The OHS Professional as a 'Critical Consumer' of Research

Core Body of Knowledge for the Generalist OHS Professional

S.I.A. Safety Institute of Australia Ltd

Australian OHS Education Accreditation Board

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Disclaimer

The OHS Body of Knowledge for Generalist
OHS Professionals has been developed under the
auspices of the **Health and Safety Professionals Alliance**

The Technical Panel established by the Health and Safety
Professionals Alliance (HaSPA) was responsible for developing
the conceptual framework of the OHS Body of Knowledge and
for selecting contributing authors and peer-reviewers.
The Technical Panel comprised representatives from:

The Safety Institute of Australia supported the development of
the OHS Body of Knowledge and will be providing ongoing support
for the dissemination of the OHS Body of Knowledge and for the
maintenance and further development of the Body of Knowledge
through the Australian OHS Education Accreditation Board which
is auspiced by the Safety Institute of Australia.

Synopsis of the OHS Body of Knowledge

Background

A defined body of knowledge is required as a basis for professional certification and for accreditation of education programs giving entry to a profession. The lack of such a body of knowledge for OHS professionals was identified in reviews of OHS legislation and OHS education in Australia. After a 2009 scoping study, WorkSafe Victoria provided funding to support a national project to develop and implement a core body of knowledge for generalist OHS professionals in Australia.

Development

The process of developing and structuring the main content of this document was managed by a Technical Panel with representation from Victorian universities that teach OHS and from the Safety Institute of Australia, which is the main professional body for generalist OHS professionals in Australia. The Panel developed an initial conceptual framework which was then amended in accord with feedback received from OHS tertiary-level educators throughout Australia and the wider OHS profession. Specialist authors were invited to contribute chapters, which were then subjected to peer review and editing. It is anticipated that the resultant OHS Body of Knowledge will in future be regularly amended and updated as people use it and as the evidence base expands.

Conceptual structure

The OHS Body of Knowledge takes a ‒conceptualø approach. As concepts are abstract, the OHS professional needs to organise the concepts into a framework in order to solve a problem. The overall framework used to structure the OHS Body of Knowledge is that:

> **Work** impacts on the **safety** and **health** of humans who work in **organisations**. Organisations are influenced by the **socio-political context**. Organisations may be considered a **system** which may contain **hazards** which must be under control to minimise **risk**. This can be achieved by understanding **models causation** for safety and for health which will result in improvement in the safety and health of people at work. The OHS professional applies **professional practice** to influence the organisation to being about this improvement.

