



Graduate Research School
**Research Proposal Coversheet for Candidates in Research
 Higher Degrees**

RP

This form should only be used by students currently enrolled in a Masters by Research (by thesis) or PhD programme at UWA. Please submit the proposal and coversheet, marked “Direct” to the Graduate Research and Scholarships Office, Hackett Hall (M358). The proposal must address the Board’s Guidelines (available at <http://www.postgraduate.uwa.edu.au/page/46501>). **Incomplete proposals will be returned.** Please retain a copy for your reference. The candidate, principal supervisor and Head of School are required to sign this coversheet where indicated prior to submission to the Board of the Graduate Research School. **The signature indicates that the information contained in the proposal is complete and correct and that all signatories have discussed and agreed on the information.** Please note that if the supervisor information below differs from that previously reported to the Graduate Research and Scholarships Office, records will be updated to reflect these changes.

You are required to submit TWO (2) copies of the proposal and TWO (2) coversheets.

SURNAME:	Boakes	STUDENT NUMBER:
GIVEN NAMES:	Jolee Alison	TITLE: Ms
POSTAL ADDRESS:		
TELEPHONE NO:	EMAIL:	
SCHOOLS:	Graduate School of Education	
DEGREE:	Doctor of Philosophy	
RESEARCH CODE:	330109 (Education Studies: Assessment and Evaluation)	

2. SUPERVISOR		
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3. FURTHER INFORMATION AND DECLARATIONS	
A Research Proposal (following UWA Research Proposal & Details of Proposed Research Guidelines) must be attached (indicate that this has been attached by ticking the box)	YES
A detailed timeplan must be attached. (indicate that this has been attached by ticking the box)	YES
What are the anticipated annual costs? (N.B. A figure must be provided)	\$2000
How much will the Schools provide? (50% each from Education and Engineering)	Nil
If necessary, please indicate the source(s) of extra funds: Grant for which principal supervisor is chief investigator (Lucent Technologies Philanthropic Foundation)	
If statistical advice is relevant to the proposal, is it available in the School? If not, how will it be obtained?	YES
If there has been any formal School review of the proposal, please describe the process: The proposal will be presented to a panel in the Graduate School of Education on May 27 2005. The panel will comprise Dr. E Chapman (Supervisor), A/Prof Anne Chapman (Chair), Ms. Di Gardiner, and Dr. Marie-Eve Ritz. **OUTCOME PENDING	
The Board of the Graduate Research School seeks confirmation that:	
(a) the candidate's proposal has been adequately discussed with the supervisor/s; and	YES
(b) (i) the candidate's proposal can be carried out with the available funding, facilities and equipment; or	YES
(ii) the necessary funding, facilities and equipment will be made available during the candidature.	YES
Does this project involve field or other work outside the University?	YES
What are the costs of this work?	Nil
Will the School undertake to pay the expenses?	NO
If not, is the student aware of the possible financial obligations?	YES
Are there confidentiality or intellectual property issues that need to be considered? (If "No" do not complete the next section)	NO
Is there any aspect of the candidate's research that is likely to result in the generation of intellectual property of potential commercial value to the University?	
Is there likely to be any restriction on the disclosure of information arising out of the candidate's research or provided to the candidate for example, confidential information or patentable inventions?	
Is intellectual property already in existence in the School or the University which is pertinent to this particular project?	
If "Yes" to any of the above an Intellectual Property Questionnaire available at http://www.postgraduate.uwa.edu.au/home/current/formsandregs/forms is attached.	

4. SCHOOL DECLARATION - TO BE COMPLETED BY ALL PARTIES

The Board seeks the assurance of the Head of School that the School certifies that the attached details of the proposed topic and supervision is appropriate and that supervision, equipment, techniques, literature and financial support will be available throughout the candidature. All signatories confirm that they have read "The Code of Good Practice in Postgraduate Research and Supervision". Heads are further required to certify that **all necessary approvals** in relation to the attached proposal have been obtained from the appropriate University committees, and that all safety and other training required by law and/or University policy has been completed, prior to commencement of the research.

Does the project involve:	YES/ NO	Approval Body	Approval obtained (please tick all applicable)
1. use of animals?	No	Animal Ethics Committee	
2. involvement of human participants?	Yes	Human Research Ethics Committee	Application submitted
3. genetic manipulation?	No	University Biosafety Committee	
4. potentially hazardous procedures and situations?	No	University Safety Committee	
5. use and disposal of potent teratogens or carcinogens?	No	Carcinogenic and Mutagenic Substances Committee	
6. use of ionising radiation?	No	University Radiation Safety Committee	

Is the candidate required, by law and/or University policy, to complete any training for the proposed research? NO

SIGNATURES

Candidate

Date:

Supervisor/s

Date:

Head of School/Postgraduate Coordinator

Date:

Manager of Animal Ethics (if applicable)

Date:

GRADUATE RESEARCH AND SCHOLARSHIPS OFFICE USE ONLY

Received

BGRS Member

On:

Recommendation:

Research Proposal Approved.

Research Proposal not approved **AT THIS STAGE**. Proposal to be amended as per my attached comments and **re-submitted**.

Research Proposal approved; candidate to note my comments as attached.

Research Proposal **NOT APPROVED**. See my comments attached.

