NCVER

An aid to systematic reviews of research in vocational education and training in Australia

Alison Anlezark

Susan Dawe

Sarah Hayman

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Alison Anlezark
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Sarah Hayman

National Centre for Vocational Education Research

Publisher's note

Additional information relating to this research is available in the associated report, *The mature-aged and skill development activities: A systematic review of research*. It is available in print or can be accessed from NCVER's website <http://www.ncver.edu.au>.

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Key messages

- A systematic review of research is a decision-making tool for policy and practice. It is a piece of research in its own right, using explicit and rigorous methods that follow a standard set of stages. These methods identify, critically appraise and synthesise relevant research (both published and unpublished) around a specific research question.
- The review process allows for different studies to be weighted for relevance and quality of findings to answer a given question. The ultimate effect of this is that research can influence a review's conclusion only when based on agreed guidelines, and when the reviewers have confidence in the research.
- In undertaking the first systematic review of research in vocational education and training (VET) in Australia on the mature-aged and skill development activities, the National Centre for Vocational Education Research (NCVER) was required to also establish a model and infrastructure for future reviews. NCVER's proposed eight-step model is outlined in this report.

Executive summary

The National Centre for Vocational Education Research (NCVER) was contracted by the Australian National Training Authority (ANTA) to undertake a first systematic review of research related to the topic of mature-aged workers. The contract included the development of a replicable framework and infrastructure for further systematic reviews of research.

A systematic review of research is a decision-making tool for policy and practice. It is a piece of research in its own right, using explicit and rigorous methods that follow a standard set of stages. These methods identify, critically appraise and synthesise relevant research (both published and unpublished) relating to a specific research question.

In undertaking the first systematic review of research in vocational education and training (VET) in Australia, NCVER learnt many lessons. Our eight-step model and developed infrastructure for future reviews includes:

Step 1: Identify the review question

- ✧ A steering group will be established and include high-level representation from state, territory and Commonwealth authorities, from industry and from the research community, or specific experts for the particular topic.
- ✧ A consultation group will be established and include external reviewers and potential reviewers or those with expertise, or who have expressed interest in the topic (including international advisors).
- ✧ Policy-makers and other stakeholders will be involved in defining the review question by focusing on a very specific population, intervention and outcome.
- ✧ Sufficient time will be allowed to consult widely with key groups and individuals for refinement of the question.
- ✧ The key reviewer and second reviewer will be selected at the beginning of the review process. In this way they will fully understand the development of the question, be involved in screening the studies for in-depth review, and be familiar with all included studies before synthesising the evidence and compiling the final report.

Step 2: Develop a framework document

The framework document takes the review question and defines keywords, search strategy, review and appraisal criteria, and contents of final report.

- ✧ The advice of the consultation group will be used to guide the development of the framework that arises from and supports the question.
- ✧ The key reviewer will contribute to the management of the review process (for example, communicating with consultant reviewers).

- ✧ Once the framework is established, a database will be developed to contain the results of searches, critical appraisal and selection (using inclusion and exclusion criteria) of materials, and the relevant findings and evidence from the included studies to answer the review question.

Step 3: Search for all relevant research

- ✧ At least two searchers will undertake the extensive and thorough searching process for each review.
- ✧ The initial selection will be done by the searchers, using titles and abstracts, and should include all material that appears to meet the inclusion criteria established within the framework, and if in doubt, they should include the material.
- ✧ The steering and consultation group will be provided with lists of the excluded and included studies and consulted to ensure that no key studies are missed. However, the final decision on inclusion will remain with the project team.
- ✧ Screening is an iterative process and a further screening stage (see next step) using full documents will be undertaken by the key reviewer and second reviewer to arrive at the final selection of studies for in-depth review.

Step 4: Select studies to be included

- ✧ The inclusion criteria will be applied more strictly to the full documents by the key reviewer and second reviewer who will be involved in the final screening stage. This will include an initial appraisal of the relevance of findings to the review question and of the quality of the research.
- ✧ Only research studies which provide evidence to answer the review question and which meet the quality criteria will be included in the in-depth review. There should be no more than 20 studies included for in-depth review (there may be a set of 'reserve' documents or lower rated studies kept for contextual information).
- ✧ The reviewers who will be synthesising the evidence for the report will be familiar with all the included studies and aware of those excluded from the in-depth evaluation.
- ✧ Sufficient time will be allowed so that references within the selected studies can be followed up, in order that these may be considered for inclusion in the review process.
- ✧ All selected reviewers will attend a training workshop before commencing the in-depth appraisal and review of evidence from the selected studies. Detailed guidelines will be provided to the reviewers.

Step 5: Appraise the studies

- ✧ Reviewers should be allocated studies, to some extent, according to their expertise in both the topic and the research and analytical techniques, as required (for example, quantitative research, including statistical analysis and economic modelling or qualitative research).
- ✧ Each study included in the in-depth review will be allocated to two reviewers who, working independently, will enter into the electronic template their appraisal of the relevance and quality of the findings to the review question. The reviewers will then reach a consensus decision.
- ✧ The project team may moderate ratings given by reviewers where consensus is not possible or some inconsistency is noted.
- ✧ The reviewers will add to the database the details of study aims, methods, population, intervention, outcomes and findings and the best examples to illustrate the findings.

Step 6: Synthesise the evidence

- A database will be used in future to enable electronic sorting and amalgamation of evidence from the studies to assist in the synthesis of findings and in checking the evidence trail for the final report.
- The key reviewer and a second reviewer will synthesise the evidence found to answer the review question into categories, pooling material from the studies in whose findings we can have confidence.
- Using other members of the project team to provide feedback, the key reviewer will compile a draft final report of the evidence to answer the review question, and implications for policy, practice and research.

Step 7: Present findings to stakeholders

- The draft final report will be distributed to the steering group members and reviewers for comments before finalising for publication.

Step 8: Disseminate the findings

- The final report will be published on the NCVER website.
- Presentation of the findings of systematic reviews will be made to stakeholders through research forums, conferences and other channels as appropriate.

Introduction

> A systematic review can be defined as a review of a clearly formulated question that attempts to minimize bias using systematic and explicit methods to identify, select, critically appraise and summarize relevant research. (Needleman 2002, p.6)

What is a systematic review of research?

A systematic review is a decision-making tool for policy and practice. It uses explicit and rigorous methods to identify, critically appraise and synthesise relevant research (both published and unpublished) around a specific research question.

A systematic review is a piece of research in its own right, using explicit and transparent methods that follow a standard set of stages. This enables it to be replicated. It is also undertaken by a team and the outcome is a collective one—which reduces potential bias.

The review process allows for different studies to be weighted for relevance and quality of findings to answer a given question. The ultimate effect of this is that research can influence a review's conclusion only when based on agreed guidelines, and when the reviewers have confidence in the research.

A meta-synthesis uses textual analysis to synthesise findings from qualitative research studies and those quantitative research studies where numerical data cannot be combined. A meta-analysis, on the other hand, is a 'the statistical analysis of a large collection of results from individual studies for the purpose of integrating the findings' (Glass 1976). The synthesised findings are usually presented in the form of a structured narrative, with tables summarising the findings from the reviewed studies.

Based on the work of the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre[1]) in the United Kingdom, the National Education Research Forum[2] summarises systematic reviews in its 'Advice and information for funders'. They note that:

- ✧ They are pieces of research in their own right using explicit and transparent methods and follow a stand set of stages. This enables them to be replicated.
- ✧ The process allows for different studies to be weighted for quality and relevance of evidence for a given question.
- ✧ The process produces a map of evidence which helps classify the research.
- ✧ They are undertaken by teams and the outcome is a collective one—which reduces potential bias.
- ✧ The process allows for reviews to be updated—even by different authors—and so provides flexibility and value for money in the longer term.

[1] The EPPI-Centre is part of the Social Science Research Unit, Institute of Education, University of London. Since February 2000 the EPPI-Centre has been funded by the Department for Education and Skills (DfES) to provide a resource for those wishing to undertake systematic reviews of educational research, and for those wishing to use reviews to inform policy and practice. Detailed information available from <http://eppi.ioe.ac.uk/>.

[2] A website funded by the Department of Education and Skills, London. Information available from <http://www.nerf-uk.org/>.

- ✧ The review process is designed to support user engagement e.g. practitioners taking part in undertaking reviews.
- ✧ Some systematic review methods enable qualitative and quantitative studies to be analysed and compared in the same review.
- ✧ Participating in a systematic review helps improve research skills and can help researchers address how they report on primary research.
- ✧ The systematic review process is criterion-based, transparent and public.
- ✧ Systematic reviewing enables international collaboration and supports inclusion of international evidence in a review.

(National Education Research Forum website, p.1)

Background

In the 1970s, systematic reviews of research were pioneered in health care by the Cochrane Collaboration, which linked research and development sites across the world to review and analyse randomised clinical trials from an international perspective. From these reviews Cochrane generated reports to inform practitioners, to influence practice and to be a resource in the development of consensus guidelines. Essentially, 'evidence-based practice as it relates to health care is the combination of evidence derived from individual clinical or professional expertise with the best available external evidence to produce practice that is most likely to produce a positive outcome for a patient or client' (Pearson 2004). However, as Sackett (1989) explains, 'the nonexperimental evidence that forms the recalled experiences of practitioners with expertise will tend to overestimate efficacy'. Sackett outlines three reasons for this: favourable treatment responses are more likely to be remembered; unusual patterns of symptoms when reassessed, even a short time later, tend to return toward a more usual, normal result; and, both patients and their clinicians have a desire for treatment to be successful which can cause both parties to overestimate effectiveness.

Knowledge acquired from qualitative approaches to research has been largely absent from the Cochrane Collaboration systematic reviews (Pearson 2004). As Pearson notes, the 'development of accepted approaches to the appraisal and synthesis of evidence' by those with expertise in qualitative approaches to inquiry has been slower than that by quantitative researchers.

Qualitative research is centrally concerned with understanding things rather than measuring them. Qualitative research is best used for problems where the results will increase understanding, expand knowledge, clarify the real issues, generate hypotheses, identify a range of behaviours, explore and explain motivations, attitudes and behaviours, identify distinct behavioural groups, or provide input to a future stage of research or development (Gordon & Langmaid 1988).

During the 1990s, the development of approaches to include qualitative evidence in systematic reviews of research has become important in health care (Pearson 2004), social science (Spencer et al. 2003), and education (Evidence for Policy and Practice Information and Co-ordinating Centre 1993).

Systematic reviews and vocational education and training (VET)

While the scientific or experimental approach is considered to ensure objectivity or non-bias in the findings of medical research for systematic reviews, we note that, in social science research, the use of control and treatment groups for comparative purposes is rare and often impractical or unethical. A single intervention is going to be difficult to isolate, as usually a multitude of factors impact on an individual's choice to undertake vocational education and training (VET) or on the outcomes of VET. Thus, determining a direct link between an intervention and outcome is more difficult in vocational education and training than in heath care with its randomised controlled trials.

Dawe (2003) notes that a broad definition of research is used for VET research in Australia: a 'systematic and organised way of finding answers to questions'. In addition, VET research often comprises a combination of different research methods.

