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Shining a light on occupational inter-relationships

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Abstract: Four Canberra-based projects were examined to explore the significance of interpersonal skills in technical occupations. The importance of interpersonal skills and demands for teamwork, cooperation and collaboration during projects was confirmed. The implications of skill terminology, career practitioner advice, occupational information, and gendered career choices are explored. The research points to the need to shift thinking about skill distinctions to give greater recognition to interpersonal skills in technical occupations.

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Background

Much career information treats occupations as discrete units. Skill lists highlight technical skills and while they may include teamwork and communication skills, little or no information is provided about what these mean in practice.

The 2013 *Core Skills for Work Developmental Framework (CSFW)*ⁱ, targeted at educators, trainers and practitioners rather than employees, describes performance in ten Skill Areas, grouped under three Skill Clusters: Navigate the world of work, Interact with others, and Get the work done. These are called non-technical skills that employers regard as highly desirable in employees.

Cluster 2, Interact with others, covers three areas of interest to this research:

- Communicate for work
- Connect and work with others
- Recognise and utilise diverse perspectives.

The CSFW uses a developmental approach encompassing five stages of performance: Novice, Advanced Beginner, Capable, Proficient, and Expert. The framework also recognises contextual dependency, meaning that the stage of performance at which an individual will operate is highly dependent on the work situation.

Much work is project based, bringing together a range of occupations, trades, and professions at different levels of skill and seniority, to produce an outcome within a specified timeframe. The range of occupations that contributes to a project is largely invisible once a project is completed, as are the inter-relationships between these occupations.

This combination of factors raises questions:

- How significant are interpersonal skills for people in technical occupations?
- Does the lack of information about occupational inter-relationships matter?

Based on project case studies, backed by relevant literature and career websites, this research sought to map the range of occupations employed and explore the inter-relationships between them so as to establish in what context interpersonal skills become important.

To explore these questions interviews were conducted with people involved in four Canberra-based projects. As horticulture was common to some of these projects, input was sought from staff teaching horticulture at the Canberra Institute of Technology.

The Projects

Floriade is Canberra's annual, theme-based spring festival, based in Commonwealth Park. Running for 27 years, this project is managed by a Head Gardener, supported by a leading hand and apprentices. A Memorandum of Understanding operates between key stakeholders including ACT government agencies and the National Capital Authority. Contracts apply to services including construction and planting, soil, plumbing, fencing, and bulb supply.



Floriade 2014

Planning typically begins more than 12 months ahead of schedule, based on a four-stage process: design and development, garden establishment, festival month, post-festival restore, rectify and return. Floriade is constructed from the ground up and involves marking out garden beds, installing infrastructure such as drainage and watering systems, and creating paths. During the Festival the gardening team works around the clock to keep the gardens in top shape. <http://www.floriadeaustralia.com/>

The Red Centre Garden at the Australian National Botanical Gardens (ANBG) was a three-year project, designed to inspire appreciation of Australia's unique desert plants and landscapes. It draws its inspiration from the area of Central Australia that lies within a 500 km radius of Alice Springs. Incorporated into the garden's landscape design are elements of sand dune country, rocky escarpments and outcrops. An Indigenous artwork pavement that interprets country, is a centrepiece of the garden. The project was managed by ANBG staff supported by contractors and consultants. <http://www.anbg.gov.au/gardens/visiting/exploring/gardens/red-centre-garden.html>



Red Centre Garden, ANBG

The National Arboretum Canberra is a 250 hectare site, home to over 90 forests of rare, endangered and symbolic trees from Australia and around the world. Officially opened in 2013, the Arboretum is based on a winning entry in a 2005 design competition. The site includes a Village Centre, Pod Playground, Canberra Discovery Garden, Pavilion, Amphitheatre, and outdoor sculptures. Developing the Arboretum from the ashes of a bushfire-ravaged hillside was achieved in a series of stages, with most of the work subcontracted. <http://www.nationalarboretum.act.gov.au/>



NEST 111 sculpture, Dairy Farmers Hill, National Arboretum Canberra

The Enlarged Cotter Dam project represents one of the most significant infrastructure projects in Canberra's history. The five year project was delivered by the Bulk Water Alliance. A 24 hour construction operation for more than two years, employing over 4000 people during design and delivery, the Cotter Dam Project involved the construction of a new Roller Compacted Concrete (RCC) dam about 100 metres downstream of the existing Cotter Dam, plus other construction works. The dam is 87 m high, the tallest RCC dam in Australia.