Signed:

Board member

Date:

HiDegs Amended

Approval Sent

A. PROPOSED STUDY

TITLE

Development and Validation of a Test Battery to Evaluate Employability Skills

BACKGROUND

Despite the flood of research that has been conducted in the field of personnel selection over the last 30 years, studies in the area have been criticized for being poorly designed, devoid of theory and narrow in focus (Rynes, 1991). The goal of the current research is to establish a reliable and valid instrument that will systematically assess generic workplace skills that have been identified as essential for today's labour market. It is envisaged that the validated instrument will have applications in a diverse cross-section of industries and have potential for use both for recruitment and for staff development purposes.

Current Trends in the Workplace – The Shift Toward Generic Skills

The 'globalization' and rapid transformation of the world economy over the last two decades has resulted in profound changes to the Australian labour market. Globalization refers to the "increased mobility of goods, services, labour, technology and capital throughout the world" (Government of Canada, 2002). Prior to the mid 1980s, Australian politicians and business analysts focused on the 'national economy', consisting largely of centralised agriculture and manufacturing industries, together with a labour force trained to perform routine duties relating to specific occupations. With the introduction of the globalization process, however, there was a shift away from agriculture and a move towards global service industries. Australian workers became part of a knowledge-based labour market, both competing and interacting with workers from around the world. In fact, by 2001, approximately 4.9 million, or 56% of the Australian workforce were employed in global labour markets (Maglen, 2001). Moreover, the shift towards service-oriented industries meant that positions that once required workers to perform specialized duties now called for higher levels of broadband skills, with communication and the ability to adapt successfully to change becoming increasingly important. It should be noted that this trend was not specific to the Australian context, but rather a worldwide phenomenon (Maglen, 1994).

To ensure business success in the 'new economy', employers now require workers with a 'global mindset', that is, the ability to look at the broader context, be flexible, problem-solve, manage information, and undertake a variety of different tasks. Whilst technical skills are still important, greater emphasis is now placed on individuals' 'generic' skills (Kerka, 1993). In broad terms, the Australian Education Council, Mayer Committee (1992) defined generic skills (or key competencies/employability skills as they are sometimes called) as:

competencies essential for effective participation in the emerging patterns of work and work organization. They focus on the capacity to apply knowledge and skills in an integrated way in work situations. Key competencies are generic in that they apply to work generally rather than being specific to work in particular occupations or industries. This characteristic means that the key competencies are not only essential for participation in work, but are also essential for effective participation in further education and in adult life more generally. (p.7)

Initial attempts to identify, define and construct sets of generic skills (both in Australia and overseas) involved two phases. In Phase I, various committees were formed to review the educational needs of young people to ensure that school leavers were equipped with a set of skills that would allow them to function successfully outside the educational context. It was found that the ability to access information, work well in teams and communicate effectively with various groups were essential skills for school leavers. In Phase II, industry-led initiatives were undertaken to develop sets of key competencies that were more closely related to employability than to life in

general (as had been the focus in Phase I) (NCVER, 2003). A comparison of the key skills identified by such initiatives can be seen in Table 1 (content drawn from NCVER, 2003).

Table 1

Comparison of the key skills identified by various initiatives from around the world

Country	Initiative	Key Competencies Identified
Australia	Mayer Key Competencies	Communication, use of mathematical ideas, teamwork, problem-solving, planning, collecting, analyzing and organizing information, use of technology.
	Australian Chamber of Commerce and Industry and Business Council of Australia – Employability Skills Framework	Communication, teamwork, problem-solving, planning, initiative, self-management, learning, technology, personal characteristics and attributes (e.g., reliability, motivation)
United Kingdom	The United Kingdom Confederation of British Industry – Key Skills Qualification	Communication, numeracy, use of technology, teamwork, self-directed learning, problem-solving, adaptability, career management.
Canada	Employability Skills 2000+ Scheme	Fundamental Skills (communication, management of information, numeracy, problem-solving) Personal Management Skills (positive attitude, responsible, adaptable, self-directed learning, safety) Teamwork Skills Values (positive self-esteem, integrity, responsibility)
United States	The Secretary’s Commission on Achieving Necessary Skills (SCANS) Project	Basic Skills (literacy, numeracy, communication) Higher Order Thinking Skills (adapting to change, problem-solving, creativity, decision-making, learning how to learn) Interpersonal and team skills (communication, co-operation, negotiation, conflict resolution, leadership, dealing with diversity) Personal characteristics and attributes (politeness, perseverance, goal-setting, positive self-worth)

From Table 1, it is clear that there is no single definitive set of generic skills, nor has an international consensus been reached as to which skills are essential for producing successful and adaptive employees. Whilst the United Kingdom (UK) model is more pragmatic, focusing on a traditional set of key competencies that are broadly similar, countries such as the United States (US) have developed a more flexible and holistic set of competencies, taking into account personal characteristics as well as basic workplace skills. As noted by Kearns (2001), the focus of the US model appears to be more consistent with changes to the economy (e.g., the shift towards working across a variety of contexts, the need to be adaptive, flexible and creative) than the model adopted in the UK.