In establishing systematic reviews of research and reviewer groups, the National Centre for Vocational Education Research (NCVER) is intending to encourage an informed and robust critique of research related to policies and practice in VET and to bring research directly into the decision-making processes at the level of both policy and practice.

In the associated report (Thomson et al. 2005), a narrative summary is used in reporting the findings of the first systematic review that NCVER has undertaken. As noted by Greenhalgh et al. (2004) in analysing different research approaches, a narrative, rather than statistical, summary technique is used.

> Because different researchers in different traditions had generally conceptualised the topic differently, asked different questions, privileged different methods, and used different criteria to judge 'quality' and 'success', we used narrative, rather than statistical, summary techniques. We highlighted the similarities and differences between the findings from both an epistemological and an empirical perspective. In this way, heterogeneity of approaches and contradictions in findings may be turned into data and analysed systematically, allowing conclusions to be drawn that go beyond statements such as, 'the findings of primary studies were contradictory' or that 'more research is needed'. (Greenhalgh et al. 2004, p.8)

Why do a systematic review?

The aim of a systematic review is to develop a concise summary of the best available evidence that addresses a clearly defined question in a particular area of interest. While the question addressed by a systematic review may be the same as that posed by a primary researcher, the difference is that primary research must exist on the topic to make conducting a review worthwhile (Averis & Pearson 2003). For further details on the differences between systematic reviews and traditional literature reviews, and common misconceptions of systematic reviews, we suggest reading Needleham (2002) and Petticrew (2001).

'Without a requirement that reviewers clearly specify inclusion criteria and then exhaustively include all studies that fit these criteria, reviewers may consciously or unconsciously decide to include studies that favour their own biases and ignore those that do not' (Slavin 1995). This does not mean that value judgements can be totally isolated from the systematic review process, but rather that reviewers have to be explicit about procedures in creating the review, giving readers enough information about the studies so they can gain a good understanding of the original research (Slavin 1995). Reviewers must assess the quality of the study by examining how far its design, content and analysis have helped or hindered the minimisation of bias. Reviewers must be at pains to carefully and critically appraise the evidence, because the inclusion of biased studies can provide misleading final results. It should be noted that the quality of studies is on a continuum and includes the two main criteria of research design and implementation: the design needs to fit the purpose of the study and be well conducted.

What we did

NCVER was contracted by the Australian National Training Authority (ANTA) to undertake a systematic review of research related to the topic of mature-aged workers. To the best of our knowledge this was the first systematic review conducted in Australia in the field of vocational education and training. As part of the contract, NCVER was to develop a replicable framework and infrastructure within which further systematic reviews of research could be conducted.

The starting point for the NCVER researchers was to familiarise themselves with models already being used for systematic reviews of social and educational research overseas. Four key organisations provided models for investigation:

- the Cochrane Collaboration which pioneered systematic reviews in the field of medicine, establishing what interventions work and for whom
- the Campbell Collaboration in the United Kingdom which developed a model for the social sciences to mirror that of the Cochrane Collaboration
- the Evidence for Policy and Practice Information and Co-ordinating Centre in the United Kingdom which supports external review groups by providing tools and procedures to assist groups to undertake and disseminate systematic reviews of research of social interventions in health and education
- the Learning and Skills Development Agency in the United Kingdom which is a strategic national resource for the development of policy and practice in post-16 education and training. The Learning and Skills Development Agency uses the Evidence for Policy and Practice Information and Co-ordinating Centre model and has also developed its own hybrid model.

Other relevant research reports were also used in developing this new NCVER systematic review process; for example, Spencer et al.'s *Quality in qualitative evaluation: A framework for assessing research evidence* (2003); Averis and Pearson's *Filling the gaps: Identifying nursing research priorities through the analysis of completed systematic reviews*; Pearson's *Balancing the evidence: Incorporating the synthesis of qualitative data into systematic reviews* (2004); Glass, McGaw and Smith's *Meta-analysis in social research* (1981); Slavin's *Best evidence synthesis: An intelligent alternative to meta-analysis* (1995); and Sackett's *Rules of evidence and clinical recommendations on the use of antithrombotic agents* (1989; Cook, Guyatt, Laupacis & Sackett 1992).

The NCVER process for a systematic review was further developed with feedback from the steering group, consultation group, and ten external reviewers selected from expressions of interest for this first systematic review.

Outline of this report

This report reflects the process undertaken in 2004 in developing our own model for systematic reviews of research in vocational education and training in Australia. The associated report (Thomson et al. 2005) outlines what we found in relation to the first review on the topic of mature-aged workers. The first systematic review will be updated in 2005 using the refinements to the review process as outlined in this report.

The following chapters discuss the process undertaken for each step in the NCVER model and what was learnt from this process to aid future systematic reviews. The eight steps identified for the NCVER model are: identifying the question; developing a framework; searching for studies; selection of relevant studies; appraising quality of selected studies; synthesising the findings; presenting and disseminating the findings of the systematic review to stakeholders.

Identifying the question

> The first step in a systematic review is to define a focused question. The focused question provides the same role and is as important as the research question or hypothesis in primary research. The focused question addresses an important and relevant question. Narrowing the focus produces an answerable research question. Otherwise, the question might be too broad to have any chance of being answered or could in fact be a series of questions. Whilst the narrowing of scope in a systematic review may be perceived as a disadvantage compared with traditional reviews … it helps to ensure the review will provide as conclusive a summary as data permits. (Needleman 2002, p.6)

What we did

Involvement of stakeholders

Defining the review question is the most critical part of the review because other aspects of the process flow directly from this. The question needs to be relevant to policy-makers and to have a body of research behind it. It should also be one that does not require an immediate answer, as a review will typically take up to a year.

For the first systematic review, NCVER convened a meeting of a steering group which included high-level representatives from state and territory authorities, the Australian Government, ANTA and the research community. At this meeting, the group considered papers developed by the NCVER project team providing a general introduction to systematic reviews and examples of systematic reviews which were sourced from the five organisations listed in the previous chapter under 'What we did'. The group was also provided with an overview of the systematic review process, and taken through an actual example.

Generally, the recognised format to focus a systematic review question is to consider the *population* of interest, *intervention* for investigation and *outcomes* considered most important for assessing the results.

The group discussed the definition of and current policy issues around the topic of 'mature-aged workers', and relevant research being undertaken in this area. The question was then refined from these discussions.

Population

Consideration was given to looking at all ages since initial human capital formation affects labour market attachment over time. Looking at all those over 25 years was also considered. In the final instance, it was agreed that this review should focus on those people 45 years of age and over because they are of immediate policy relevance. On current trends in demography and workforce participation, there will be a significant shortage of labour by the end of the decade of the order of 1.4 million workers, if those people over 45 years do not increase and extend their labour market participation rates.

Interventions

At the time of forming the question, the Organisation for Economic Co-operation and Development (OECD) was looking at all factors impacting on extending the working life of people 50 years of age and over in Australia (and 19 other OECD countries). Considering that the VET sector's core business is education and training, it was decided to restrict the interventions of interest to learning programs that were eventually referred to as *skill development activities*.

Outcomes

Since the focus of VET is to enhance employability, it was decided to focus on labour market outcomes rather than broader social and economic outcomes, which might also include working in the voluntary sector or improving health and wellbeing of older people. However, it was agreed that the outcomes should go beyond just extending the working lives of existing workers (scope of OECD study) to include increasing the total numbers of people over 45 years attached to the labour market. In addition, it was agreed that the outcomes would include increased productivity while at work.

Using an iterative process, the draft final question was defined, noting the need to limit the scope to make it tractable, and that policy-makers are particularly interested in interventions (what works and what does not work).

The draft question was defined as:

> *What evidence is there that skill development activities for mature-age workers (45 years and over) lead to:*
>
> ✧ *improved attachment to the labour market?*
>
> ✧ *improved productivity?*

Implied in the review question, and to be reported in the research findings and final report, were the issues of:

✧ the factors that have an important bearing on these key outcomes, either as barriers or facilitators

✧ implications for policy, practice and research of the findings.

Defining the terms in the question

After drafting the question, the terms in the question were defined by the steering group:

Defining mature-aged

The starting brief contained the term 'mature-aged workers', but after discussion by the steering group, the population was defined more broadly as 'mature-aged'.

Mature-aged was defined as all people 45 years and over. This was to include all those who desire work, or who might desire work if their skills were more suitable or if there were more opportunities.

Defining skill development activities

Skill development activities were defined as 'deliberate' general education or specific vocational activities undertaken to learn new skills or further develop skills related to work. 'Deliberate' in this context referred to the person knowingly participating in the skill development activity, for example, an activity which has a predetermined plan and format designed to develop employment-related skills and competencies.

Skill development activities thus included a structured (formal) learning activity, such as undertaking an accredited or non-accredited course, or as an informal learning activity, such as self-directed learning, networking, coaching or mentoring, as long as it was predetermined or

knowingly participated in. Skill development activities could have also been initiated by self, employer or other (such as, Job Network member).

Improved attachment to the labour market

Improved attachment to the labour market included:

- ✧ increased labour force participation rate
- ✧ increased employment duration
- ✧ job retention or improved job security (no longer at risk of losing job)
- ✧ change of work role or new career following new interest (including self-employment)
- ✧ change in attitude to work, 'early retirement' or 'retrenchment', for example, looking forward to continuing participation in paid work past 55 years.

Defining improved productivity

Improved productivity included:

- ✧ increased wages
- ✧ promotion
- ✧ increased efficiency in processes and work output
- ✧ reduction in accidents and injuries to workers through improved health and safety.

The steering group noted that outcomes did *not* include participation in the voluntary sector.

Defining the scope of the research to be included

The search strategy set by the steering group included all studies (primary and secondary research, policy documents and articles) that:

- ✧ were in English (from Australia and overseas)
- ✧ were recent (from approximately the last ten years)
- ✧ matched keywords deemed relevant to the review question.

The scope also included research that dealt with a population under 45 years where the research findings were relevant to improving attachment to the labour force for the mature-aged. Similarly, while research was likely to cover those up to 65 years, relevant research focusing on over 65-year-olds was also included.

Feedback on the draft question

The draft question and definitions of terms determined by the steering group were then sent to a consultation group within the VET community for comments and suggestions for improvement. Feedback received included the need to note which skill development activities worked, under what circumstances, for which group of mature-aged, and what needed to change in current policy and practice. It was also considered important to record what other factors (such as employer and employee attitudes) influence the key outcomes of improved labour market attachment and productivity levels.

What we learnt

Focusing on the population, intervention and outcomes worked well as the starting point for defining the review question in this systematic review. Defining the review question was an iterative process

involving policy-makers until the scope of the question was sufficiently narrow to be useful, but sufficiently broad to ensure that there were relevant research studies on the topic.

Our key learning from this phase was that it is crucial to allow sufficient consultation time with key groups and individuals for the development of the question.

In NCVER's ongoing program of research, a steering group will be established to oversee all systematic reviews. The group will have high-level representation from state, territory and Commonwealth authorities, from industry and from the research community. It will invite membership from individuals with expertise in the particular topic area chosen for each review.