Cotter Dam wall viewed from the Discovery Trail

This was a high risk project, given the inherent uncertainty of geological conditions and flood risk. The project won 10 industry awards, with multiple papers about the project presented at domestic and international conferences. <https://www.iconwater.com.au/Community-and-Education/Our-projects/Enlarged-Cotter-Dam.aspx>

Occupational inter-relationships

The projects demonstrate that in order to get the work done people need to be able to build relationships, collaborate and cooperate, working together in order to achieve project outcomes. Opportunities and expectations vary depending on seniority, size of the project, and type of problems that need to be identified and solved.

Apprentices working on Floriade, a repeat project with more than 20 years experience to draw on, may have the opportunity to observe contracted specialists such as in pest control and soil testing, learn customer service skills, help plumbers lay irrigation work or work with contractors laying drainage. Depending on their skill and confidence they can gain experience talking to the public and the media.

The Red Centre Garden comprised projects within projects, with a main working group of ANBG staff plus consultants, rangers in Central Australia, contractors, and experts such as CSIRO specialists. Several working groups managed design, construction, horticulture and interpretation. Plus there were many stakeholders, such as Friends of the Gardens who paid for the art work.

Similarly, developing the Arboretum was a collaborative venture, with multiple stakeholders, a development team, advisory groups, a strategic advisory board, and a Friends group building community engagement.

In delivering the Enlarged Cotter Dam project a number of significant challenges had to be overcome, notably weather with extremes of temperature and some of the wettest periods in Canberra's recorded history which resulted in several flood events. The project required over 20 authorisations under ACT and federal legislation. During the construction phase maintaining a collaborative and productive relationship with regulators and inspectorates was central to achieving outcomes.

Key result areas were safety, the environment, quality, legacy, operability and community. Reward and recognition of individuals and teams were important for motivation, morale and driving performance. The Great Ideas initiative encouraged all members of the team, from labourers to senior management, to put forward ideas for potential improvements to site operations.

Almost every aspect of the works was high to extreme risk. The approach to safety ensured a proactive approach to hazard identification, implementation of controls, education of co-workers and ownership by the entire workforce. Much of the safety innovation was borne out of management challenging construction teams to go beyond current industry practice.

Apart from the actual dam, several programs illustrate the need for highly developed interpersonal skills and collaboration.

- A comprehensive Fish Management Program to protect the endangered Macquarie Perch, represented a benchmark in cooperation between government agencies, research institutions, asset owners and construction organisations in protection of the natural ecosystem.
- The significance of the Cotter Dam Project, including the history of the wider area, led to the creation of the Heritage Archive Project that included a multimedia record of construction. The 1.4 km Cotter Dam Discovery Trail was constructed to satisfy community interest in the project. Both

Aboriginal and European heritage was captured, recorded and incorporated into the Discovery Trail. A program was established to capture a snapshot of the area's archaeological value before being inundated. An Aboriginal Liaison Officer, Heritage Consultant, and Archaeologist were engaged to undertake salvages alongside Representative Aboriginal Organisations.

- The Cotter Dam Education Program was integrated into the ACT school curriculum to educate about water and engineering.

These projects point to the wide range of occupations involved, the numerous sub-projects that need to be coordinated, and the many levels of collaboration needed amongst staff, contractors and consultants and stakeholders. Obviously, the degree of cooperation, collaboration and consultation changes with the size, complexity and risk of the project, as well as with level of seniority and the nature of the occupation, thereby confirming the CSFW framework's recognition of contextual dependency.

Common to all projects and all people involved is the need to work safely. Teamwork and interpersonal skills are essential for problem solving, whether that be in the context of safety or dealing with the unexpected and the unknown.