Many of the conceptual issues associated with identifying and defining generic skills were examined in a program funded by the Organization for Economic Co-operation and Development (OECD) called the Definition and Selection of Competencies (DeSeCo: 1998-2002). The major purpose of this program was to establish a theoretical and scholarly framework for identifying key generic skills by focusing on economic, psychological, sociological, anthropological and philosophical perspectives, rather than relying on the opinions of industry leaders. This program established four criteria for distinguishing between key or generic competencies, and more situationally relevant skills. To be identified as ‘key’ or ‘generic’, a competency had to meet the following four criteria (Rychen & Salganik, 2001): (i) multifunctionality (i.e., needed to achieve goals across settings), (ii) relevance to a ‘high order of mental complexity’ (i.e., encourage independent thinking), (iii) relevance across different social contexts (i.e., both work and life

generally), and (iv) multidimensionality (i.e., incorporate basic, interpersonal and intrapersonal skills).

After reviewing the sets of generic skills identified by various initiatives from around the world (see Table 1) and taking into account the common elements identified by DeSeCo, the National Centre for Vocational Education Research (NCVER) in Australia concluded that there are typically six elements included in competency frameworks (NCVER, 2003, p.8):

1. Basic/fundamental skills – such as literacy, using numbers, using technology
2. People-related skills – such as communication, teamwork
3. Conceptual/thinking skills – such as problem-solving, planning and organizing, thinking innovatively and creatively
4. Personal skills and attributes – such as being responsible, resourceful, flexible, able to manage own time, having self-esteem
5. Skills related to the business world – such as innovation skills, enterprise skills
6. Skills related to the community – such as civic or citizenship knowledge and skills

Review of Methods Employed in Workplace Recruitment

Interestingly, the renewed focus on generic skills in the workplace has not been reflected in the area of personnel selection. Prior to the second world war, there was little interest in the area of workplace recruitment, with most individuals obtaining employment on a ‘who they knew’ basis. However, with the massive problems associated with selecting and classifying personnel for entry into the Armed Forces in the United States, it was recognized that there was a need for the use of testing in this area (Brown & Fritz, 1996). A review of the literature reveals that there have been hundreds of instruments developed to assist in the selection of personnel, including personality questionnaires (e.g., the Revised NEO Personality Inventory, NEO-PI-R [Costa & McCrae, 1992]) and general intelligence tests (e.g., Slosson Intelligence Test, SIT-R [Slosson, Nicholson, & Hibpshman, 2002]). Despite the increasing interest and productivity in this area, little attention has been focused on: (i) determining exactly which skills are essential for workplace success, and (ii) developing valid and comprehensive instruments to test the range of skills that may be relevant across a variety of work contexts. To date, most businesses and recruitment agencies have employed a ‘mish mash’ of instruments, providing them with an abundance of information that, in some cases, is not valid and/or applicable for the given purposes (Breugh & Starke, 2000).

Three types of instruments have typically been employed in the area of personnel recruitment. These include: tests of cognitive ability, structured interviews and personality questionnaires (Brown & Fritz, 1996). Table 2 provides a summary of the advantages and disadvantages associated with each type of instrument as they pertain to employee selection. From the table, it is clear that cognitive ability measures, such as general intelligence and aptitude tests, have been found to have good reliability and validity, measuring skills (e.g., reasoning and planning, creativity, problem-solving, adaptability) that have recently been deemed essential for employee success (NCVER, 2003). The major disadvantage of employing such tests in the workplace is that they may be time consuming, particularly if used in conjunction with tests that focus on assessing personal skills. It is therefore apparent that there is a need for a brief test of cognitive ability that is not only valid and reliable, but also measures the key conceptual/thinking competencies identified by the NCVER (2003). Table 2 also highlights many of the disadvantages associated with using structured interviews and questionnaires when assessing an individual’s personal skills and attributes. Whilst such techniques have the advantage of being easy to administer, they are prone to response biases. That is, individuals completing questionnaires/interviews usually have a basic

understanding of the types of responses that employers seek. For example, if asked to state whether one is honest (a generic skill sort by most organizations), applicants will typically respond in the affirmative, as they are aware that this is a socially desirable trait. Hence, the use of explicit methods such as interviewing and questionnaires may not provide valid and reliable information about a particular applicant, highlighting the need for alternative methods for assessing personal skills and attributes.

Table 2
Summary of the Advantages and Disadvantages Associated with Common Techniques Employed in Personnel Selection (Adapted from HR-Guide, retrieved April 2005)

Method	Advantages	Disadvantages
Cognitive Ability Measures (General Intelligence Tests/Aptitude Tests)	<ul style="list-style-type: none"> • Highly reliable • Verbal reasoning and numerical tests have shown high validity for a wide range of job • Validity rises with increasing complexity of job • May be administered in group settings where applicants can be tested at the same time • Scoring of the test may be completed by computer scanning equipment 	<ul style="list-style-type: none"> • Full-administration of standardized general intelligence tests may be time consumer • Non-minorities typically score one standard deviation above minorities
Structured Interview	<ul style="list-style-type: none"> • Can assess applicants knowledge • Can determine compatibility between supervisor and applicant • May reveal additional information useful for the selection decision 	<ul style="list-style-type: none"> • Subjective evaluation are made • Decisions tend to be made within the first few minutes of the interview • Interviewers may hold negative stereotypes about particular groups • Research has shown disproportionate rates of selection between minority and non-minority members using interviews • Negative information seems to be given more weight • Not much evidence of validity of the selection procedure
Personality Questionnaires	<ul style="list-style-type: none"> • Numerous tests available • Relatively easy to Administer • Quick 	<ul style="list-style-type: none"> • Responses by applicant may be altered by applicant's desire to respond in a way they feel would result in their selection • Difficulty to measure personality traits that may not be well defined • Lack of diversity if all selected applicants have the same personality traits • Lack of evidence to support validity of using personality tests for recruitment