For each review a consultation group will also be established. Members of the consultation group will also have expertise in the relevant topic area and in the research and analytical techniques, as required (for example, quantitative research, including statistical analysis and economic modelling or qualitative research). Others will include those who have expressed interest, such as those with experience of systematic reviews in other disciplines or those undertaken by the Learning and Skills Development Agency, in addition to a pool of experienced or potential reviewers.

Conclusions

Step 1: Identify the review question

- ✧ A steering group will be established and include high-level representation from state, territory and Commonwealth authorities, from industry and from the research community, or specific experts for the particular topic.
- ✧ A consultation group will be established and include external reviewers and potential reviewers or those with expertise, or who have expressed interest in the topic (including international advisors).
- ✧ Policy-makers and other stakeholders will be involved in defining the review question by focusing on a very specific population, intervention and outcome.
- ✧ Sufficient time will be allowed to consult widely with key groups and individuals for refinement of the question.
- ✧ The key reviewer and second reviewer will be selected at the beginning of the review process. In this way they will fully understand the development of the question, be involved in screening the studies for in-depth review, and be familiar with all included studies before synthesising the evidence and compiling the final report.

Developing a framework

What we did

The framework

The second step of the systematic review of research is the development of the framework for the review. The framework for the review presents the background to the project, the scope of the review and an outline of the review process to the VET community and general public.

NCVER's first framework included the defined policy question, the definitions of the terms in the question, the criteria to be used to select research studies for inclusion in the review, the coding to be used to record the findings from the included studies, and the criteria for appraising the quality of the included studies. It also detailed the content for the final report. A list of the steering group members, NCVER project personnel, and external reviewers, and an outline of the review process were also provided in the framework document for reference (see appendix A). For further feedback, the draft framework was sent to the steering and consultation groups with the finalised policy question, and at this point the framework was finalised.

The evaluation template

From the finalised framework, a draft evaluation template was developed by the NCVER project team. This template was designed for reviewers to include, in detail, the aims, research methods and findings from the research studies to provide the information for synthesis in the final report (see appendix D). It was designed with specific codes for the relevant components of the evidence; for example, details of the population involved and types of interventions and outcomes. It was envisaged that the coding would be a useful tool in synthesising the findings by searching in a proposed database of the reviewed studies.

The reviewers' evaluation template captured the evidence for the review question and also provided the criteria by which each study was appraised for relevance and quality of findings to answer the review question.

NCVER trialled the draft template in an internal pilot using three different studies and six different internal researchers. It was amended and presented at the training workshop for trial and discussion with the external reviewers. Following feedback at this workshop, a number of changes were made and the final template was sent electronically to reviewers to use on their first study. During this process further clarification was sought by reviewers and NCVER's responses were circulated to all reviewers before they proceeded to their next study. This feedback process continued to support reviewers throughout the review process.

What we learnt

It is useful to have the advice of the consultation group as well as the steering group to guide the development of the framework that arises from, and supports the review question.

The person(s) appointed to undertake the final synthesis of the evidence should be involved in the review process from this point onwards to enable them to fully understand the background to the

review question. This key reviewer needs also be involved in the final selection of studies to enable a better understanding of the scope of all the studies selected, as well as those studies included for in-depth review by the reviewers.

For each review, careful consideration is required in relation to documents to be included for in-depth review. Policy documents were not useful in the first review because they did not provide evidence to answer the review question and generally were based on an assumption that training would lead to improved attachment to the labour market. Such narrative opinion and text may be useful in the screening process to confirm references which may contain evidence to answer the review question. However, when available, only studies which provide evidence or new analysis of literature or data should be included for the in-depth reviews.

Additional time should be allowed to check new primary references which are provided in selected studies in order to include these in the review process also, where appropriate.

The use of a database as a receptacle for the completed in-depth reviews is recommended for future reviews. While it was the intention that the completed reviewers' evaluations be imported into a database, time did not permit the development of the database during the first review. The database will assist in the transparency of the review process by providing a clear record in one location of all the review activity. During the synthesis phase, the database will also assist reviewers in managing the categorisation and grouping of findings into synthesised findings.

Conclusions

Step 2: Develop a framework document

The framework document takes the review question and defines keywords, search strategy, review and appraisal criteria, and contents of final report.

- ✧ The advice of the consultation group will be used to guide the development of the framework that arises from and supports the question.
- ✧ The key reviewer will contribute to the management of the review process (for example, communicating with consultant reviewers).
- ✧ Once the framework is established, a database will be developed to contain the results of searches, critical appraisal and selection (using inclusion and exclusion criteria) of materials, and the relevant findings and evidence from the included studies to answer the review question.

Searching for all relevant research

> A systematic review is a piece of research. Like any piece of research, it uses research methods that aim to make it produce valid and reliable results. For example, systematic reviews include efforts to find as much as possible of the research which addresses the review's research question. This is important if the review's conclusions are not to be over-influenced by studies which are simply the easiest to find.
>
> (Evidence for Policy and Practice Information and Co-ordinating Centre website)

What we did

The search strategy

The third step of the systematic review is the searching phase. A coherent search strategy was required to identify all potentially relevant studies to the review. The search strategy was recorded in detail so that the process was transparent and replicable.

The systematic searching for relevant literature was undertaken during May and June 2004. It used a range of identified resources, including electronic online databases, web-based databases, web search engines, websites and hand-searching of bibliographies or reference lists and journals—hard copy and content pages online (see appendix B).

In developing the search strategy for electronic and web-based databases, not only did we identify key terms, but also a range of synonyms (see appendix C). For example, we included variations in terminology and in spelling, such as 'labour' and 'labor', 'ageing' and 'aging'. We also used singular and plural of terms such as 'older worker' and 'older workers'.

During the searching phase, the steering group and experts in the field of mature-aged research were consulted to identify other sources of published and unpublished relevant research. The choice of databases and key search terms was submitted to the steering group as part of the draft framework prior to implementation. The selection process was piloted on a subset of primary studies. A training session was run with all those selecting the studies to ensure uniformity of selection.

Studies initially included in this review were selected on the basis of the criteria listed in table 1.

The search log

A log was kept of the databases and websites searched to assist the reporting of the search process. The selection of research studies was largely based on abstracts and titles. The number of relevant studies found, the key search terms and the number of records matched was documented. The search log template is shown in table 2.

Table 1: Criteria used to select studies for the systematic review

Item	Criteria
Language & geographical limits	English, from Australia and overseas
Date of research study	Approximately the last 10 years
Scope	For a study to be included it had to meet the research study, population and intervention criteria, and at least one of the outcome criteria. Where population was 'mature-aged', intervention was 'skill development activities', and outcome was either 'improved attachment to the labour market' or 'improved productivity'
Key websites	As listed in appendix B
Key databases	As listed in appendix B
Key authors	Recommendations were sought from steering group and topic experts
Key papers/journals	Recommendations were sought from steering group and topic experts

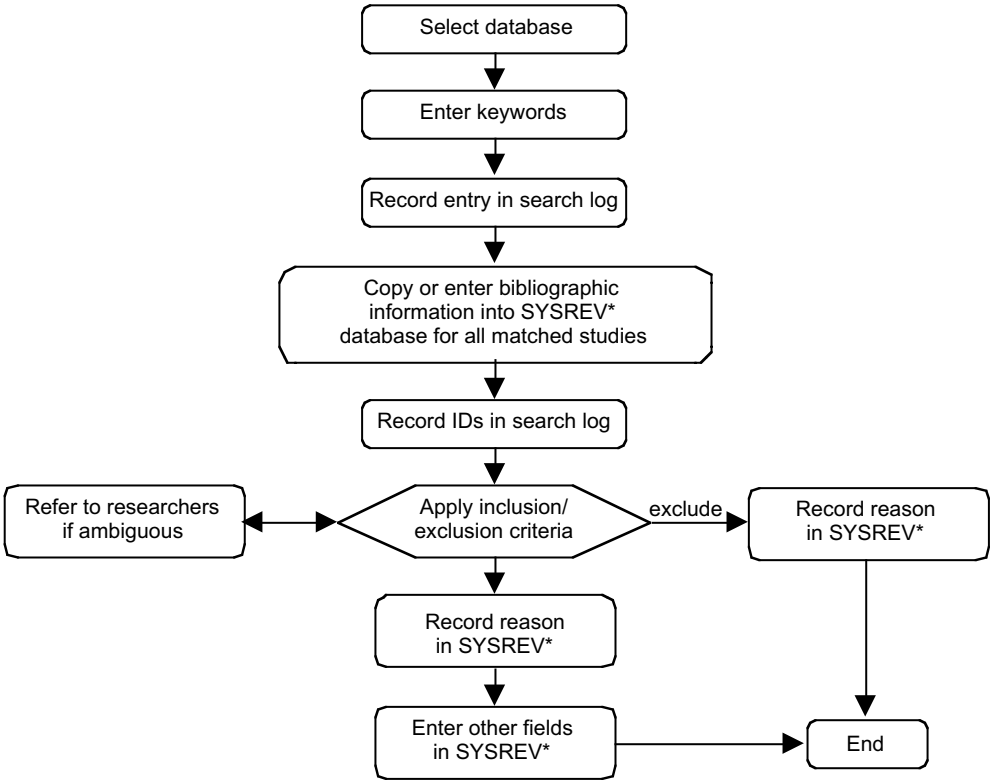
Table 2: Search log template

ID range of records added to SYSREV	Key search terms used	No. records displayed	No. records selected as possible inclusions	No. matched records	Down loaded file saved as	Database or website name	Date	Searcher

Each individual study was assigned a specific ID number as it was recorded in the search log and these ID numbers stayed with the particular studies throughout the process and in the final report.

The searching approach applied by NCVER for this systematic review is summarised in figure 1.

Figure 1: Summary of the searching approach



Note: * SYSREV is the name given to the database NCVER developed for the systematic review using DB/TextWorks®.

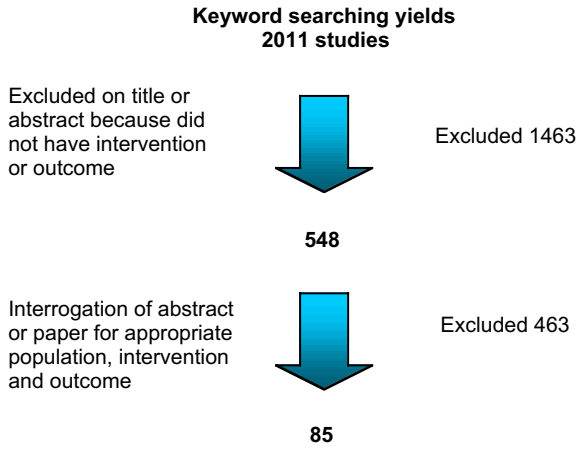
Search results

Search results were screened through an iterative process. In the first instance, the total of 2011 references from the initial searches on keywords was reduced through selection based on title or abstract of those that appeared to match the basic selection criteria; that is, were in English and had been produced between 1994 and 2004. These 548 references were then further reduced to those 85 studies deemed to match the inclusion criteria for the review question—population, intervention and outcome(s). The search results for these two stages are summarised in figure 2.

The set of 85 references from the literature searches deemed to match the inclusion criteria were entered into the SYSREV database in readiness for the selection process to determine the final set of references to use for the review. Reasons for inclusion or exclusion were recorded in the SYSREV database.

