable organisations), and gov are more likely to have scholarly content (Szuchman & Thomlison, 2011, p. 65), although even in the case of an edu address the site may be the personal website of a lecturer or professor and, therefore, not have undergone peer review.

Google searchers can search for specific domains by adding the word *site* to the search. This command instructs Google to search only in the specified domain. This means that a search for *youth "alcohol abuse" site.gov* would search U.S. government websites for the term *youth* and the phrase "*alcohol abuse.*" Similarly, *youth "alcohol abuse" site:gov.uk* would search government websites from the United Kingdom. Searching within domains, therefore, is a useful evaluative filter which also serves to reduce the search result.

Second Level of Evaluation

Once various combinations of the above criteria have been applied, the remaining material can be subjected to a second level of evaluation. This is in effect to ask whether the information or argument in the article or study is unambiguous and rigorously-derived and whether the conclusions follow logically from the rest of the content.

Pawson, Boaz, Grayson, Long, and Barnes (2003) have developed a set of helpful principles which can be used to appraise material at this deeper level. They label these principles "TAPU-PA," based on the quality dimensions which they have suggested.

- **T**ransparency – is it open to scrutiny?
- **A**ccuracy – is it well grounded?
- **P**urposivity – is it fit for purpose?
- **U**tility – is it fit for use?
- **P**ropriety – is it legal and ethical?
- **A**ccessibility – is it intelligible? (p. 40)

The TAPUPA framework is designed to assess the quality of social care knowledge more widely, but it also has the virtue of capturing many of the characteristics of social work research. Although Pawson et al. (2003) point out that these are "basic questions" in the sense that they are "generic" and "elemental" (p. 37), they do require careful content analysis. "Transparency", for instance, requires that the material provide detail regarding the theoretical framework, rationale, and process of analysis (pp. 38, 42). "Accuracy" requires that assertions, conclusions, and recommendations are solidly based on data (p. 38). "Purposivity" requires experience at judging appropriate methodologies (pp. 38-39).

The generic nature of these principles gives them wide application and this is their value. But, of course, questions regarding the nature of the argument or study, its clarity and rigour, will be rendered more specific contingent on the nature of the material.

Such questions clearly undergird the checklist below for appraising systematic reviews which has been adapted from Oxman (1995). Amongst the evaluative criteria for evaluating systematic reviews are the following:

- Is the question which the review seeks to address clearly stated?

- Is the search strategy clearly set out? Is it systematic and thorough so that the relevant studies are identified?
- Are the inclusion criteria adopted by the reviewers made explicit, and are they appropriate or is there evidence of selection bias?
- Is the validity of the studies adequately appraised?
- Are the conclusions or recommendations supported by the data? (p. 78).

The diversity of problems, contexts, and interventions associated with social work activity means that statistical comparisons are difficult to achieve. There are too many variables and results may have limited transferability to other contexts. Not only does a systematic review, therefore, require evaluation on its own merits (as above), but its applicability to a specific case scenario can, of course, only be determined on a case-by-case basis after careful practitioner scrutiny.

Gibbs (2003) discusses the usefulness of the Quality of Study Rating Form (QSRF), which had earlier undergone several iterations and was revised again by Gibbs for his 2003 text (pp. 157-158). He observes that it had been designed for use by students to evaluate the relative merits of studies and treatments. In this context, he also notes that it is particularly valuable for evaluating randomised controlled trials but it can be used to rate any effectiveness study (p. 158). This set of questions below has been adapted from criteria (there are 22 in total) that Gibbs sets out in detail (pp. 160-164):

- Does the study describe the subject(s) clearly and the presenting problems?
- Is the treatment clearly specified so that it could be replicated?
- Does the study identify where the treatment occurred and over how long, and provide contact details of those at the facility?

- Does the study explain the rationale for the interventions used or cite literature that can be followed up?
- Were the subjects randomly selected for inclusion in the study, and once selected were they randomly assigned to the control or treatment groups?
- Were subjects in the control and treatment groups treated equally prior to treatment?
- Were subjects unaware of whether they were in the control or treatment groups?

Gibbs includes a range of other criteria which involve statistical analysis (pp. 161-164) and which require rather more detail than can be set out here. Nevertheless, the criteria above give some guidance regarding what to look for, and only once there is assurance on these points is there any obligation to subject the studies to statistical scrutiny.