This can be represented as:
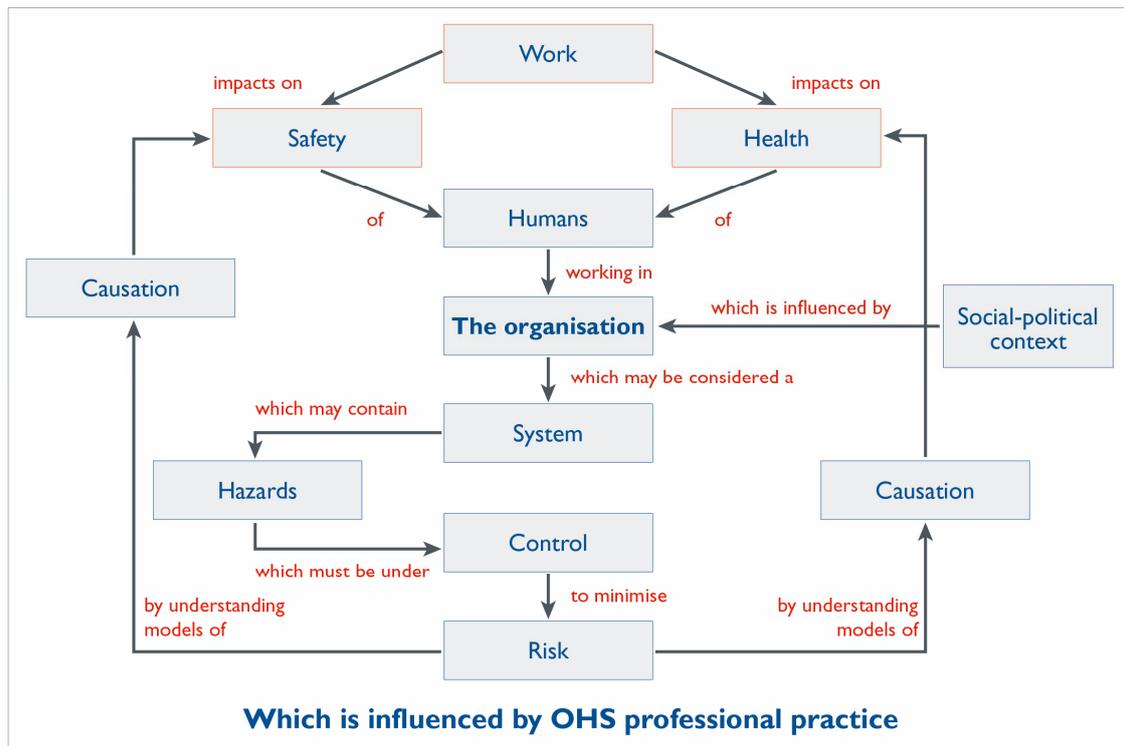
Audience

The OHS Body of Knowledge provides a basis for accreditation of OHS professional education programs and certification of individual OHS professionals. It provides guidance for OHS educators in course development, and for OHS professionals and professional bodies in developing continuing professional development activities. Also, OHS regulators, employers and recruiters may find it useful for benchmarking OHS professional practice.

Application

Importantly, the OHS Body of Knowledge is neither a textbook nor a curriculum; rather it describes the key concepts, core theories and related evidence that should be shared by Australian generalist OHS professionals. This knowledge will be gained through a combination of education and experience.

Accessing and using the OHS Body of Knowledge for generalist OHS professionals

The OHS Body of Knowledge is published electronically. Each chapter can be downloaded separately. However users are advised to read the Introduction, which provides background to the information in individual chapters. They should also note the copyright requirements and the disclaimer before using or acting on the information.

The OHS Professional as a 'Critical Consumer' of Research

Pauline Zardo BA(Hons)

PhD candidate, Department of Epidemiology and Preventive Medicine, Monash University
Email: pauline.zardo@monash.edu

Pauline's PhD project is focused on evaluating capacity for evidence-informed decision making in public health policy environments. Currently, Pauline works as a Research Translation Officer for the Institute of Safety, Compensation and Recovery Research. Previously, she was a Policy and Project Officer in WorkSafe Victoria's Health and Safety Strategic Programs Division, and has written evidence-based fact sheets on workplace issues for an industrial relations and human resources consultancy company.

Pam Pryor BSc, BEd, GDOHM, FSIA

Secretary, SIA OHS Education Chapter
Sessional Lecturer, Senior Research Fellow and PhD candidate, University of Ballarat
Email: pampryor@ballarat.edu.au

Pam has qualifications in education and in OHS, and has been a practising OHS professional for more than 25 years. She has worked in various internal and external-consultant OHS roles, and was the chair of the Technical Panel for the OHS Body of Knowledge project. Currently a PhD candidate at the University of Ballarat, Pam's thesis is titled "Towards an understanding of the strategic influence of the occupational health and safety professional."

Peer reviewer

Dr Steve Cowley PhD, BSc(Hons)(OHS), MSc(OccHyg), GCert(Ed), FSIA, RSP
Steve Cowley Health & Safety Consulting

Core Body of Knowledge for the Generalist OHS Professional

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The OHS professional as a 'critical consumer' of research

Abstract

One of the characteristics of a professional is that their practice is evidence-informed and reflects current knowledge. While Occupational Health and Safety (OHS) professionals may conduct research, they are more likely to be 'consumers' of research conducted by others. Consequently, they need to be able to access and analyse OHS-related research literature to maintain their currency of knowledge and to identify implications for their professional practice. This chapter provides a basis for understanding the need for OHS practice to be informed by research together with a review of the types of research, research design, data collected and the key features of an academic paper as a basis for critical review. For OHS professionals embarking on evidence-informed OHS professional practice, guidance is provided for clarifying the purpose of a literature search, accessing resources, and appraising research literature. A framework for critical review of research papers is presented. Finally, OHS professionals are encouraged to use evidence from individual papers to inform their practice, to reference the evidence base in their reports and to use documented critical analysis of research to enhance their continuing professional development.