Following the initial search process, there was a second screening or selection phase where studies were screened based on a more stringent application of the inclusion criteria relating to the study itself (as described in the next step—Selecting studies to be included).

Figure 2: Searching process—summary of stages one and two



What we learnt

At least two searchers are needed to undertake the extensive and thorough searching process for each review. Searchers need to include all material that appears to meet the inclusion criteria established within the framework, and if in doubt they should include it.

A further screening process (see next step) must be applied to arrive at the final selection of appropriate studies for in-depth review.

Sufficient time must be allowed to follow up references within the selected studies.

It is useful to store the information about both included and excluded studies in a structured database so that reports can be easily generated and attributes (such as reasons for exclusion and findings and evidence) can be easily recorded and retrieved.

Conclusions

Step 3: Search for all relevant research

✧ At least two searchers will undertake the extensive and thorough searching process for each review.

- ✧ The initial selection will be done by the searchers, using titles and abstracts, and should include all material that appears to meet the inclusion criteria established within the framework, and if in doubt, they should include the material.
- ✧ The steering and consultation group will be provided with lists of the excluded and included studies and consulted to ensure that no key studies are missed. However, the final decision on inclusion will remain with the project team.
- ✧ Screening is an iterative process and a further screening stage (see next step) using full documents will be undertaken by the key reviewer and second reviewer to arrive at the final selection of studies for in-depth review.

Selecting studies to be included

What we did

The fourth step in the systematic review is the selection of studies for inclusion in the reviewing process. This was an iterative process undertaken by the project team in consultation with the steering and consultation groups, including the reviewers.

Initially, the project team assessed the 85 studies or documents for relevance against the definitions of population, intervention and outcomes in the review question as outlined in table 3. At the request of the steering group, both primary and secondary research studies were included for this review. An initial set, List A, consisting of 37 studies considered to meet the criteria (see table 3) was circulated to the steering and consultation groups along with the remainder in List B consisting of 48 potentially excluded studies.

Useful feedback was received and some adjustments were made to the initial sets (see figure 3), after which List A consisted of 32 studies to be included in in-depth evaluation by reviewers. A number of studies initially excluded on the basis that they did not address the precise review question were included. This was because they appeared to have substantial information about barriers or facilitators to skill development activities for the mature-aged, which the steering group had requested be considered within the scope of the review.

As reviewers examined the full text of the documents in detail, other references were discovered which required follow-up. One study was added to the selected studies in this way. Another study was included because a pre-publication final draft became available soon after the allocation of studies to reviewers. Thus the final A list consisted of 34 studies. For one of these the full document could not be obtained. The remaining 33 studies were evaluated by the reviewers.

Figure 3: Summary of selection process for studies to be included for in-depth review

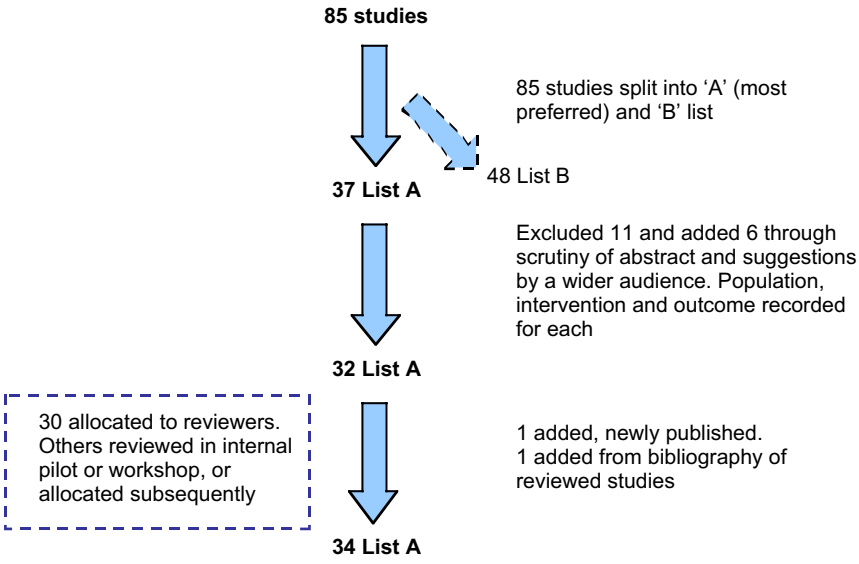


Table 3: Inclusion criteria used to select studies for the reviewing process

Key term	Description	Criteria
Population	Mature-aged	Mature-aged is defined as persons aged 45 years or over.
		Research should also be included where the findings are relevant to those aged 45 years or over.
Population	Worker	By worker we mean those who are employed, or those who would be employed if they had sufficient skills to gain employment, i.e. those who want to work.
		Includes full-time and part-time employment.
Intervention	Skill development activities	Learning programs referred to as deliberate general education or specific vocational activities undertaken to learn new skills or to further develop skills related to work.
		'Deliberate' in this context refers to the mature-aged worker knowingly participating in the skill development activity; for example, an activity which has a predetermined plan and format designed to develop employment-related skills and competencies.
		Deliberate skill development activities thus can include a structured (formal) learning activity, such as undertaking an accredited or non-accredited course, or an informal learning activity, such as self-directed learning, networking, coaching or mentoring.
Outcome 1	Improved attachment to the labour market	Employee has improved attachment to the labour force. To include increased labour force participation rate, increased employment duration, job retention or improved job security (no longer at risk of losing job), change of work role or new career following new interest, change in attitude to work, to 'early retirement' or to 'retrenchment' e.g. looking forward to continuing participation in paid work past 55 years.
Outcome 2	Improved productivity	Employer derives gain from increased activity from employee.
		Includes: increased wages, promotion, increased efficiency in processes and work output, reduction in accidents and injuries to workers through improved health and safety.
		Outcomes do not include participation in the voluntary sector.

What we learnt

The essence of the systematic review process is that it identifies only studies in which we can have confidence; that is, they meet both criteria of having findings which are of relevance and quality to answer the review question. In the appraisal phase, we considered the relevance of the findings and found (as anticipated) that there were many publications selected that did not really examine this particular review question, but rather made assumptions about outcomes of skill development activities for the mature-aged.

Therefore, in future systematic reviews, the inclusion criteria must be applied more strictly to the full documents to ensure that only research studies which provide evidence to answer the review question are included in the in-depth review process.

We recommend an additional selection stage for future reviews. The initial selection will be done by the searchers, using the abstracts, and will tend towards inclusion. The final selection process will be undertaken by the key reviewer and a second reviewer. Where necessary, the full document will be examined and assessed for relevance to the review question. Any studies which obviously do not meet the quality criteria for research should also be excluded at this stage. The aim would be to arrive at around 20 studies whose findings are most relevant to the review question and where the quality of those findings is high. Excluded studies may be referred to for useful contextual or background information in the final report, but will not be included in the in-depth review process.

The steering and consultation group will be provided with lists of the excluded and included studies and asked to suggest further studies to be *considered* for inclusion. While it is useful to consult to ensure no key studies are missed, the final decision on inclusion must be made by the review team.

Conclusions

Step 4: Select studies to be included

- ✧ The inclusion criteria will be applied more strictly to the full documents by the key reviewer and second reviewer who will be involved in the final screening stage. This will include an initial appraisal of the relevance of findings to the review question and of the quality of the research.
- ✧ Only research studies which provide evidence to answer the review question and which meet the quality criteria will be included in the in-depth review. There should be no more than 20 studies included for in-depth review (there may be a set of 'reserve' documents or lower rated studies kept for contextual information).
- ✧ The reviewers who will be synthesising the evidence for the report will be familiar with all the included studies and aware of those excluded from the in-depth evaluation.
- ✧ Sufficient time will be allowed so that references within the selected studies can be followed up, in order that these may be considered for inclusion in the review process.
- ✧ All selected reviewers will attend a training workshop before commencing the in-depth appraisal and review of evidence from the selected studies. Detailed guidelines will be provided to the reviewers.

Appraising selected studies

What we did

The fifth step of the systematic review, as shown in figure 4 in appendix A, is the appraisal of the included studies. This required the application of the reviewers' template as described in the earlier section: Developing a framework. Reviewers were selected and brought together for a training workshop, following which the draft template was modified and more detailed guidelines for appraisal of relevance and quality were developed.

Recruitment and selection of reviewers

Expressions of interest were called for external reviewers for the first NCVER systematic review. An advertisement was placed on the NCVER website with invitations also sent to researchers associated with the NCVER and other professional research organisations, such as the Australian Vocational Education and Training Research Association and the Australasian Evaluation Society consultants list. The reviewers were offered a set fee for each review (estimated to take on average one day per review) and had to be available to attend the training workshop and to have time for reviewing six documents within the next six weeks. Using the two selection criteria, research evaluation experience and expertise in the topic, the NCVER project team and steering group selected ten external reviewers for the first systematic review.

Training of reviewers

NCVER project personnel and external reviewers attended the one-day training workshop as well as one representative from ANTA, and one from the Commonwealth Department of Science, Education and Training.

The session started with a general introduction to systematic reviews and an explanation of how NCVER was implementing the process. The reviewers were then presented with an overview of the searching process for the review: keywords and databases used; initial results. Using one of the studies included in the NCVER internal pilot, the reviewers were taken through the practical exercise of completing the reviewer's template. The group discussed the application of the quality criteria and the need for further guidelines for this process. The revised reviewer's evaluation template, the guidelines for appraisal, and a detailed task list were sent electronically to all reviewers after the workshop.

At the end of the workshop, six studies from the mature-aged review List A studies were assigned to each reviewer. The reviewers were asked to complete their first assigned review and report back to the NCVER project coordinator within one week. On successful completion, and with feedback from questions which arose being sent to all reviewers, the reviewers proceeded with the other allocated studies.

Allocation of studies

Each study included in the systematic reviews was allocated to a pair of reviewers. Using the evaluation template, the two reviewers completed their review for each study independently and then advised the other when they had completed it. They then exchanged their independent

evaluations and commenced negotiations on an agreed combined review. Copies of all three reviews for each study were then sent to the NCVER project coordinator.

The same two reviewers did not review more than one study together. That is, to arrive at an agreed combined review, each reviewer had to contact a different reviewer for each of their allocated studies. This method of allocating studies, where the independent reviewers were selected to avoid the same pair working together on more than one study, was chosen by NCVER to reinforce a replicable process, to reduce bias and to diversify the differing expertise of the reviewers.

Coordination of review process and support for reviewers

The NCVER project coordinator handled all questions from reviewers during the review process and responses were formulated and sent to all reviewers. After each reviewer had completed their first study and all questions were clarified, the reviewers continued the review process until all studies included in the systematic review were completed.

In one or two instances, the reviewer had difficulty completing their allocated studies and so other trained reviewers were asked to review these.

Outcome of appraisals

Using a five-point scale (see table 4), each reviewer arrived at an overall weighting for the relevance of the particular focus of the study for addressing the question of the review. This included specifically considering the population, interventions and outcomes of the study compared with those defined in the systematic review framework in appendix A.