These criteria address the question of whether the results are internally valid. In the typical format as laid out in most published reviews and studies, there are key places where determinative information to inform evaluation can be expected. The *Title*, *Abstract* or *Introduction/background* should clearly state the question. Failure to do so may raise a red flag regarding further weaknesses in the paper. The *Methods* or *Methodology* and *Results* sections should provide information to address the criteria suggested above. These sections will, therefore, provide the data to inform whether an explanation of the findings as set out in the *Discussion* and *Conclusions* are accurately represented or if there are other ways of interpreting that data.

In addition to meeting this criteria for internal validity, a study will also need to satisfy external validity to be deemed relevant. This is a question of applicability and asks whether the results will help in a particular practice context. These are the questions which require answering before study results can be applied:

- Is the client(s) and their situation sufficiently similar to those in the study to make the results applicable?
- Is the intervention feasible? Are the resources available to pursue the intervention or recommended course of action?
- Does the client support this intervention or recommended course of action?
- Will the potential benefits outweigh any identifiable harms?

A range of appraisal instruments and frameworks is available for use in the assessment of qualitative research. Some are generic, being applicable to almost all qualitative research designs; others have specifically been developed for use with certain methods or techniques. Hannes (2011) has noted that tools for the appraisal of qualitative research usually share some basic criteria. These include the requirement for ethical research, relevance to practice or policy, rigorous methodology, and equally rigorous reporting (Section 1: Core criteria for quality assessment). But he also notes there is debate regarding whether such concepts as validity and reliability can be applied to qualitative research. He takes the view that validity, reliability, and objectivity can be established, and that researcher bias is the "core criterion" to be evaluated. The researcher needs to be able to make their "influence and assumptions clear and to provide accurate information on the extent to which the findings of a research report hold true" (Introduction).

Commenting on the difficulty associated with developing universal standards for qualitative studies, Gibbs (2003) specifically discusses the Qualitative Study Quality (QSQ) form. This has been created based on other qualitative study rating forms and on extensive discussions on qualitative study quality (p. 228). Gibbs sets out the 22 evaluative criteria which comprise the form (pp. 228-234). Below is a set of questions adapted from that form which will give an idea

of the detailed contents of the QSQ, whilst also providing sufficient criteria to make evaluative assessments of some qualitative studies:

- Is the research question clear and stated before the study began? This may not entail a very specific question, but there should at least be a general statement about what the study was designed to show.
- Is the methodology identified and appropriate? Does the study specify why a particular methodology was selected, and are there references to literature that define the methodology?
- Does the study explain from where the subjects were selected or from where their records for observation were derived?
- Is the time frame of the study specified?
- Does the study record the number of refusals to participate or respondents dropping out of the study and the reasons?
- What criteria was used for selecting subjects or records for observation? Does the study provide sufficient information to permit replication of the procedure?
- Do the authors state that they selected subjects or records according to a random selection procedure, and is there sufficient detail to allow replication?
- Does the study rely on one single observer or preferably two or more independent observers?
- Does the study make clear how much agreement existed between observers once their assessments were compared, and what procedure was used to check this?
- Does the study supply information which would suggest that the author(s) ensured respondents gave accurate responses and that their known participation in the study did not influence their responses?
- Is there a clear link between the observations and the conclusions?

- Are the transcripts of interviews or the records available so that the data could be checked?
- Is an independent assessor of the observations identified to confirm that they also drew the same conclusions as the study's authors?
- Does the study avoid unwarranted extrapolation? If the sample was not randomised, do the authors refrain from extrapolating the results beyond those in the sample?

Lincoln and Guba (1985) discuss four "trustworthiness criteria" to evaluate qualitative research findings: "credibility," "transferability," "dependability," and "confirmability." They suggest that these four terms are loosely equivalent to the terms "internal validity," "external validity," "reliability," and "objectivity" used in reference to quantitative studies (p. 300). Lincoln and Guba's detailed discussion provides multiple suggestions of how these criteria can be met along with caveats and pitfalls (pp. 301-327). Drawing on Lincoln and Guba, these criteria are described in brief below to give an idea regarding their focus and intent.

- **Credibility:** Was the inquiry carried out in such a way that the findings would be approved by the participants who are the subject of the inquiry? (p. 314). This would include efforts made by the researchers for respondents to be able to review transcripts to confirm or clarify interpretations (pp. 301, 314). It would also include triangulation using "multiple and different *sources*, *methods*, *investigators* and *theories*" (p. 305).
- **Transferability:** To what extent can the findings be applied to similar settings? Can hypotheses be developed which have application in different settings? The researcher is "responsible for providing the widest possible range of information for

inclusion" so that the reader can make an informed decision about whether transfer is possible (p. 316).