Contents

1   Introduction

The need for Occupational Health and Safety (OHS) professional practice to be informed by an evidence base was identified during the Model of OHS Practice development process.[1] Key to the model's *professional*-practice status was the application of a conceptual framework to the problem-solving process. This conceptual framework should be continually refreshed to reflect current knowledge and thinking.

Research plays a vital role in establishing the evidence-base and creating and updating knowledge. The importance of research to inform practice has been highlighted by Wigglesworth who, in advocating for increased OHS research, noted the role of medical research in combating tuberculosis so that it is no longer a major source of death, and of road safety research which saw a 50% reduction in road fatalities over a 30 year period where in the same period there was an increase in deaths due to workplace accidents. (Wigglesworth, 2001.)

As professionals in the health and public health arena move toward evidence-informed practice and policy (e.g. Banks, 2009; Frommer & Rychetnik, 2003; Greenhalgh, 2004; Killoran & Kelly, 2010; Lavis, 2008), it is essential that OHS professionals move with them. A recent survey conducted by the Australian Institute of Management and the Safety Institute of Australia (Funston & Quarch, 2011) found that many OHS personnel within organisations lack the skills to effectively engage decision makers at the top level of organisations; this impacts on their ability to lead innovation and change, to manage people and performance, and to plan strategically. Thus there is an opportunity for OHS professionals to increase their use of evidence to build their case for change and secure a seat at the decision-making table. For OHS professionals to achieve employer buy-in to OHS change processes or interventions, these must be evidence-based; evidence of 'what works' is a powerful driver for change for both employers and workers (Maule, 2011).

Conducting workplace research is a valid activity for OHS professionals,[2] and Galea (2009) and others have presented a strong case for 'insider research;' however, this chapter is inspired by Hek and Moule's (2006) insistence that practitioners[3] become 'critical consumers of research.' Being a critical consumer of research is more than just reading academic papers; it involves thinking critically about the assumptions behind research, the methodologies employed and the implications that research results hold for practice. This chapter provides

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[1] See *OHS BoK* Model of OHS Practice

[2] During the OHS Body of Knowledge development process considerable discussion focused on the importance of research knowledge and skills for OHS professionals. It was decided that while these skills are desirable, they are not 'core.'

[3] Although directed specifically at health and social care practitioners, Hek and Moule's (2006) approach to advocating critical appraisal of research has relevance for OHS professionals.

an overview of types of research and research literature, and offers guidance for OHS professionals embarking on evidence-informed practice.

2   Types of research

Research, which may be defined as =systematic critical investigation directed towards increasing the general body of knowledge or understanding of a particular processø (Wigglesworth, 2001, p. 96) is integral to establishing the OHS evidence-base and updating OHS knowledge.

In 2010, the SIA Academy of University Education and Research hosted a conference called =Towards a Policy on OHS Research.øIn her summary of the proceedings and subsequent discussion (with particular reference to a presentation by Anthony LaMontagne), Ellis concluded that OHS research:

- Has the goal of contributing to our understanding of the relationships between work and health and safety to make work safer for workers
- Has an articulated research question or hypothesis
- Has specified methods of inquiry
- Is systematically conducted
- Has conclusions based on the results of analysis
- Acknowledges its strengths and limitations
- Is reported so as to be replicable or a clear audit trail links data with analysis and conclusions (SIA, 2010).

Continuing to cite LaMontagne, Ellis listed three types of OHS research:

- *Knowledge generation*, which may be experimental, observational, descriptive, etiologic, applied or interventional
- *Knowledge synthesis*, which may include reviews, systematic reviews and meta-analyses.
- *Knowledge translation* and exchange (the newest and least developed type of research), which may be observational or intervention/experimental (SIA, 2010).

In recent years, it has been asserted that the traditional scientific research paradigm has been supplemented by the emergence of a more =socially distributedøknowledge system. This new approach to knowledge production was identified by Gibbons et al. (1994), who labelled it =Mode 2øto distinguish it from the traditional =Mode 1ø

í in Mode 1 problems are set and solved in a context governed by the, largely academic, interests of a specific community. By contrast, Mode 2 knowledge is carried out in a context of application. Mode 1 is disciplinary while Mode 2 is transdisciplinaryí .Mode 2 is more socially accountable and reflexive.

It includes a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localised contextö (Gibbons et al., 1994, p.3).