The Potential Use of Implicit Methods in Personnel Selection

One method that could potentially eradicate the disadvantages of using explicit measures to assess personal skills is the use of implicit latency measures such as lexical-decision priming. During the 1960s, researchers were attempting to create computer simulations of information processing, by exploring the ways in which humans perform memory searches. According to Quillian (1967), humans organize the vast amount of information they encounter into a series of 'concepts', with each concept corresponding to particular features of words and phrases. For example, if an individual was asked to describe the concept 'bird', they might start by describing some of the more

obvious features associated with birds in memory, such as ‘they have wings’ or ‘they can fly’. If continually prompted to provide information about birds, however, some less obvious features might be described, such as ‘they breathe’ or ‘they differ in colour’. The point of this example is twofold. First, it illustrates that by generating information about one particular concept, several other concepts are also generated (e.g., the concept of colour). Second, the amount of information an individual can generate about a particular concept is seemingly unlimited, highlighting the fact that concepts are complicated and intertwined structures (Collins & Loftus, 1975). Quillian proposed a spreading-activation theory of human information processing and memory, whereby each concept represents a node in the neural network and can be linked to other nodes, depending upon the strength of the association between the two concept nodes. Figure 1 provides a hypothetical representation of a memory structure for ‘birds’, illustrating potential pathways for a spreading-activation effect.

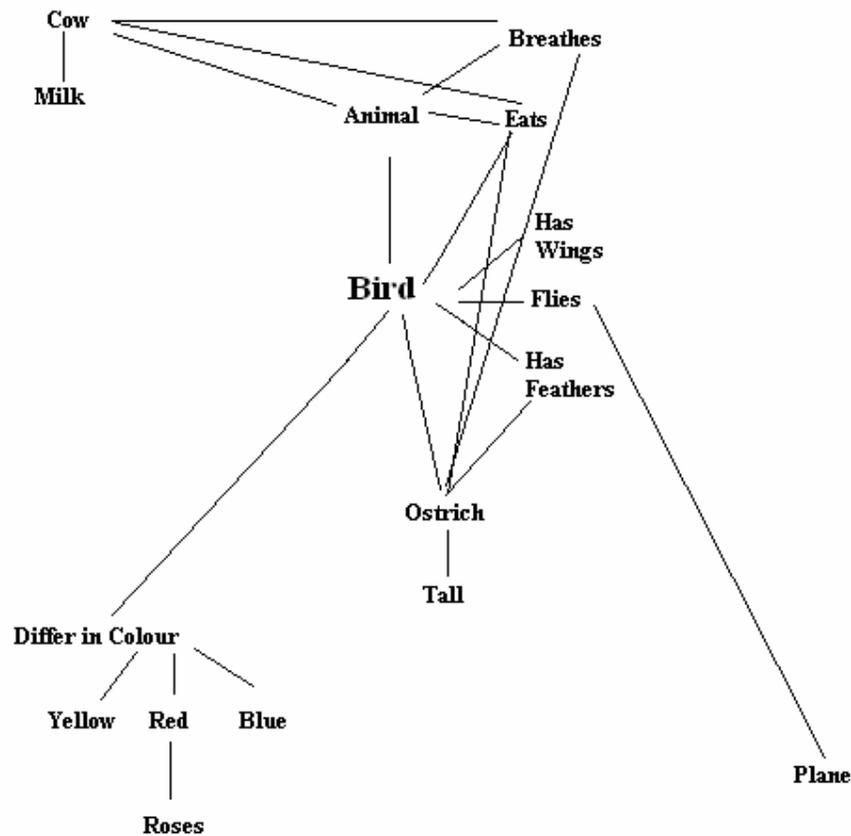


Figure 1. Hypothetical memory structure for the concept ‘bird’ (where shorter lines represent greater concept relatedness) (adapted from Collins and Quillian, 1969, p. 240)

From Figure 1, it can be seen that when asked to think about the concept ‘bird’, associated concepts such as ‘flies’ or ‘has feathers’ may be activated more quickly in memory for some people than concepts such as ‘ostrich’ or ‘animal’. The degree of association between these concepts and thus their metaphorical proximity will depend on the respondent’s experiences. Thus, these methods can provide an index of the manner in which an individual’s memory is structured. The figure also shows that all concept nodes are linked to other nodes, and that the activation of one node results in the activation of further nodes, which in turn activates more nodes and so forth (e.g., bird (*activates*) → animal → (*activates*) cow → (*activates*) milk). It is important to note, however, that concepts that are unrelated and share fewer associations, such as ‘roses’ and ‘plane’ (as seen in Figure 1), are not directly activated in memory by the initial concept (i.e., ‘bird’) (Collins & Loftus, 1975).