Table 4: Summary of relevance appraisal

In this research study:	Rating				
Population i.e. mature-aged	High	Medium+	Medium	Medium-	Low
Intervention i.e. skill development activities	High	Medium+	Medium	Medium-	Low
Outcomes i.e. improved attachment to the labour market or productivity	High	Medium+	Medium	Medium-	Low
Overall weight of evidence A (relevance)	High	Medium+	Medium	Medium-	Low

Similarly, using a five-point scale as shown in table 5 and the guidelines for systematic review appraisal (appendix E) to answer the questions on validity, authenticity, reliability, sufficiency and currency of the research, reviewers arrived at an overall weighting for the quality of the research in relation to the evidence found to answer the systematic review question.

Table 5: Summary of quality appraisal

In this research study:	Rating				
Is the evidence valid?	High	Medium+	Medium	Medium-	Low
Is the evidence reliable?	High	Medium+	Medium	Medium-	Low
Is the evidence authentic?	High	Medium+	Medium	Medium-	Low
Is the evidence sufficient?	High	Medium+	Medium	Medium-	Low
Is the evidence current today?	High	Medium+	Medium	Medium-	Low
Overall weight of evidence B (quality)	High	Medium+	Medium	Medium-	Low

The project team then extracted the overall weights of evidence for relevance and quality from the combined reviews of all included studies and placed them in a matrix, as shown in table 6.

Reflection by reviewers of the review process

Feedback on the review process was deliberately sought by NCVER from all reviewers, with an evaluation form sent to all reviewers to obtain their opinion on the process and changes for future systematic reviews. Most reviewers valued their involvement in the process and were keen to be involved again. Comments included how the process had influenced the reviewer in such a way as to change their approach to writing future primary research reports. The synthesiser for the mature-aged review, who was chosen from the team of trained reviewers, noted that it would have been helpful to have been involved in the process from the beginning—to have heard the arguments which led to the development of the review question.

What we learnt

It was very important to offer support and maintain communication with reviewers throughout the process. Reviewers worked independently and appreciated frequent messages of explanation and interpretation of what was a new process for most. A frequently asked question-and-answer file was compiled as a result of the first review and distributed to the reviewers.

Comprehensive guidelines for the completion of the evaluation template were essential and will need adjustment in response to reviewers' feedback. For example, a number of reviewers did not weight equally the five questions for appraising the quality of the study. This was not discussed at the 2004 training workshop. Thus, independently, some reviewers weighted one of the five aspects of quality as of most importance, for example, sufficiency or currency, and so their overall weighting followed the rating for that particular component. The project team was involved in moderating the overall weight of evidence rating in three cases in the first review (see table 6). This was required because the reviewers were unable to reconcile their weightings, or subsequently, the synthesiser found no evidence of relevance to the main review question.

Lessons learned from the 2004 review will be valuable in training at the next workshop; the project team and experienced reviewers will know of the 'sticking points' and be able to give relevant advice.

Selection and training of reviewers to undertake the appraisal of the selected studies is very important. Reviewers with particular technical expertise (for example, in quantitative research methods, statistical analysis, economic modelling or qualitative research methods) will be identified. NCVER will keep ongoing records of existing and potential reviewers.

Reviewers will be given details of the searching and selecting processes and outcomes and asked to recommend studies for consideration or inclusion.

Reviewer pairs will be assigned to included studies, although it is intended that around 20 studies will be selected for in-depth review in future. The collaborative and unbiased nature of evaluating research studies will be maintained.

A full-day workshop will be held to train reviewers. A small study will be chosen as an example to work through on the day. Papers, including the study, will be circulated to reviewers beforehand. Reviewers will work in pairs and will have ample opportunity to discuss any concerns and make suggestions. Reviewers with experience may be asked to contribute to the running of the workshop. Studies for the actual review will be allocated at the workshop.

The database containing the evaluation reports of each study did not eventuate in time to be used for the synthesis of the findings in the 2004 systematic review. However, it is believed that such a database would be useful in future reviews and further development of software to manage the systematic review documents is planned.

Since undertaking the first review, we have investigated the software developed to manage comprehensive systematic reviews in health care by the Joanna Briggs Institute. This institute is an international research and development agency based in Adelaide, an affiliated research centre of

the University of Adelaide and the Royal Adelaide Hospital, and linked to an international collaboration of autonomous speciality, country and state-based collaborating centres—The Joanna Briggs Collaboration.

Conclusions

Step 5: Appraise the studies

- Reviewers should be allocated studies, to some extent, according to their expertise in both the topic and the research and analytical techniques, as required (for example, quantitative research, including statistical analysis and economic modelling or qualitative research).
- Each study included in the in-depth review will be allocated to two reviewers who, working independently, will enter into the electronic template their appraisal of the relevance and quality of the findings to the review question. The reviewers will then reach a consensus decision.
- The project team may moderate ratings given by reviewers where consensus is not possible or some inconsistency is noted.
- The reviewers will add to the database the details of study aims, methods, population, intervention, outcomes and findings and the best examples to illustrate the findings.

Synthesising the evidence

The sixth step of the systematic review process is the synthesis of the findings from the included studies into a final report, thereby answering the review question. The associated report of the first systematic review (Thomson et al. 2005) was developed by the project team to describe the evidence available to answer the specific policy question. In doing this, issues for further research were raised.

What we did

Appointment of the synthesiser

One of the external reviewers was selected on the basis of experience and availability as the synthesiser for the report on this first systematic review. As with other NCVER team members, before commencing this task, the synthesiser undertook a great deal of independent reading on systematic reviews to acquire background information.

Identification of key studies and findings

The appraisal results of the 33 combined reviews were placed in a matrix based on their relevance (weight of evidence A) and quality of their findings (weight of evidence B) to answer the review question. The appraisal results are summarised in table 6 and the referenced studies are listed in detail in the associated report (Thomson et al. 2005).

Table 6: Appraisal matrix of 33 studies appraised

		Weight of evidence B (quality)				
		High	Medium plus (+)	Medium	Medium minus (-)	Low
Weight of evidence A (relevance)	High	**91**		**45**		
	Medium plus (+)	**(2), 90**	**85**	**(74)**		
	Medium			**(68)**	4, 49, 89	18, 33*
	Medium minus (-)	78, 81	44, (57), (73*)	(17), 83, (88*)	6, 29, 36, 87	38
	Low	86		10, 14	66, 70, 77	20, 43

Notes: Study ID in bold contains evidence for review question and study ID in brackets contains information on barriers and facilitators.
* Indicates those studies whose overall rating was moderated by the project team.

For the synthesis of the evidence in answer to our review question, we used those studies with at least medium minus weighting of relevance to the review question and at least medium weighting based on the quality criteria. Seven studies were identified to include evidence for the review question (91, 90, 2, 85, 45, 74, 68—marked in bold on the matrix). Three of these (2, 74, 68—marked in brackets) specifically mentioned the existence of barriers and facilitators to skill development activities improving attachment to the labour market or productivity. The steering group had requested that such factors, if identified, should also be noted in the final report. In

addition, in looking at those studies appraised as medium minus for relevance, four more studies (57, 73, 17, 88—marked in brackets) were identified as providing evidence for the existence of barriers and facilitators, although not providing evidence for the specific review question. These 11 studies were used as the key studies in the synthesis of key findings for the associated report (Thomson et al. 2005).

The evidence

The project team developed a draft map for an NCVER-style report of the findings of the first systematic review. It included an introduction with background to the review question and the systematic review approach used. The findings chapter of the associated report outlines the evidence found in the research studies in whose findings we can have confidence for answering the specific review question. A further chapter provides the evidence found for the existence of barriers (and thus identifying possible facilitators) to the mature-aged undertaking skill development activities leading to improved attachment to the labour market or productivity. Finally, implications for further research, policy and practice are outlined in the report (Thomson et al. 2005).

What we learnt

It was at this stage of the review that we learnt that we should have screened more effectively (as outlined at Step 4), to eliminate studies which do not provide evidence to answer the review question (rated low in relevance), from the in-depth evaluation stage. Similarly, if reviewers undertaking the final selection stage note reasons why the study will definitely not meet the criteria for quality of findings to answer the review questions, these studies should also be eliminated before the in-depth review is undertaken.

In the first review, we erred towards inclusion, because to have eliminated any possibly relevant studies may have resulted in too few findings to write a report. However, experience has shown us that a more rigorous screening process could safely be applied at an earlier stage to increase efficiency and allow more time for appraising fewer studies in detail.

In the first review, it was found necessary for the synthesiser to refer to the full text of each key study and not rely solely on the findings placed in the template by the reviewers. This required additional time.

We learnt also that there may be a need for the project team to moderate ratings given by reviewers. This was required for two studies where the reviewers were unable to reconcile their ratings (studies 88, 33) and one where no evidence was found to answer the review question, so the overall relevance rating given by the pair of reviewers was inconsistent with other studies.

One of the most important lessons we learnt is that the synthesiser should be involved in the systematic review process from the beginning in order to have a clear understanding of the arguments and selection criteria leading to the specific review question, and participate in the development of the framework and the reviewers' template. Thus, this key reviewer may also be able to contribute to the management of the review process (for example, communicating with other reviewers).

Although for the first review the synthesiser was selected after the reviewing process had begun, it was agreed that a better model (for reasons stated above) would be to appoint the synthesiser as part of the review process from the beginning.

Conclusions

Step 6: Synthesise the evidence

- A database will be used in future to enable electronic sorting and amalgamation of evidence from the studies to assist in the synthesis of findings and in checking the evidence trail for the final report.
- The key reviewer and a second reviewer will synthesise the evidence found to answer the review question into categories, pooling material from the studies in whose findings we can have confidence.
- Using other members of the project team to provide feedback, the key reviewer will compile a draft final report of the evidence to answer the review question, and implications for policy, practice and research.

Presentation of findings

What we did

The draft final report was sent to steering group members and external reviewers for comment before being published by NCVER.

The final report was distributed to stakeholders and placed on the website. For purposes of transparency details of the process were also published in this report.

NCVER will seek opportunities to disseminate the findings of the reviews and also to share our learning about the review process. For example, two members of the project team presented a paper to the national Australian Association for Research in Education (AARE) conference in November 2004 to inform other educational researchers about the results and the process of the first systematic review in vocational education and training in Australia.

Strengths of the review

The NCVER final report of the findings of the mature-aged systematic review was based on a small number of key studies, but these were the result of an exhaustive search and in-depth review by a collaborative team. While the findings from this limited number of studies are important, other strengths have been identified in the review process. These include the development of infrastructure for future systematic reviews, as outlined in this report.

In addition, another strength is that this well-documented, systematic and transparent approach enables the review to be updated by the same or different authors. Subject to available resources, additional research on this topic will be identified and will be made available as a supplement on the website.

Another important strength of this systematic review is the capacity building, through the transparent and collaborative approach, to improve the quality of future VET research in Australia. This review has provided policy-makers, other stakeholders and researchers with the opportunity to look at the quality of our vocational education and training research. For consultant reviewers, there were many positive outcomes as demonstrated in their feedback on the review process. This included the need for some to re-assess their ideas about they way they write their research reports or articles for publication. It also caused them to re-assess the nature, purposes and scope of literature reviews, and the role of referees and editors.