While the Mode 1óMode 2 distinction (further developed by Nowotny, Scott & Gibbons, 2001) has been the subject of much debate (see, for example, Hessels & van Lente, 2008), the identified attributes of application-oriented Mode 2 research resonate strongly in the multidisciplinary field of OHS.

General distinctions between types of research and approaches to research design that OHS professionals should be familiar with are explained below.

2.1   Primary and secondary research

Academic research papers can be based on either primary or secondary research. Whereas primary research features first-hand data collection, secondary research involves the review and summation of findings from existing research studies. OHS professionals do secondary research when they select and appraise research or professional papers (e.g. Fleming, Ryan & Wakefield, 2006). Increasingly, evidence-based practice, particularly in healthcare, is making use of systematic reviews, i.e. secondary research reviews that õaim to identify, evaluate and summarise the findings of all relevant individual studies, thereby making the available evidence more accessible to decision-makersí   [and] adhere to a strict scientific design based on explicit, pre-specified and reproducible methodsö (CRD, 2009, p. v). (For more information about systematic reviews see, for example, Higgins & Green, 2011; Petticrew & Roberts, 2006).

2.2   Quantitative, qualitative and mixed methods of inquiry

A simplistic distinction between the two research paradigms ó quantitative and qualitative ó is that the former generates numerical data (or information that can be converted into numbers), while the latter generates word-based data (Experiment Resources, 2008). Since Newman and Benz (1998) and others argued for replacing the traditional quantitative *versus* qualitative perspective with the idea of combining aspects of these paradigms, a third method of inquiry ó known as ÷mixed methodsøresearch ó has evolved. Creswell (2009) described the differences between quantitative, qualitative and mixed methods of inquiry:

- In a *quantitative* approach, a researcher:

  tests objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures. The final written report has a set structure consisting of introduction, literature and theory, methods, results, and discussioní   [T]hose who engage in this form of inquiry have assumptions about testing theories deductively, building in protections against bias, controlling for alternative explanations, and being able to generalize and replicate the findings.

- In a *qualitative* approach, a researcher sets out to explore and understand:

the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data typically collected in the participantøs setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data. The final written report has a flexible structure. Those who engage in this form of inquiry support a way of looking at research that honors an inductive style, a focus on individual meaning, and the importance of rendering the complexity of the situation.

- In a *mixed methods* approach, the researcher:

  combines or associates both qualitative and quantitative formsí It is more than simply collecting and analyzing both kinds of data; it also involves the use of both approaches in tandem so that the overall strength of a study is greater than either qualitative or quantitative research. (Creswell, 2009, p. 4)

Traditionally, OHS research has tended to employ quantitative techniques (such as experimental designs, intervention studies and surveys) in, for example, studies of epidemiology, toxicology and occupational hygiene. Increasingly, however, OHS practices and workplace culture are being elucidated via qualitative research techniques, including observation, focus group studies and in-depth interviews, as well as, for example, participatory action research and the systematic methodology of grounded theory. (For more information on the wide range of qualitative and quantitative research methods see, for example, Creswell, 2009). Both approaches provide valuable information and often complement each other (Caldwell, Henshaw & Taylor, 2005), and the efficacy of applying mixed quantitative-qualitative methods to some OHS research problems is being recognised. After employing both quantitative and qualitative methods of inquiry in a research setting, Matveev (2002, p. 59) observed that õWhile quantitative methods can provide a high level of measurement precision and statistical power, qualitative methods can supply greater depth of information.ö

2.2.1 *Evaluating the quality of evidence*

To be a critical consumer of research, the OHS professional needs to be able to evaluate the quality of the evidence presented. Different evaluative criteria apply depending on whether the data is quantitative or qualitative.