Quillian's (1967) spreading-activation theory was later tested using priming (or preparation) methods. In lexical-decision priming tasks, participants are presented with a string of letters (i.e., the target) and asked to state, as quickly as possible, whether the string represents a word (e.g., bread) or a non-word (e.g., bisod). Prior to the presentation of the target however, participants are presented with another word (i.e., the prime) that may or may not be associated with the target. It has been found in numerous experiments (Forster & Davis, 1984; Meyer & Schvaneveldt, 1971; Posner & Snyder, 1975; Scarborough, Cortese, & Scarborough, 1977) that participants' ability to judge whether the target was a word or a non-word was facilitated by exposure to an associated prime. For example, participants responded more quickly when presented with the prime 'butter', prior to the presentation of the target 'bread', than when presented with the prime 'nurse'. Such findings were interpreted as providing support for the spreading-activation theory. That is, because 'bread' is likely to be closely associated with 'butter' in many individuals' memory networks, deciding whether 'bread' is a word or non-word should be facilitated when presented with the prime 'butter'. This is because the concept nodes associated with 'butter' (which are likely to include bread) have already been partially activated and thus require less time to reach full activation when the corresponding word is presented. However, as the word 'nurse' is not typically associated with the word 'bread', using the prime 'nurse' will not result in any spread of activation to nodes relating to 'bread'. Hence, the decision as to whether 'bread' is a word or non-word will not be facilitated by an unrelated prime (Lucus, 2000). In short, lexical-decision priming provides a reliable measure of the associative strength between concepts which does not rely on self-report evidence.

Recently, several researchers (Baccus, Baldwin, & Packer, 2004; Greenwald & Banaji, 1995; Greenwald, Banaji, Rudman, Farnham, Nosek, Mellott, & 2002; Karpinski, 2004) have been investigating ways in which implicit methods can be applied to solve measurement problems in social psychology. A small group of these researchers have, in particular, been investigating ways in which priming methods can be used to evaluate individuals' self-perceptions. Greenwald and colleagues (e.g., Greenwald & Farnham, 2000), for example, used reaction time tasks to demonstrate facilitation effects for responses to the word 'me' subsequent to the presentation of generic positive and negative primes. This research team has interpreted such facilitation effects in terms of implicit attitudes rather than associative or semantic priming processes. The precise mechanisms of implicit attitudes, however, have been called into question (Fazio & Olson, 2003), with recent evidence suggesting that effects ascribed previously to these processes are merely a reflection of associative priming. The results reported by this group nonetheless suggest that implicit methods can be used to assess self-related perceptions.

Employing the spreading-activation theory discussed earlier, it is feasible that individuals have several concepts pertaining to their perception of 'the self'. Just as the concept 'bread' is likely to be more closely associated with 'butter' than 'nurse' for most people, the concept 'self' is more likely to be associated with certain concepts than others (depending on an individual's past experiences and self-perceptions). For example, when asked to think of the word 'I'm', associated concepts such as 'happy', 'intelligent', 'lazy' might be activated in the neural network more quickly than other concepts such as 'liar', 'responsible', 'motivated', depending on the individual's perception of him/herself. It is therefore possible that a lexical-decision priming task similar to that employed in cognitive research can be applied within the social domain. Here, the primes would be 'I'm' and 'they're', while the targets would be a list of personal attributes and values. An individual's reaction time to each target (i.e., determining whether it is a word/non-word) would indicate the associative strength between the prime and the target. Such a task could eradicate many of the problems associated with the use of explicit, self-report methods (i.e., response biases) and could provide a more realistic assessment of an individual's perception of their personal attributes and values.

In summary, personnel agencies and businesses have used a wide array of tests (e.g., cognitive, vocational, personality) to assist them in recruiting suitable staff. In general, these approaches use a 'mish mash' of instruments that provide an abundance of information, not all of which will be valid and/or applicable for the given purposes. Further, the tests that are in use at present rely exclusively on self-report, the interpretation of which is fraught with difficulty due to response biases. This highlights the need for the development of a comprehensive assessment protocol for generic workplace skills that utilizes both implicit and explicit assessment methodologies.

RATIONALE, ORIGINALITY, AND SIGNIFICANCE OF THE PROPOSED RESEARCH

The main goal of this research is to develop a comprehensive test battery, using both explicit (i.e., direct) and implicit (i.e., indirect) measures, to assess generic workplace skills. Due to recent changes in the economy, there has been a renewed focus on broadband or generic skills. Several initiatives have emerged, both locally and overseas, with the goal of developing a comprehensive framework which outlines the essential skills required for workplace success. Whilst no one definitive list of generic skills has been established, the NCVER (2003) has identified elements commonly included in competency frameworks. The current study will therefore be the first to develop and validate an instrument that will systematically assess individual performance on these dimensions. In short, the test battery will be divided into three modules assessing an individual's conceptual/thinking skills (i.e., reasoning and planning, creativity, problem-solving, adaptability), people-related skills (i.e., communication, assertiveness, leadership, teamwork), and personal skills and attributes (i.e., self-esteem and values). The battery will not include basic skills such as numeracy and literacy, as these are consistently assessed prior to entry into the workforce (i.e., a goal of primary and secondary education). As such, a number of validated tests are already available within each area.