What we learnt

We learnt from the first systematic review that it may be that only a small number of studies will be identified as key studies; that is, studies in which we can be confident of the findings, because they rate highly for relevance and for quality. The first review found seven key studies to provide evidence to answer the review question and used another four studies with additional supporting evidence for barriers and facilitators. The synthesis report was based on these 11 key studies, although it may refer to other studies for context or other supporting evidence.

The systematic review also provides an opportunity to identify gaps in current research and implications for further research, policy and practice. Exhaustive identification and evaluation of existing research enabled us to say that, in the case of the mature-aged review, further research is required into the question, especially about the nature of the skill development activities and their related outcomes.

It is important to maintain the involvement of the reviewers who have contributed key work to the outcome of the systematic review. The steering group, reviewers and consultation group were kept involved throughout the systematic review.

Conclusions

Step 7: Present findings to stakeholders

- The draft final report will be distributed to the steering group members and reviewers for comments before finalising for publication.

Step 8: Disseminate the findings

- The final report will be published on the NCVER website.
- Presentation of the findings of systematic reviews will be made to stakeholders through research forums, conferences and other channels as appropriate.

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Appendix A Framework for first systematic review

Final framework for the systematic review of research: Skill development activities that keep the mature-aged in paid work

The framework for the NCVER/ANTA systematic review of research includes:

- ✧ the policy question(s) to be addressed by the review
- ✧ the definitions of the terms in the question(s)
- ✧ the criteria to be used to select research for inclusion in the review
- ✧ the coding to be used for recording the findings from the included studies
- ✧ the criteria for appraising the quality of the included studies

All components of the framework must be considered in conjunction with each other when carrying out the review.

A list of the steering group members and an outline of the review process are provided at the end of this framework document for reference.

The policy question

The question developed by the steering group to be addressed in this review is:

> *What evidence is there that skill development activities for the mature-aged lead to:*
>
> - ✧ *improved attachment to the labour market?*
> - ✧ *improved productivity?*

The steering group agreed that this question needs some unpacking. Implied in the review question, and to be reported in the research findings and final report, are the issues of which skill development activities work, when and for whom. Also to be reported in the findings are the factors (such as attitude) that have an important bearing on these key outcomes, either as barriers or facilitators, and the implications for policy, practice and research from these findings (see coding of findings section).

The definitions of the terms in the questions

The terms in the question as defined by the steering group are as follows.

Mature-aged

The starting brief contained the term 'mature-aged worker', but after discussion by the steering group the population was defined more broadly as 'mature-aged'.

Mature-aged refers to all people 45 years and over. It includes all those who desire work, or who might desire work if their skills were more suitable or if there were more opportunity.

Skill development activities

Skill development activities are defined as 'deliberate' general education or specific vocational activities undertaken to learn new skills or further develop skills related to work. 'Deliberate' in this context refers to the person knowingly participating in the skill development activity, for example, an activity which has a predetermined plan and format designed to develop employment-related skills and competencies.

Skill development activities thus can include a structured (formal) learning activity such as undertaking an accredited or non-accredited course, or an informal learning activity such as self-directed learning, networking, coaching or mentoring, as long as it is predetermined or knowingly participated in.

Skill development activities may be initiated by self, employer or other (such as Job Network member).

Improved attachment to the labour market

Improved attachment to the labour market includes:

- ✧ increased labour force participation rate
- ✧ increased employment duration
- ✧ job retention or improved job security (no longer at risk of losing job)
- ✧ change of work role or new career following new interest (including self-employment) (what's driving longer engagement with the labour market?)
- ✧ change in attitude to work, 'early retirement' or 'retrenchment', for example, looking forward to continuing participation in paid work past 55 years.

Improved productivity

Improved productivity includes:

- ✧ increased wages
- ✧ promotion
- ✧ increased efficiency in processes and work output
- ✧ reduction in accidents and injuries to workers through improved health and safety.

Outcomes do not include participation in the voluntary sector.

Research selection criteria

The search strategy will involve hand and electronic searching (databases and websites), to select studies that:

- ✧ are in English (from Australia and overseas)
- ✧ are recent (from approximately the last 10 years)
- ✧ match keywords deemed relevant to the review question.

Note, however, that research dealing with a population under 45 years will also be included where the research findings are relevant to improving attachment to the labour force for the mature-aged. Similarly, while the research is likely to cover those up to 65 years, relevant research focusing on over-65-year-olds will also be included.

All found studies will be recorded with reasons for any exclusion noted, such as because they do not answer the set question, or a study has been replaced by a primary research study on which it was based.

All included studies will undergo a further coding process as outlined below.

Coding of the findings from the included studies

As well as defining the question for the review, the steering group and others who provided feedback on drafts were concerned to ensure maximum value from the review by specifying how the findings of included research were to be recorded.

Findings from the included studies will be recorded and the studies coded by the reviewers within categories as suggested in table 7. Note that more than one code may apply, and some categories will be open-ended and more terms may be added as needed to code the studies systematically.

Table 7: Coding of the included studies

Item	Details
Bibliographic details, including: ✧ title ✧ author(s) ✧ publication details ✧ series ✧ url	Title, author(s), publication date and other relevant bibliographic details
Aims of the research	Brief description of study aims, including research questions and any hypotheses
Study methodology (proposed and actual) ✧ textual description	Brief textual description of the proposed methodologies for the study, including details of the sample size, population and coverage Any differences between the actual and proposed methods used will be noted
Geographic location ✧ local (Australian) ✧ state (Australian) ✧ national (Australian) ✧ international (one country, not Australia) ✧ international (more than one country)	Location the study covers
Time period ✧ date range, by year	Time period the study covers
Mature-aged population ✧ 45 to 65 ✧ over 65 ✧ under 45 but relevant to over 45 *Other terms may be needed, arising from the studies included*.	Size and nature of the mature-aged population in the study. This will include the population from which the sample was drawn as well as the sample itself
Skill development activities (the five categories here will be further subdivided, as indicated by the examples): ✧ provider (for example, school, TAFE, higher education, adult and community education, private training provider, enterprise training) ✧ delivery (for example, on-the-job training, off-the-job training, apprenticeship, traineeship, distance education, e-learning, in classroom, informal) ✧ field of education (Australian Standard Classification of Education categories) ✧ level of qualification (AQF and non-AQF, for example, non-award, subject only, cert I–IV, diploma, bachelor degree or higher) ✧ duration (for example, short-term, long-term) *Other terms may be needed, arising from the studies included*.	Description of skill development activities, to include but not be limited to: education sector, formal or informal, duration
Outcomes (the 2 categories here will be further subdivided, as indicated by the examples): ✧ any changes in attachment to the labour market (for example, in labour force participation, employment duration, job retention, job security, change of work role, change of career, change in work attitude, re-entry to labour market, move to or from self-employment) ✧ any changes in productivity levels (for example, wages, promotion, demotion, efficiency, output, health and safety) *Other terms may be needed, arising from the studies included*.	Description of the outcomes (in relation to attachment to the labour market and/or productivity) of the skill development activity

Item	Details
Barriers or facilitators: ✧ attitudes as barrier/facilitator ✧ other social/cultural factors as barrier/facilitator ✧ financial circumstances as barrier/facilitator ✧ health as barrier/facilitator ✧ disadvantage (equity group) as barrier/facilitator ✧ access to services (educational or other) as barrier/facilitator ✧ alternative opportunities as barrier/facilitator ✧ prior educational background as barrier/facilitator ✧ area of residence as barrier/facilitator	Description of barriers/facilitators (to include how other factors might have impacted on the effectiveness of the skill development activities such as attitudes, financial circumstances, health, availability of alternative careers, or socio-economic context)
Other terms may be needed, arising from the studies included	
Findings	Findings as described by the author will be recorded
Expert comment	Relevant additional comments, for example, about the context of the study, supplied by a reviewer or other external expert.

Appraisal of the included studies

To evaluate the studies, there will be two weights of evidence allocated to each study rated on a five-point Likert scale.

Weight of evidence A: Reviewers will rate the *relevance of the particular focus of the study* for addressing the review question (considering the population, intervention and outcomes, as described in this framework, compared with those described in the study).

Table 8: Assessment criteria for weight of evidence A (relevance)

	Rating				
Population i.e. mature-aged	High	Medium+	Medium	Medium-	Low
Intervention i.e. skill development activities	High	Medium+	Medium	Medium-	Low
Outcomes i.e. improved attachment to the labour market or productivity	High	Medium+	Medium	Medium-	Low
Overall weight of evidence A (relevance)	High	Medium+	Medium	Medium-	Low

Weight of evidence B: Reviewers will rate the *quality of the study* in terms of the trust that can be put in its findings against the questions posed (considering the rules of evidence criteria: validity, reliability, authenticity, sufficiency, and currency).

Table 9: Assessment criteria for weight of evidence B (quality)

In this research study:	Rating				
Is the evidence valid?	High	Medium+	Medium	Medium-	Low
Is the evidence reliable?	High	Medium+	Medium	Medium-	Low
Is the evidence authentic?	High	Medium+	Medium	Medium-	Low
Is the evidence sufficient?	High	Medium+	Medium	Medium-	Low
Is the evidence current today?	High	Medium+	Medium	Medium-	Low
Overall weight of evidence B (quality)	High	Medium+	Medium	Medium-	Low

Note: Both weighting A (relevance/focus compared with review question) and weighting B (quality/reliability of the findings of the study) will be taken into account in preparing the final synthesis report.

Reporting

Full reporting will detail:

- ✧ number of studies found in the initial search
- ✧ number of studies excluded, and reasons for exclusion
- ✧ full details of results of appraisals of included studies.

The final synthesis phase will answer the review question by detailing the evidence (and weight) for skill development activities for the mature-aged that lead to improved attachment to the labour market and/or improved productivity. It will state explicitly what skill development activities work, under what circumstances, and for which groups of the mature-aged, noting barriers and facilitators, and detailing the implications for policy, practice and research.

Background

The National Centre for Vocational Education Research received funding from the Australian National Training Authority to undertake, for the first time, a systematic review of research for Australian VET policy-makers on a question of policy salience. Systematic reviews in the field of education have been undertaken overseas since the late 1990s but this method has not previously been used in Australian education research. In the course of undertaking the review NCVER will also be developing a framework and capabilities for similar reviews.

The outcomes of the first NCVER systematic review of research project to be achieved by the end of 2004 are:

- ✧ a report of the systematic review of research into a key policy question that ANTA has specified is to be related to mature-aged workers
- ✧ a replicable framework and infrastructure within which further systematic reviews of research can be conducted
- ✧ a report on the process of this systematic review of research.

In undertaking this review, NCVER is seeking a highly interactive relationship with Commonwealth, state and territory policy-makers, and a network of VET researchers throughout the systematic review process. Consultation will ensure that this first Australian VET systematic review of research has current relevance to policy- and decision-makers.