Because much quantitative research seeks to generalise from a sample to a full population, much importance is placed on the sample size, selection technique (and avoidance of selection bias) and representativeness of a population. Various *hierarchies of evidence* have been developed for use in medical and clinical settings to rank quantitative research methods based on the reliability and validity of their findings (see, for example, Evans, 2003; Merlin, Weston & Tooher, 2009). The most common type of hierarchy places systematic reviews and meta-analyses at the apex followed by individual studies involving randomised controlled trials (RCTs) (Cluett, 2006). A typical hierarchy of evidence is depicted in Figure 1.
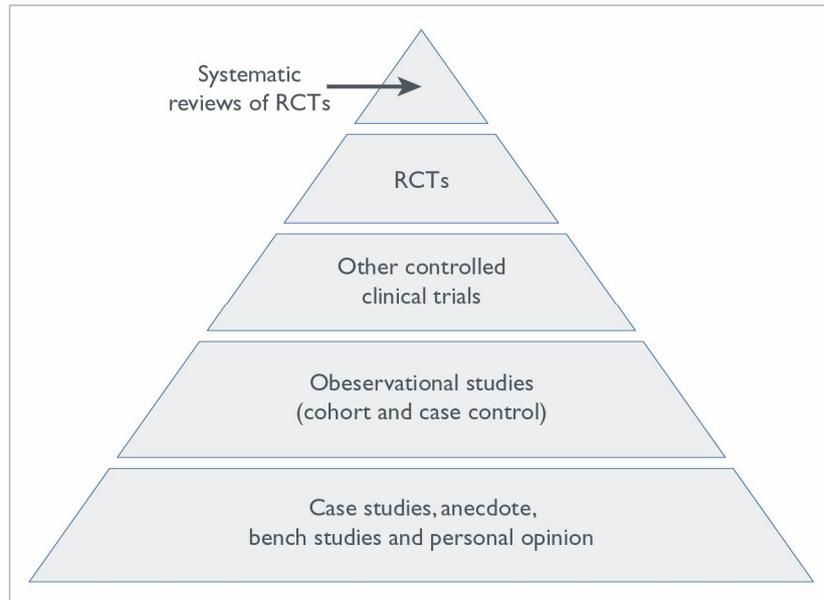
Figure 1: One example of a hierarchy of evidence (Greenhalgh, 2010)

It is important to understand that while such hierarchies of evidence are useful for determining the effectiveness of something such as a treatment or educational program, evidence about such things as client attitudes and practitioner perspectives may be better captured by qualitative research, which is less likely to feature in an evidence hierarchy (Hek & Moule, 2006). Indeed, Caldwell, Henshaw and Taylor (2005) identified a tendency for qualitative research to be evaluated on the basis of criteria that is appropriate for quantitative research evaluation; this results in unjustified criticism because quantitative frameworks for critique õraise questions concerning reliability and validity, rather than confirmability, dependability, credibility and transferabilityö (p. 46). To address this issue, hierarchies of evidence for qualitative research have been proposed (Daly et al, 2007; Jackson, Fazal & Giesbrecht, 2009); these feature well-developed generalisable conceptual studies at the top of the hierarchy and, at the bottom, single-case studies that are least likely to produce good evidence for practice.

3   Research literature

The outcomes of OHS research may be reported in OHS journals or other professional or industry journals in fields such as public health, human resources or management. Peer-reviewed literature is considered the most reliable source of quality information as it has been reviewed by people considered experts in the field. This review process is usually anonymous and blind (i.e. the reviewer does not know who wrote the article under review). Also, OHS research may inform guidance information published by OHS regulators; in this case the research outcomes are generally interpreted, condensed and presented in an abbreviated form.

It is important to differentiate between sources of information that directly report primary research from secondary, abbreviated sources, and sources with no stated evidence base.

3.1 The academic paper

While there are many variations in the detail, most academic papers have a similar structure. Some key research report features are listed below.

Abstract

An abstract is a short summary of the research paper. It will usually introduce the topic, explain the research question, and briefly describe the methods and the main findings.

The research question

The paper should clearly state the purpose of the research and this will usually be framed as a carefully constructed question. Qualitative research is more likely to be characterised by broader, open-ended questions than quantitative research, which is likely to feature more specific, closed research questions.

Methodology

The research methodology includes a description of the research design, which will indicate whether the study involved primary or secondary research, whether the methods are qualitative or quantitative, the type of data collected and how the data was analysed.

Results and discussion/conclusion

The results present the studyøs key findings, derived from the reported data, and the discussion/conclusion use the results to answer the research question and assess its implications.

References

The reference list is a list of all sources cited in the paper; it indicates the extent of academic rigour and the scope of the evidence-base used to formulate the research question, undertake the study and interpret its results.