As discussed, the field of personnel selection has also been thwart with methodological problems. Agencies have typically relied on explicit measures to assess employee suitability, as these techniques allow for a large amount of information to be collected quickly and easily. Whilst some explicit measures such as aptitude tests are a valid means for assessing conceptual thinking skills, other explicit techniques such as interviewing and questionnaires (typically employed to assess personal skills) are prone to response biases, and therefore may not provide a true indication of an applicant's skills (Schneider, 2001). The current research will therefore be the first to employ both explicit and implicit techniques in an effort to provide recruiters and businesses with a more accurate assessment of an individual's workplace skills and abilities. The development of such a tool will not only eradicate many of the problems associated with exclusive reliance on explicit measures, but may also make a significant contribution to research in the fields of social and cognitive psychology, by illuminating potentially important implicit/unconscious pathways (Fazio & Olson, 2003).

It is envisaged that the final instrument will be used in a variety of settings, including service and manufacturing industries, educational settings, and law enforcement/military organizations. An additional advantage of the final instrument will lie in its flexibility. Agencies and businesses will be given the option to administer the full test battery or to select individual tests from each of the three modules to meet their specific needs. Furthermore, the battery could be used as a professional development tool, allowing existing employees to obtain 'ability profiles' which highlight their specific strengths and weaknesses.

B. RESEARCH PLAN

SPECIFIC AIMS/PROBLEMS TO BE ADDRESSED

The specific aim of the project is to develop and validate a comprehensive test battery for personnel selection to systematically evaluate applicants' generic skills. Given the problems associated with the exclusive reliance on explicit methods for assessing workplace skills, the current instrument will employ both implicit and explicit techniques. To ensure that the final instrument demonstrates adequate properties in terms of reliability and validity, target levels stipulated by the *American Psychological Association*, the *American Educational Research Association*, and the *National Council on Measurement in Education* (1999) will be employed. To this end, each module of the battery will be evaluated in terms of its validity (content, criterion-related and construct), and internal consistencies. The full final instrument will then be administered to employees from a large and diverse cross-section of the Australian workforce and re-evaluated for its reliability (i.e., test-retest, and internal consistencies) and validity as a whole. The instrument will continue to be refined until the target levels stipulated in the *Standards* framework are met.

RESEARCH FRAMEWORK

The research will proceed in four key phases. A separate timeplan is presented in Attachment A.

Phase	Goal	Major Task/s	Completion Date
I. Development and validation of "Conceptual/Thinking Skills" module	Preparation	Review relevant literature and identify existing validated instruments.	June 2005
	Development Work	Develop pilot instruments for <i>Reasoning and planning; Creativity; Problem Solving; and Adaptability</i> .	July 2005
	Pilot Data Collection	Administer pilot instruments to small sample ($n = 30$).	August 2005
	Data Analysis/Instrument Validation	Conduct internal consistencies and concurrent validity checks; analyse comments to identify potential problem items.	September 2005
	Module Refinement	Refine the module in light of pilot study.	October 2005
II. Development and validation of "People-Related Skills" module	Preparation	Review relevant literature and identify existing validated instruments.	December 2005
	Development Work	Develop pilot instruments based on the outcomes from the preparation stage to assess <i>Communication; Assertiveness, Leadership; and Teamwork</i> .	January 2006
	Pilot Data Collection	Administer pilot instruments to small sample ($n = 30$).	February 2006
	Data Analysis/Instrument Validation	Conduct internal consistencies and concurrent validity checks; analyse comments to identify potential problem items.	March 2006
	Module Refinement	Refine the module in light of pilot study.	April 2006
III. Development and validation of "Personal Skills and Attributes" module	Preparation	Review relevant literature and identify existing validated instruments to assess "self-esteem" and "values".	June 2006
	Development Work	Use the E-Prime © software to construct the lexical decision priming task.	August 2006
	Pilot Data Collection	Administer pilot instruments to small sample ($n = 30$).	September 2006
	Data Analysis/Instrument Validation	Conduct internal consistencies and concurrent validity checks; analyse comments to identify potential problem items.	October 2006
	Module Refinement	Refine the module in light of pilot study.	November 2006
IV. Implementation of test battery to	Preparation	Final instrument will be established on the basis of the pilot data analysis. A computer programmer will be hired to develop an appropriate protocol for presenting the battery.	February 2007

Industry and final validation	Large-Scale Data Collection	The instrument will then be completed by a large sample of employees drawn from Retail, Business Services, and Education industries. One-hundred employees from each industry type will participate in this phase of the research (total sample $n = 300$). A small subsample ($n = 20$ per industry) of participants will also be invited to complete the instrument again within 8 weeks of completing the initial instrument.	May 2007
	Analysis and Refinement of Instrument	The data collected will be analysed in several ways to examine the properties of the instrument: 1) Traditional reliability estimates 2) Confirmatory factor analysis 3) Item characteristics (Rasch analysis) 4) Multivariate analyses of variance (MANOVAs) 5) Profile analysis via multidimensional scaling	August 2007
Final review of literature and writing of dissertation			December 2007

The thesis is anticipated to be completed by December, 2007 and submitted by February, 2008.

ELABORATION OF METHODS AND COMPARISON WITH SIMILAR PROJECTS AND METHODS

As the instrument will be designed with the intention of being completed online, two primary indices will be used in assessing participants' responses: accuracy assessed via multiple choice, and accuracy/latency based on dichotomous response decisions.

The item stems will fall into three primary categories:

- i) Scenario-based problem tasks
- ii) Verbal and non-verbal closed problem tasks
- iii) Latency decision priming tasks.