Horticultural roles are common to several projects and provide concrete examples of potential demands on interpersonal and problem solving skills. In general, landscape gardeners may have to work with plumbers, brick layers, earth workers, electricians, stonemasons, concreters, irrigators, arborists, plus government departments, suppliers, and work safety authorities. Some horticultural jobs have limited interactions, such as a green keeper at a bowling club or a greens mower. Some roles demand sophisticated skills, such as dealing with members of the public who want trees removed that are illegal, or working with builders who bring a horticulturalist onsite at the end of a build when funds are limited and denial of early access creates costly difficulties such as in laying sprinklers. Depending on the context, people in horticultural roles may need to work with a diverse range of occupations in order to complete projects.

Occupational invisibility

The invisibility of work in finished projects is most apparent with the Enlarged Cotter Dam project. It is to the Alliance's credit that the Discovery Trail acknowledges that hundreds of disciplines 'come together to address legal, environmental, social and cultural, occupational health and safety, governance, quality and community issues, not to mention the engineering, geotechnical, surveying, materials testing, modelling, hydrological, construction and project management fields.'ⁱⁱ Table 1 lists more than 100 occupations that contributed to the dam project.

Appreciation of the work involved and the diverse range of occupations available would both be enhanced if more projects publicly acknowledged this contribution.

Skill terminology limitations

The CSFW in part aims to provide a common language, focusing on non-technical skills, often referred to as generic or employability skills, as distinct from technical or discipline-specific skills, and core language, literacy and numeracy skills. While using a developmental approach and acknowledging context-dependency, it's still worth asking how useful are current skill distinctions and how do these distinctions position the relationship between different skill types?

Still common in career literature is the distinction between hard (technical) and soft (non-technical) skills. While technical skills and knowledge are fundamental to successful performance, if people in different trades and professions can't talk to each other and cooperate to solve problems, project goals won't be met.

The demands on interpersonal skills during major projects suggest that the continued use of this distinction is counter-productive. With its connotations of difficult/easy, serious/frivolous, and male/female, calling non-technical skills 'soft', particularly interpersonal and communication skills, perpetuates unhelpful attitudes towards these skills.ⁱⁱⁱ

Both sets of distinctions (technical/non-technical, hard/soft) position interpersonal skills within a false hierarchy rather than as equal and complementary. They privilege discipline-specific skills over social skills, thereby misleading potential entrants into thinking social skills are not needed, or are of lesser importance.

Implications for career practitioners

Career practitioners may, as part of their role, provide guidance and information, and explore career options with clients. The range of occupations contributing to the projects in this study points to the impossibility of any person knowing everything about any given occupation and of having a comprehensive knowledge of what occupations exist. Given clients may hold unrealistic expectations of infinite knowledge, the role of career practitioner needs to be skilfully managed. At the same time, practitioners need to keep up-to-date with occupational developments and information resources.

Practitioners also need to check their own stereotypes and judgements about roles so that they don't inadvertently limit a client's options and perspective. For example, as highlighted by Canberra Institute of Technology staff, people may think of florists only in terms of retailing. Yet florists working on corporate events may need to exercise considerable diplomacy and be able to negotiate and compromise in order to provide acceptable services, such as indoor arrangements when pollen and insects may present conservation problems for a museum, or indoor plants need to be checked for health issues.

Part of a career practitioner's role is to foster clients' critical consciousness so as to challenge taken-for-granted knowledge and explore how some interpretations of the world are privileged over others.^{iv} Practitioners need to be able to challenge clients' thinking so they understand that even if the primary focus of a role is technical, skills in teamwork and relationships will be needed now, and demands for these skills may increase over time.

Implications for career information

There is a wealth of online career information. Typically, information is provided for individual roles about qualifications needed, tasks performed and key skills required. While this information is often primarily targeted at entry level people, it gives little indication as to what the future holds as a career progresses, particularly in terms of inter-relationships with other occupations and the need for greater use of higher-level interpersonal skills.

To illustrate, a landscape company recently advertised for a Senior Landscaper. Requirements included a minimum of three years' experience in structural landscaping, a Certificate III in Horticulture, Landscape Construction or equivalent experience, and 'exceptional communication skills'. The job description stated that 'effective communication and organisational skills are essential as you will be required to organise and liaise with sub-contractors, home owners, suppliers and management at all stages of the construction process.'