- **Dependability:** How dependable are the accounts given that changes to the entity being studied may occur during fieldwork? This criterion evaluates whether the process of research is logical and clearly documented. This involves keeping clear and detailed records (e.g. transcriptions and recordings) which can be subjected to an audit trail (pp. 316-318).

- **Confirmability:** Does the study indicate the extent to which the research findings are determined by the participants in the study and not the researcher? This would entail researchers reflecting on the impact they may have had on the research and providing information on their background and perspective. An audit process examining the data, findings, interpretations, and recommendations, and attesting that it is supported by data would establish confirmabilty. So would keeping a reflective journal (pp. 318-319).

Although Litva and Jacoby (2007) do not wish to be seen to be creating a "rigid checklist" (p. 162), they acknowledge the value of these same four criteria (p. 163). Hannes (2011) also believes this criteria suggests the methodological standard that a qualitative study should be able to attain, although he recognises that a study may follow appropriate procedures and yet the data be poorly interpreted, and conversely a study may lack clarity in its methodology and yet still provide valuable insight (Section 1: Core criteria for quality assessment: What indications are we looking for in an original research paper?)

The various criteria outlined in this section contain the basic questions necessary for assessing the quality of quantitative and qualitative research studies and is admittedly a brief survey. Further

more detailed resources for learning these sort of appraisal skills can be found in Gibbs (2003) who devotes four chapters on how to appraise studies that evaluate the effectiveness of treatment, how to appraise systematic reviews and meta-analyses, assessment and risk/prognosis studies, and descriptive and qualitative studies (pp. 147-236). Resources can also be found at the book's website: http://www.evidence.brookscole.com

There are also a number of appraisal instruments that are available on the Internet. Two commonly used critical appraisal tools are the Qualitative Assessment and Review Instrument (QARI) Instrument and the Critical Appraisal Skills Programme (CASP) instrument. Both contain ten quality criteria. Pearson and Hannes (2013) compare the differences between the two (pp. 229-237). These tools are listed below along with other checklists and tools that are easily accessible on the Internet. They clearly define what is meant by each individual criterion, making it easier for practitioners who may have less confidence in appraising qualitative research.

Qualitative Assessment and Review Instrument (QARI) (http://joannabriggs.org/sumari.html)

The QARI software tool from the Joanna Briggs Institute (JBI) is designed for appraising, extracting and synthesizing qualitative research. Although subscription is required to gain full benefits, the appraisal forms can be found on various websites.

The University of Oxford Centre for Evidence Based Medicine (http://www.cebm.net/index.aspx?o=1157)

This site provides critical appraisal sheets for systematic reviews and randomised controlled trials, setting out what questions to ask and what to look for.

Critical Appraisal Skills Programme (CASP) (http://www.casp-uk.net/)

This programme includes eight critical appraisal tools which are free to download and can be used by anyone under the Creative Commons License.

CONCLUSION

Developments in information technology have facilitated evidence-based practice (Gambrill, 2006, p. 341; Gibbs, 2003, p. 15). But the tools available to the practitioner need to be fully harnessed if there is not to be risk of significantly relevant information being overlooked. It is, therefore, necessary to be familiar with the information resources and to know when the use of any one of them is appropriate. It is also necessary to master the basic principles and practices of searching for and selecting material which is useful in practice. This chapter has sought to summarise some of the resources that are available, to set out the principles of searching, and to summarise some useful criteria for evaluating sources. The potential benefits associated with the vast plethora of material available need to be maximised so that the social work practitioner's efforts are informed by the best available research evidence.

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KEY TERMS AND DEFINITIONS

Boolean Operators: Words that combine search terms to either broaden or reduce a search result.

Controlled Vocabulary: Another term for subject headings.

Database: A searchable electronic system that stores and indexes the abstracts (and sometimes full text) of published and unpublished records.

Descriptors: A term assigned by some databases to controlled vocabulary.

Free Text: Words that are entered into a database as they would if they were spoken.

Index: Another term for thesaurus. "Index term" is a synonym for controlled vocabulary.

Search Strategy: A combination of selected free text and subject heading terms which are used when searching for material to address a question.

Subject Headings: Used to standardise the indexing in a database. This enables the searcher to select and search for synonyms or related and preferred terms and also to see descriptions of the terms. Subject headings identify the content of the item and are added to the thesaurus or index.

Text Word: Words that have not been individually indexed in the database, i.e. they do not appear in the database thesaurus.

Thesaurus: Many databases employ subject headings to standardise the indexing in the database. This enables the searcher to select and search for synonyms or related and preferred terms and also to see descriptions of the terms. This is also known as controlled vocabulary.