Phase I. Development and validation of "Conceptual/Thinking Skills" module

The 'Conceptual/Thinking Skills' module will be divided into four sub-sections including: reasoning and planning, creativity, problem-solving, and adaptability. These are the components drawn from the NCVER framework. The first goal in this phase will be to review the existing literature in each of these areas and collect established tests that have demonstrated good reliability and validity (this will be conducted for each subsection). Tests included will be the *Raven's Progressive Matrices* and the *Torrance Tests of Creativity*. The pilot instruments will be developed on the basis of the outcomes from the preparation stage. The following response formats will be used for each module subsection:

Reasoning and Planning = Reasoning Matrix Multiple Choice

Creativity = Multiple Choice

Problem Solving = Scenario-Based Multiple Choice

Adaptability = Scenario-Based Multiple Choice

Following the development stage, the pilot module instrument will be completed (pencil and paper format) by a small sample of participants ($n = 30$). It is most likely that participants for this phase will be invited from the student body of the University of Western Australia. These participants will also complete an exemplary validated test in that area. The data collected will be used to assess basic item characteristics and internal consistency for each subtest, and concurrent validity. Participants will also be invited to write any comments they have about each sub-test (i.e., strengths, weaknesses, problems etc). The module will then be refined on the basis of these outcomes.

Phase II. Development and validation of "People-Related Skills" module

The 'People-Related Skills' module will be divided into four sub-sections: communication, assertiveness, leadership, and teamwork. Again, the existing literature in each of these areas will be reviewed and tests that have demonstrated good reliability and validity collected. Pilot instruments will be developed on the outcomes from the preparation stage. These will conform to the following item stem and response formats:

Communication = Scenario Based Multiple Choice

Assertiveness = Scenario Based Multiple Choice

Leadership = Scenario Based Multiple Choice

Teamwork = Scenario Based Multiple Choice

The pilot validation of this module will use the same essential procedures as for the Conceptual/Thinking skills module. A different group of $n = 30$ will, however, be used in this phase to avoid overtesting of study participants.

Phase III. Development and validation of "Personal-Skills and Attributes" module

The 'Personal Skills and Attributes' module will consist of two sections: 'self-esteem' and 'values'. This will differ somewhat from other modules in the sense that the basic methodology of the assessment will rely on implicit rather than explicit techniques. The validation of the instrument in this pilot phase, however, will be done using existing explicit measures of the same constructs. As indicated in the literature review, one of the key problems in using explicit measures stems from associated social desirability biases. In this phase, however, no rewards will be contingent on the specific nature of the responses given. As such, participants will have no motivation to respond on the basis of such biases. Again, the existing literature in each area will be reviewed, and existing tests that have demonstrated good reliability and validity will be selected for use in the validation.

To construct the lexical-decision priming tasks, the E-Prime © software will be utilised. The primes used will be 'I'm' and 'They're', the targets will be both a series of generic attributes identified in the literature as being essential for workplace success, and a series of attributes that are known to be true about the person (e.g., gender, occupation). The latter targets will be included to provide baseline latency and accuracy levels. Aside from the content of the module, the basic pilot testing procedures used will be identical to those used in Phases I and II.

Phase IV. Implementation of test battery to Industry and final validation

Following the analysis of the data from the three pilot phases, the final instrument will be established. As the battery will be made available in an online format, a computer programmer will be hired to develop an appropriate protocol for presenting the battery, collecting data and providing feedback to respondents. The instrument will then be completed by a large sample of employees drawn from Retail, Business Services, and Education industries. These industries have been chosen as they represent a large and diverse cross-section of the Australian work force as indicated by the current Australian and New Zealand Standard Industrial Classification (ANZSIC) (Australian Bureau of Statistics, 2003). One-hundred employees from each industry type will participate in this phase of the research (total sample $n = 300$).

A small subsample ($n = 20$ per industry) of participants will also be invited to complete the instrument again within 8 weeks of completing the initial instrument. The identification numbers or passwords will allow matching of retest with test responses to generate temporal stability estimates. Any items that demonstrate significant variance across the two time points will be examined for possible modification. This will be done to ensure that the final items in the instrument reference characteristics that are stable traits of the individual, rather than unstable patterns of behaviour that may vary over short time periods.

The data collected will be analysed in several ways to examine the properties of the instrument:

1) Traditional reliability estimates: Internal consistency estimates (Cronbach's alphas) will be computed for items within each section of the survey. Any items that do not contribute to the consistency of each section will be examined for possible deletion. Test-retest reliability will be estimated on the basis of the small subsample that completed the survey on a second occasion. All of these analyses will be performed using SPSS Version 12.0 (SSI, 2004).

2) Validity: Construct-related validity will be addressed by examining the factor structure of the instrument. This will be done to determine whether the items 'cluster' together appropriately. Given that structure of the instrument will have a strong theoretical basis, confirmatory factor analyses will be performed to address this question. These analyses will be based on LISREL 8.71 (Jöreskog & Sörbom, 2004).

3) Item characteristics: Responses to each item within the instrument will be analysed to ensure that the items discriminate adequately and that the response formats represent linear scales. This will be done using RUMM (Andrich, Sheridan, Lyne, & Luo, 1998). Any items that fail to meet these criteria will be considered for deletion.

4) Multivariate analyses of variance (MANOVAs) will be used on the final scores to assess the extent to which each of the skills assessed is genuinely generic across the three industry types. These will also be performed using SPSS 12.0.