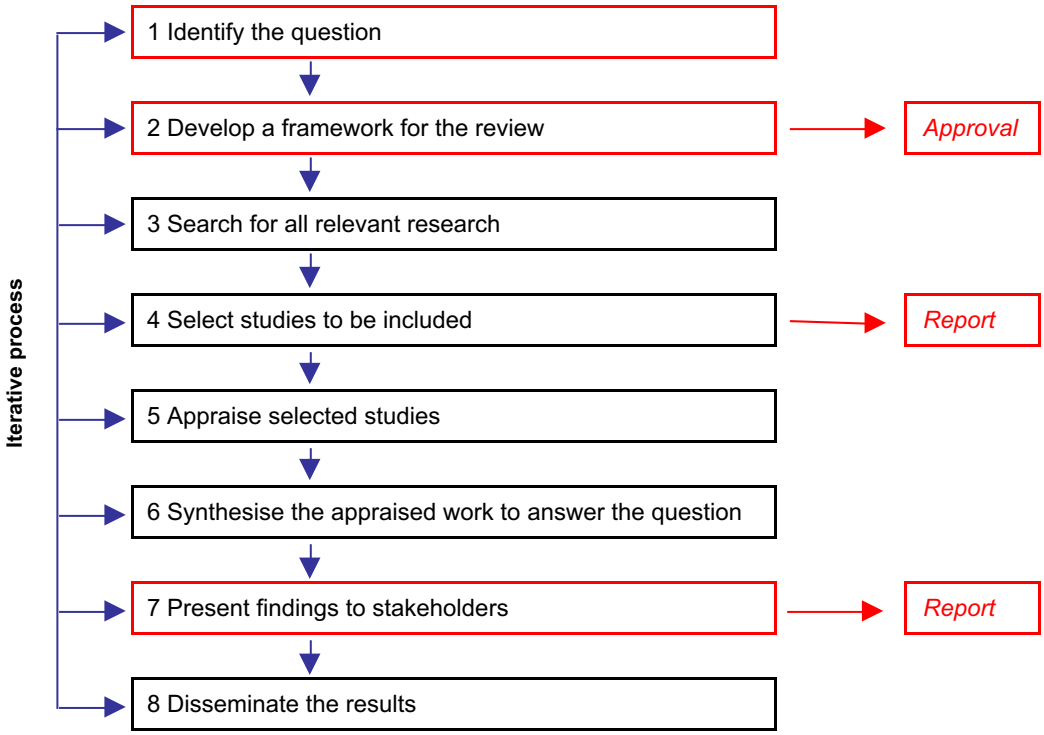
What does a systematic review of research involve?

A systematic review of research is a secondary research activity that locates all relevant existing material (published and unpublished) on a focused policy question. It evaluates this material for its information content, approach and robustness, concluding with a balanced and relevant synthesis of the findings.

A systematic review of research follows a structured framework, and is transparent in its approach, making clear the criteria and reasons why a study has or has not been included, and the basis for the judgement of its quality. Thus it provides an empirically based foundation for decision-making.

The United Kingdom-based Evidence for Policy and Practice Information and Co-ordinating Centre was established in 1993 to address the need for a systematic approach to the organisation and review of evidence-based work on social interventions. The centre-developed model of systematic reviewing has been followed and adapted by the Learning and Skills Development Agency in the United Kingdom. In this project, NCVER will adapt the centre model and other approaches to suit our purposes. The eight steps for this systematic review are outlined in the following chart.

Figure 4: Summary of the steps of a systematic review



Appendix B
Resources used for search

The systematic searching for relevant literature was undertaken during May and June 2004.

Electronic online databases searched

Social SciSearch (via database vendor – Dialog)
Education Abstracts (via database vendor – Dialog)
ERIC (via database vendor – Dialog)
EconLit (via database vendor – Dialog)
Australian Education Index (AEI) cdrom + online via Informit Online
British Education Index (BEI) cdrom

Web based databases searched

VOCED (Vocational Education and Training Research Database) <http://www.voced.edu.au>
AgeLine (American Association for Retired Persons) <http://research.aarp.org/ageline/home.html>
EconPapers Online <http://econpapers.hhs.se/>
Educational Research Abstracts (ERA) online <http://www.tandf.co.uk/era/>

Web search engines used

Google <http://www.google.com.au>
Vivisimo <http://vivisimo.com/>

Web sites viewed

AgeInfo Information service (UK Centre for Policy on Ageing) <http://www.cpa.org.uk/ageinfo/ageinfo.html>
Ageing Policy Home (Uni of Melbourne, National Clearinghouse Project – Ageing policy) <http://www.public-policy.unimelb.edu.au/research/Clearinghouse/Ageing/Ageing.html>
GeroNet – Center for Policy Research in Aging <http://www.geronet.med.ucla.edu/centers/cpra/#res>
Barbara McIntosh Publication History – School of Business Administration, University of Vermont <http://www.bsad.uvm.edu/Research/FacPubs/details?author=62>
Centre for Reviews and Dissemination – University of York <http://www.york.ac.uk/inst/crd/index.htm>
United Nations: Policies and programmes on ageing <http://www.seniorweb.nl/un/start.asp>
English Longitudinal Study of Ageing <http://www1.ifs.org.uk/elsa/index.htm>
The Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) <http://eppi.ioe.ac.uk/EPPIWeb/home.aspx>
Eurofound: Active Strategies for an ageing population <http://www.eurofound.eu.int/living/ageing.htm>
Evidence Network <http://www.eurofound.eu.int/living/ageing.htm>

Journals – content pages online

Ageing & Society <http://titles.cambridge.org/journals/journal_catalogue.asp?historylinks=ALPHA&mnemonic=ASO>

Appendix C
Key search terms

Note: mature age(d) was not a term used in the VOCED, ERIC, AEI, BEI or AgeLine Thesauri.

Population

older worker / older workers / older adults / older students / older learner / older learners / old age / middle aged adults / old old adults / young old adults / ageing / aging / aging (individuals) / ageing population / aging population / aged / adult student / adult learner / adult learners / mature worker / mature workers / mature age worker / mature age workers / mature-age worker / mature-age workers / mature aged worker / mature-aged workers / mature-aged worker / mature-aged workers / mature learner / mature learners / mature age learner / mature age learners / mature-age learner / mature-age learners / mature-aged learner / mature-aged learners / mature-aged learner / mature-aged learners / baby boomers / elderly / 50+ / population ageing / population aging

Intervention

training / education / learning / learning activity / deliberate general education / vocational training / vocational education / continuing education / continuing vocational education / continuing vocational education / adult learning / adult education / adult programs / adult vocational education / lifelong learning / retraining / refresher training / job skills / job development / job training / skill development / skill upgrading / skills / accredited / unaccredited / self-directed learning / formal learning / networking / coaching / mentoring / reentry student / human capital / training investment / intervention / interventions

Outcomes

participation / participation rates / productivity / alternative work patterns / postretirement work / employment / engagement / employment opportunity / part-time employment / full-time employment / job retention / job security / job satisfaction / career change / new career / entry to job market / entry to labour market / entry to labor market / longer engagement with labour market / longer engagement with labor market / reduced retrenchment / promotion / increased hours or work / regular hours or work / labour utilisation / labor utilisation / labour market / labor market / labour force development / labor force development / labour force participation / labor force participation / labour productivity / labor productivity / educational benefits / educational attainment / no early retirement / reduced accidents / improved health and safety / return on investment / tenure / return to work.

Appendix D
Evaluation template

Systematic review of research: Skill development activities that keep the mature-aged in paid work

REVIEWER Evaluation Template

To ensure consistency and maximum value from the review, the following template has been developed for completion by each reviewer. It is based on the Framework for the systematic review of research*, Skill development activities that keep the mature-aged in paid work*. For your response please circle or bold the relevant answer(s).

Important notes:

1. For all fields, if you are supplying information that you have inferred from the review, or ascertained from other sources, please make this clear by putting it in square brackets and writing **[inferred by reviewer]** at the end of the comment or code. It is necessary to distinguish between what is explicit in the report and what is implicit, or sourced from elsewhere. You may need to undertake further investigation (eg a phone call to an author) to answer a question. If that is the case it must be recorded.

2. Wherever necessary, put a **page reference** to indicate where in the report you found the text on which your decision was based. This will help in the discussion with your fellow reviewer and in the final synthesis.

3. In many fields, you are asked to indicate one or more codes that apply to all or part of the study. You are also able to use a text field to write comments about how the codes apply; for example if the study uses several types of methodology in different geographic areas, you can outline exactly which codes apply and how they are related.

1. ABOUT THE STUDY YOU ARE REVIEWING

Q1 Information needed for this section will be supplied with the studies.

1.1 ID:	
1.2 Author(s):	
1.3 Title:	

1.4 Publication details (place, publisher and date):

1.5 Source (detail below): Web Hand search Database

1.6 Details:

2. ABOUT THE REVIEWER

Q2 Please complete your details below:

2.1 Name(s):

2.2 Date of review: / /

3. ABOUT THE RESEARCH, IT'S SCOPE AND ITS FINDINGS

Q3.1 Briefly describe the **aims** and **scope** of the study, including research questions and any hypotheses set up and tested by the study. Use your own words to paraphrase **only** if necessary (for example if the study describes its aims differently in several places).

Q3.2 State **all** the key findings and how they relate to the objectives of the study. Please use a separate paragraph for each finding. Use your own words to paraphrase **only** if necessary (for example if the study describes its findings differently in several places).

Q3.3a Please describe all the proposed methodologies for this study. Include details of the sample size, population and coverage. (e.g. 30 in-depth interviews in NSW, 2 focus groups in ACT, and a national telephone survey of 400 mature-aged)

Q3.3b Please describe any differences between the actual and proposed methods used for this study.

Q3.4 What geographic location(s) does the actual study cover? Select all that apply and make comments in your own words below if you need to explain different geographic locations applying to different parts of the study. Note: **local** can apply to a location within a particular state, organisation or industry. Please list the region(s)/state(s)/countries the study covers, and make explanatory notes if necessary

3.4a	Australia (national)	3.4b	Australia (state)
3.4c	Australia (local)	3.4d	International (one country only, not Australia)
3.4e	International (more than one country, may include Australia)	3.4f	Other (detail below)

Q3.5 What time-period does the study cover? Make explanatory notes if necessary

3.5a	Month(s) if relevant:	
3.5b	Year (inc range if relevant):	

Q3.6 What age of mature-aged population does the study cover? (Use more than one if needed, indicate if only part of range covered); make explanatory notes if necessary. Please record here both the **actual** sample used and the **expected** sample, if different, and provide an explanatory note in your comments. If the population from which the sample was drawn is different from the actual sample, please also record that in your comments.

3.6a	Over 45	3.6b	Over 50
3.6c	45-65	3.6d	Over 65
3.6e	Under 45 but relevant to over 45	3.6f	Other (detail below)

Q3.7 If there are any other particular characteristics of the included population that you have not yet recorded (e.g. gender, employment status), please detail below. List the characteristics and make explanatory notes if necessary. Please record here both the **actual** sample used and the **expected** sample, if different, and provide an explanatory note in your comments. If the population from which the sample was drawn is different from the actual sample, please also record that in your comments.

4. ABOUT THE SKILL DEVELOPMENT ACTIVITIES

Q4.1 Who provided the skill development activities? Make explanatory notes as necessary. List any other provider(s) and give details.

4.1a	School	4.1b	TAFE
4.1c	Adult & community education (ACE)	4.1d	Private provider
4.1e	Enterprise training	4.1f	Other (detail below)

Q4.2 How was the skill development activity delivered? Select all that apply. Make explanatory notes as necessary. List any other delivery methods/types and give details.