4 Embarking on evidence-informed OHS professional practice

Although the OHS Body of Knowledge is not intended to be a -how toøguide, the authors of this chapter considered that some research-appraisal guidance specifically developed for OHS professionals would encourage activity in this previously neglected area of professional practice. Hence this section includes advice on accessing and critically analysing academic papers to assist in knowledge synthesis and translation into evidence-informed practice.

4.1 Clarifying the purpose of a literature search

The OHS professional is likely to have a particular problem or topic in mind when embarking on a literature search. Clarifying this purpose before commencing will help to ensure that the search is effective and that time is used efficiently. Possible reasons for searching the research or professional literature may be to answer a specific OHS practice question or to gain a broad understanding of an OHS topic or issue or other related occupational health, public health, policy or regulation topic or issue. Writing down the purpose of the literature search and, preferably, phrasing the purpose of the search as a question will help in maintaining focus when searching for relevant papers.

4.2 Accessing resources

OHS literature can be accessed via research databases, online sources, and library catalogues and databases. As OHS is a multidisciplinary field, OHS research may be reported in many databases and under many headings including management, human resources, psychology, education and training, engineering, risk management, and industry-specific databases such as asset management, mining and construction.

- É Research databases: Most research databases require payment for full view of academic papers[4].

- É Search engines and websites: OHS research can be accessed online at no cost via search engines such as Google and Google Scholar (http://scholar.google.com.au/) and a range of websites. A sample of OHS-relevant websites are listed below; all have search functions to facilitate searching on particular topics of interest:
    - o Safework Australia: http://safeworkaustralia.gov.au
    - o UK Health and Safety Executive, particularly the science and research section: http://www.hse.gov.uk/research/index.htm
    - o US National Institute of Safety and Health: http://www.cdc/gov/niosh
    - o Cochrane Collaboration, OSH Group: http://osh.cochrane.org/

- É Libraries: Australian state and national libraries provide access to books, journals and online databases.

Locating relevant research papers from online sources will require nominating appropriate search terms ó keywords ó that will generate topic-relevant ‑hits.ø(For more information about conducting effective Internet searches see, for example, Ó Dochartaigh, 2007.)

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[4] The Safety Institute of Australia has secured access to the EBSCOHost research database for SIA members; this can be accessed via an SIA membership login

4.3   Critical analysis of research papers

A framework constructed as a series of questions (inspired by Caldwell, Henshaw & Taylor, 2005; Fitzpatrick, 2007; and Greenhalgh, 2010) has been developed to assist OHS professionals in their critical appraisal of research papers (Appendix 1). Use of this framework will enable OHS professionals to update or expand the conceptual basis that informs their practice.

5   Using research to enhance practice

This section outlines three ways in which the outcomes of critical analysis of research papers can inform OHS practice: (i) by using evidence from individual papers to inform OHS practice; (ii) by referencing the evidence base in professional reports; and (iii) by enhancing the continuing professional development process.

5.1   Using evidence from individual papers to inform OHS practice

Having critically reviewed a research paper, the OHS professional should reflect on how the findings apply to OHS generally and to their personal professional practice in particular. It may be appropriate to share these findings or the implications of these findings with other OHS professionals, clients, managers or workers. Questions to prompt these reflections and subsequent actions are included in Appendix 1.

5. 2   Referencing the evidence base in professional reports

In their evidence-informed practice, OHS professionals should use the information obtained from their reading to inform their thinking, the way they approach problems and to add credibility to their formal reports. The latter requires proficiency in the use of a recognised referencing system to appropriately acknowledge sources of information, including academic papers, electronic documents and websites. There are several referencing systems; these differ in their citation format and location of the referencing details, and punctuation and abbreviation rules. Briefly, **author-date** citation incorporates the last name of the author/s or source and the year of publication within the body of the text. Full bibliographic information for each source cited is provided in a reference list at the end of the report. The advantage of author-date citation is that the source of the information is immediately accessible for the reader; however, a disadvantage is the potential for references to interrupt the flow of the text. Common author-date styles include *Harvard* and *American Psychological Association (APA)* ó the referencing style that is used in the OHS Body of Knowledge. In contrast, **notation** systems use in-text superscript numbers to refer to references in either footnotes at the bottom of the page or endnotes at the end of the text. Generally, a full reference list is provided at the end of the paper. Examples include *Vancouver* and *Institute of Electrical and Electronics Engineers (IEEE)*. Although footnotes and endnotes do not disrupt the flow of text, they require the reader to look beyond the text for the reference. The OHS professional

who is a critical consumer of research applying evidence informed practice should be able to apply a recognised referencing system to acknowledge their sources of information.(For more information on referencing and appropriate source acknowledgement, consult one of the many style guides available or see, for example, Harris, 2011; Snooks & Co., 2002.)