5) Profile analysis via multidimensional scaling will also be used to determine whether distinct profiles of skills are characteristic for the different industry types. This technique was developed recently by Mark Davison at the University of Minnesota. The method allows a separation of profile patterns versus overall levels. Use of this method will allow us to determine first whether an individual has high overall levels across the skills, but then whether they have an identifiable pattern of particular strengths within certain areas (e.g., conceptual/thinking versus people-related skills).

EFFORTS TO ENSURE NON-DUPLICATION OF PREVIOUS WORK

An extensive literature search has been conducted using the Australian Industrial Relations (IREL), the Educational Resources Information Centre (ERIC), the Department of Employment, Workplace Relations and Small Business (WORKLIT) and PsycINFO databases, with over 250 articles collected and reviewed. A search for established and validated instruments was also conducted using Buros - Institute of Mental Measures online search of over 4000 commercially available tests (Buros Institute, n.d) and the Australian Council for Educational Research (Acer) online tests database (ACER, n.d).

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E. FACILITIES

Dr Elaine Chapman (Lecturer) and Professor Keith Punch from the Graduate School of Education (GSE), will supervise the project. Dr Chapman is experienced in measurement and statistical techniques, and has an extensive background in Social Psychology and instrument development. Professor Punch has extensive and broad-based knowledge in research methodology and measurement.

F. ESTIMATED COSTS

E-Prime Software and License	\$2000.00
Computer Programmer at \$60 an hour	\$1800.00
Collection of Tests	\$1500.00
Photocopying at \$0.05 per sheet	\$500.00
Telephone 22 months at \$10 per month	\$220.00
Postage at \$50 per letter	\$40.00

Given that this project will be done under the auspices of a large Lucent Technologies grant (Chief Investigator: Dr. Elaine Chapman), all costs will be covered by the grant.

G. CONFIDENTIALITY & INTELLECTUAL PROPERTY

All data collected from individual participants in each of the study phases will remain strictly confidential. The data (both hard and soft copy) will be stored in a secure location within the Graduate School of Education at the University of Western Australia. Participants will be given an ID number to ensure that individual names are not recorded. No reference to individual participants

will be made in any resulting publications. No intellectual property issues have been identified as yet with this research. Should such issues emerge, the University Solicitor will be consulted and Graduate Research School informed immediately.

H. APPROVALS

An application for ethics approval has been lodged.

I. SUBMISSION OF THE RESEARCH PROPOSAL/DETAILS OF PROPOSED RESEARCH

Two copies of the Research Proposal Coversheet and this proposal have been submitted.

Attachment A: Timeplan for the proposed research

Phase	Goal	Major Task/s	Completion Date
I. Development and validation of “Conceptual/ Thinking Skills” module	Preparation	Review relevant literature and identify existing validated instruments.	June 2005
	Development Work	Develop pilot instruments for <i>Reasoning and planning; Creativity; Problem Solving; and Adaptability</i> .	July 2005
	Pilot Data Collection	Administer pilot instruments to small sample ($n = 30$).	August 2005
	Data Analysis/ Instrument Validation	Conduct internal consistencies and concurrent validity checks; analyse comments to identify potential problem items.	September 2005
	Module Refinement	Refine the module in light of pilot study.	October 2005
II. Development and validation of “People-Related Skills” module	Preparation	Review relevant literature and identify existing validated instruments.	December 2005
	Development Work	Develop pilot instruments based on the outcomes from the preparation stage to assess <i>Communication; Assertiveness, Leadership; and Teamwork</i> .	January 2006
	Pilot Data Collection	Administer pilot instruments to small sample ($n = 30$).	February 2006
	Data Analysis/ Instrument Validation	Conduct internal consistencies and concurrent validity checks; analyse comments to identify potential problem items.	March 2006
	Module Refinement	Refine the module in light of pilot study.	April 2006
III. Development and validation of “Personal Skills and Attributes” module	Preparation	Review relevant literature and identify existing validated instruments to assess “self-esteem” and “values”.	June 2006
	Development Work	Use the E-Prime © software to construct the lexical decision priming task.	August 2006
	Pilot Data Collection	Administer pilot instruments to small sample ($n = 30$).	September 2006
	Data Analysis/ Instrument Validation	Conduct internal consistencies and concurrent validity checks; analyse comments to identify potential problem items.	October 2006
	Module Refinement	Refine the module in light of pilot study.	November 2006
IV. Implementation of test battery to Industry and final validation	Preparation	Final instrument will be established on the basis of the pilot data analysis. A computer programmer will be hired to develop an appropriate protocol for presenting the battery.	February 2007
	Large-Scale Data Collection	The instrument will then be completed by a large sample of employees drawn from Retail, Business Services, and Education industries. One-hundred employees from each industry type will participate in this phase of the research (total sample $n = 300$). A small subsample ($n = 20$ per industry) of participants will also be invited to complete the instrument again within 8 weeks of completing the initial instrument.	May 2007
	Analysis and Refinement of Instrument	The data collected will be analysed in several ways to examine the properties of the instrument: 1) Traditional reliability estimates 2) Confirmatory factor analysis 3) Item characteristics (Rasch analysis) 4) Multivariate analyses of variance (MANOVAs) 5) Profile analysis via multidimensional scaling	August 2007
Final review of literature and writing of dissertation			December 2007