4.2a	On-the-job training (structured)	4.2b	On-the-job training (unstructured)
4.2c	Off-the-job training (external)	4.2d	Off-the-job training (in-house)
4.2e	Apprenticeship	4.2f	Traineeship
4.2g	Distance education	4.2h	On-line (e –learning)
4.2i	In classroom	4.2j	In informal community setting
4.2k	Other (detail below)		

Q4.3 What was the nature of the setting for the skill development activity? Make explanatory notes as necessary. List any other setting(s) and give details.

4.3a	Formal (structured)	4.3b	Informal (includes self-directed, networking, mentoring, coaching)
4.3c	Formal & informal	4.3d	Other (detail below)

Q4.4 What were the major field(s) of education for the skill development activity? Use ASCED (2 digit level) as set out below. Information about what is included in each of these is included on a separate sheet and is also available at http://www.abs.gov.au/Ausstats/abs%40.nsf/66f306f503e529a5ca25697e00176 61f/41ca34c3a2af0c2cca256aaf001fca77!OpenDocument

Select all that apply (if any). Make explanatory notes as necessary.

4.4a	Natural & physical sciences	4.4b	Information technology
4.4c	Engineering & related technology	4.4d	Architecture & building
4.4e	Agriculture, env. & related studies	4.4f	Health
4.4g	Education	4.4h	Management & commerce
4.4i	Society & culture	4.4j	Creative arts

4.4k	Food, hospitality & personal services	4.4l	Literacy & numeracy
4.4m	Learning skills	4.4n	Social skills
4.4o	Employment skills	4.4p	Other general education
4.4q	Other mixed field programs	4.4r	Subject only (no field of education)

Q4.5 Indicate, if relevant, the level of qualification for the skill development activity(s). Select all that apply (if any). Make explanatory notes as necessary.

4.5a	Non-award course	4.5b	AQF Subject only/statement of attainment
4.5c	Secondary education cert.	4.5d	Certificate I
4.5e	Certificate II	4.5f	Certificate III
4.5g	Certificate IV	4.5h	Diploma
4.5i	Advanced Diploma	4.5j	Graduate Certificate
4.5k	Graduate Diploma	4.5l	Bachelor Degree or higher
4.5m	Other – specify below:		

Q4.6 Indicate, if relevant, the duration of the skill development activity(s). Make explanatory notes as necessary.

4.6a	Describe duration here (eg months, hours/wk, years)	

Q4.7 If there are any other features of the skill development activities that you have not yet recorded, please detail below, with any necessary explanatory comments.

5. ABOUT THE OUTCOMES OF THE SKILL DEVELOPMENT ACTIVITIES

Q5.1 Does the study identify and/or demonstrate change(s) in attachment to the labour market of the relevant mature-aged population as an outcome of the skill development activity/activities?

1 Yes ☐ 2 No ☐ 3 Not applicable ☐

If yes, please indicate all that describe this change in attachment to the labour market. Make explanatory notes as necessary. List any other relevant outcomes and give details. Please note outcomes here do **not** include participation in the volunteer sector:

5.1a	Change in labour market participation	5.1b	Change in employment duration
5.1c	Job retention	5.1d	Change in job security
5.1e	Change of work role	5.1f	Job promotion or demotion
5.1g	Change of career	5.1h	Change in work attitude
5.1i	Re-entry to labour market	5.1j	Move to or from self-employment
5.1k	Other (specify below)		

Q5.2 Does the study identify and/or demonstrate improved productivity of the relevant mature-aged workers as an outcome of the skill development activity/activities?

1 Yes ☐ 2 No ☐ 3 Not applicable ☐

If yes, please indicate all that describes this improved productivity within the labour market. Make explanatory notes as necessary. List any other relevant outcomes and give details.

5.2a	Increased wages	5.2b	Promotion
5.2c	Increased efficiency	5.2d	Increased output
5.2e	Improved health & safety	5.2f	Increased morale
5.2g	Other (specify below)		

Q5.3 If the study identifies and/or demonstrates outcomes other than improved attachment to the labour market or improved productivity, as an outcome of the skill development activities, please describe below.
Please include **negative** as well as positive outcomes.

Q5.4 If there are any other details regarding the outcomes of the skill development activity(s), as described in the study, that you have not yet recorded, please detail below. Make explanatory notes as necessary.

6. ABOUT BARRIERS OR FACILITATORS TO SKILL DEVELOPMENT ACTIVITIES AND/OR THEIR OUTCOMES

Q6.1 Does the study identify and/or demonstrate **barriers** to skill development activities for the mature-aged leading to improved attachment to the labour market and/or productivity?

1 Yes ☐ 2 No ☐ 3 Not applicable ☐

If so, please indicate what these barriers are (circle all that apply). Make explanatory notes as necessary. List any other relevant barriers and give details.

6.1a	Peer attitude	6.1b	Health
6.1c	Personal attitude	6.1d	Financial circumstances
6.1e	Employer attitude	6.1f	Availability of alternative careers
6.1g	Access to services (educational or other – specify)	6.1h	Disadvantage (equity group)
6.1i	Prior educational background	6.1j	Geographic location
6.1k	Physical ability	6.1l	Employment opportunities
6.1m	Socio-economic factors (specify below)	6.1n	Other social/cultural factors
6.1o	Others (specify below)		

Q6.2 Does the study identify and/or demonstrate **facilitators** to skill development activities for the mature-aged leading to improved attachment to the labour market and/or productivity (circle one only)?

1 Yes ☐ 2 No ☐ 3 Not applicable ☐

If so, please indicate what these facilitators are (circle all that apply). Make explanatory notes as necessary. List any other relevant facilitators and give details.

6.2a	Peer attitude	6.2b	Health
6.2c	Personal attitude	6.2d	Financial circumstances
6.2e	Employer attitude	6.2f	Availability of alternative careers
6.2g	Access to services	6.2h	Disadvantage (equity group)
6.2l	Existing skills	6.2j	Geographic location
6.2k	Physical ability	6.2l	Employment opportunities
6.2m	Socio-economic factors	6.2n	Prior educational background
6.2o	Social/cultural factors	6.2p	Others (specify below)

Q6.3 If there are any other details regarding barriers or facilitators, as described in the study, that you have not yet recorded, please detail below. Make explanatory notes as necessary.

7. ANY FURTHER COMMENTS ABOUT THE STUDY

Q7 Please feel free to add expert comment on any additional aspect **that you believe is relevant** to this systematic review, for example about the context of the study or the funding source.

8. ANY OTHER RELEVANT RESEARCH

Q8 Finally, please put details here of any highly relevant research referred to in the study you are reviewing, that you believe should be followed up for the systematic review.

9. EVALUATION SECTION

In this section we are interested in your evaluation of this study. Please refer to the Reviewers' Guidelines for Quality Appraisal for explanatory detail.

9.1 WEIGHT OF EVIDENCE A (relevance)

Q9.1 How would you rate the **relevance of the particular focus of the study** for addressing the question of this review? Consider the population, intervention and outcomes as described in the review framework compared with those covered in this study. Rate each component as well as giving an overall rating.

In this research study:	Rating				
Population i.e. mature-aged	High	Medium+	Medium	Medium-	Low
Intervention i.e. skill development activities	High	Medium+	Medium	Medium-	Low
Outcomes i.e. improved attachment to the labour market or productivity	High	Medium+	Medium	Medium-	Low
Overall Weight of Evidence A (relevance)	High	Medium+	Medium	Medium-	Low

Please add any comment below:

9.2 WEIGHT OF EVIDENCE B (quality)

Q9.2 How would you rate the **quality of this study** in terms of the trust that can be put into its findings against the questions posed? Please refer to the Reviewers' Guidelines for Quality Appraisal.

In this research study:	Rating				
Is the evidence valid?	High	Medium+	Medium	Medium-	Low
Is the evidence reliable?	High	Medium+	Medium	Medium-	Low
Is the evidence authentic?	High	Medium+	Medium	Medium-	Low
Is the evidence sufficient?	High	Medium+	Medium	Medium-	Low
Is the evidence current today?	High	Medium+	Medium	Medium-	Low
Overall Weight of Evidence B (quality)	High	Medium+	Medium	Medium-	Low

Please add any comment below:

9.3 WEIGHT OF EVIDENCE SUMMARY

Q9.3 Please provide final weights of evidence A and B below:

Weight of evidence A **Weight of evidence B**

Thank you for completing this evaluation form.

Appendix E Guidelines for systematic review appraisal

Item:	Weight of evidence A
Criterion A:	How would you rate the relevance of the substance of this study to the review question?
Guidelines:	Consider the following in answering the question above: 1. Actual population sample covered compared with that specified in the review framework 2. Actual intervention(s) covered compared with that specified in the review framework 3. Actual outcomes focused on compared with those specified in the review framework
Item:	Weight of evidence B
Criterion B:	How would you rate the quality of the study in terms of trust that can be put into its findings for the research question posed?
Guidelines:	Consider all quality criteria as outlined below i.e. validity, reliability, authenticity, sufficiency and currency
Criterion 1:	Is the evidence in this study valid?
Guidelines:	**Consider the following in answering the question above:** 1. research aims and variables or concepts measured 2. design and whether methods measure what was intended to be measured (i.e. validity) 3. efforts made to address the validity of data collection tools/methods e.g. pilot testing tools 4. efforts made at data analysis stage to address validity e.g. limiting analyses where numbers are insufficient 5. efforts made in the analysis to control for bias from confounding variables 6. whether links between data, interpretation and conclusions are valid 7. justification of conclusion drawn
Criterion 2:	Is the evidence in this study reliable?
Guidelines:	**Consider the following in answering the question above:** 1. efforts to determine that data collection methods and tools will yield same result each time (i.e. are reliable) 2. efforts to ensure data analysis can be repeated and yields same result each time 3. any assumptions/theoretical perspectives that shape the form or the output of the research 4. any alternative explanations for stated findings
Criterion 3:	Is the evidence in this study authentic?
Guidelines:	**Consider the following in answering the question above:** 1. whose voice it is in the report 2. for whom and for what purpose the knowledge was being sought 3. sources of evidence: direct or indirect

Criterion 4:	Is the evidence in this study sufficient?
Guidelines:	**Consider the following in answering the question above:** 1. sample sizes etc. 2. the authors' conclusions 3. whether there are any other possible explanations for the findings 4. that the evidence presented is enough to support the findings and conclusions
Criterion 5:	Is the evidence in this study current today?
Guidelines:	**Consider the following in answering the question above:** 1. when the study was done and any contextual issues that are no longer relevant or that now are relevant that were not at the time of the study

The weight of evidence A & B will then be scored in a 5 x 5 matrix:

		Weight of evidence B (quality)				
		High	Medium plus (+)	Medium	Medium minus (-)	Low
Weight of evidence A (relevance)	High					
	Medium plus (+)					
	Medium					
	Medium minus (-)					
	Low					

National Centre for Vocational Education Research

NCVER

A systematic review of research is a decision-making tool for policy and practice. It is a piece of research in its own right, using explicit and rigorous methods that follow a standard set of stages: to identify; critically appraise; and synthesise relevant research (both published and unpublished) to answer a specific question.

This report documents the establishment of NCVER's own eight-step model for future systematic reviews of research.

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