5.3   Enhancing the continuing professional development process

Continuing professional development (CPD) is a requirement of professional certification. One way that an OHS professional can demonstrate CPD is by reviewing papers and documenting their analysis in a structured way (i.e. by applying the framework in Appendix 1). This structured documentation supports a further enhancement of the CPD process by providing a focus for group discussion of research papers.

6   Summary

As Cluett (2006, p. 36) observed, ōEvidence is forever changing in the light of new research, new technology, new ideas, as well as old ideas and opinions put together in new ways.ö To provide appropriate advice, engage decision makers, and lead innovation and change, OHS professionals need to employ up-to-date evidence-based practice. It has been established that a key component that differentiates the Model of OHS Practice from a standard problem-solving model is its conceptual framework.[5] Developing, maintaining and updating the conceptual framework requires OHS professionals to access OHS professional literature including legislation, standards and guidance information, as well as research literature that is focused on generating, synthesising and translating knowledge. Consequently, OHS professionals require basic skills in applying a structured approach to locating, retrieving and analysing research literature to update their personal conceptual framework and to identify implications for their practice.

This chapter has indicated that analysis of a research paper should be informed by an understanding of the assumptions behind the research. It explained the differences between primary and secondary research, and between quantitative and qualitative research. Strengths and weaknesses of quantitative and qualitative methods of inquiry were presented from the perspective that the choice of research design will depend on the research question(s) and the type of data that will be analysed. Sometimes a combination of quantitative and qualitative research can be most productive. This chapter has emphasised the necessity to question the reliability and validity of quantitative data collection methods and the credibility of qualitative data collection methods before accepting the researcherøs interpretation of the results. Research-appraisal guidance included provision of a framework for the critical review of research papers. Finally, OHS professionals were encouraged to use evidence from individual papers to inform their practice, to reference the evidence base in their reports and

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[5] See *OHS BoK* Model of OHS Practice

to use documented critical analysis of research papers to enhance their continuing professional development.

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Appendix 1   A framework for critical review of research papers by OHS professionals

1   Assess credibility
- Who is the author? Is the source/publisher reputable?
- Has the paper been peer reviewed?
- Is the literature review comprehensive and up to date?
- Are ethical issues identified and addressed?

2   Assess relevance
- Does the abstract indicate content relevant to the purpose of your literature search?
- How recently was the research undertaken?

3   Assess the research question
- Are the research question(s) and the research aim clearly stated?
- Is the research question clearly linked to the context or background described?

4   Assess the research design and methods?
- Does the paper describe primary or secondary research?

If primary research:
- o   Is the research design appropriate for the research question?
- o   Is the research design clearly identified and justified?
- Does the research use quantitative or qualitative methods? Or both?

If *quantitative*:
- o   Is the sample adequately described and reflective of the identified population?
- o   Are the data collection and data analysis methods valid and reliable?
- o   Are the results generalisable?

If *qualitative*:
- o   Are major concepts identified and defined?
- o   Is participant selection described and sampling method identified?
- o   Is the data collection method auditable? Is the data analysis credible and confirmable?
- o   Are the results transferable?

If <u>secondary research</u>: Is it a systematic review? If not:
- o   What is the review method? Does it appear appropriate for the research question?
- o   How many sources informed the review? How is the choice of sources justified?
- o   Is it comprehensive? Why/why not?

5   Assess the outcomes
- É What are the key research findings? Do the results answer the research question?
- É If statistical analysis is undertaken, are the findings statistically significant?
- É For clinical trials, interventions and cohort studies what is the duration of participant follow-up; what percentage of participants are followed-up?
- É Are the stated assumptions and limitations of the research credible and comprehensive?
- É Are the discussion and conclusion credible and comprehensive?
- É How do the findings of this research link to other papers you have read?

6   Assess the potential for enhancement of OHS practice
- É In what ways are the results relevant to OHS practice?
- É In what ways might the outcomes influence your personal professional practice?
- É How could you share these findings with other OHS professionals?