What is missing from online career information are details about how a career evolves in terms of social skill demands. Even a novice worker needs basic skills in communicating, cooperating, building rapport and responding to others' perspectives. Career information would be more useful and realistic if it reflected occupations' increasing complexity and future demands for higher-level interpersonal skills.

A popular and useful model of vocational interests is Dr John Holland's Vocational Type Theory.^v Known as RIASEC, with six idealised vocational personality types, (Realistic, Investigative, Artistic, Social, Enterprising, Conventional) the theory argues that people tend to have a preference for occupations that match their vocational interests. Holland doesn't hold that there are only six kinds of people in the world and he supports the view that each of us is likely to comprise several types to varying degrees.

Based on Holland's types, many career information websites provide tools to help users identify the type of work that would best suit them. Many of the occupations covered by the projects studied fall in the 'Realistic' category. Realistic people are doers, who like to work with things, such as machines, tools or animals, rather than ideas or people. They tend to be practical, enjoy physical activity, often outdoors, and can be good at solving problems.

Occupational information typically focuses on what a person does which usually translates into a focus on technical tasks. A potential limitation of Holland-based tools is that if interpreted too narrowly, users could focus on the technical aspects of a career choice and fail to grasp the significance of social skills. A gardener, for example, is primarily a Realistic occupation. A Horticultural Assistant is described in *The Job Guide*^{vi} (written mainly for year 10 students) as performing a range of tasks concerned with cultivation, growing, harvesting and maintenance of trees, plants and gardens. The Personal Requirements list undertake manual work, enjoy outdoor work, observant and methodical, good communication skills, and enjoy working in teams. In contrast, the Australian Government's Job Outlook website^{vii} links to O*NET data^{viii}, sourced from the US Department of Labor. The skills, abilities, interests and job environment data provide a more nuanced picture of occupations. For example, important skills needed by a gardener, listed in order of importance, are active listening, coordination, and speaking.

Career information websites play a significant role in how work is constructed and represented. While descriptions of jobs need to provide details of tasks and the broad working environment, the focus on technical skills, the primacy given to them, and continuing use of the hard/soft skill dichotomy with its implied lower status for social skills, raises concerns. In particular, how is an entry level person to gauge longer-term occupational expectations and possibilities if little or no mention is made of potential inter-relationships, and future skill demands are not mentioned.

Implications for gendered career choices

We know that children establish gender role stereotypes as early as the age of two and an emerging career identity by middle school. We also know that men show stronger preferences for Realistic and Investigative jobs and that there is strong sex-typing for Realistic occupations.^{ix} Occupational knowledge may inadvertently discourage people from considering Realistic roles because of an over-emphasis on technical skills.

A New Zealand study aimed to examine the interconnections between gender, gendered ideas, and careers decision making, with a particular focus on *how* and *why* young people navigate or avoid trades-related pathways.^x The research confirmed that gender stereotypes and dominant hetero-normative discourse are major influences on career decision-making. The writers suggest that reducing gender segregation could be addressed by:

- 'improving the distribution, access, quality, and accuracy of information about the trades by marketing them to nontraditional audiences (females in particular)
- the creation of female-centred environments and approaches to (early) trades training.'^{xi}

According to Holland's theory, people of the same type of vocational personality working together create a comfortable working environment that fits their type. If occupations in the Realistic category attract similar

people, mostly men, who in turn create a compatible working environment that is potentially unfriendly to women, two actions to help change the composition of these occupations are to:

- discard the technical/hard, non-technical/soft distinction and replace it with a focus on the complementarity of technical and social/interpersonal skills
- change occupational descriptions in online vocational interest tools to increase information on the role social/interpersonal skills play now, as well as their potential increased importance in the future, so as to give a more nuanced view of required skills and career progression.

Emphasising that social skills are integral to a career in 'Realistic' occupations, may help with changing unhelpful attitudes and behaviours.

Summary

This research sought to explore the expression of interpersonal relationships between occupations involved in projects. While opportunities and expectations vary depending on size and complexity of the project, the four projects examined demonstrate that in order to get work done people need to use both technical and non-technical skills, often at high-levels of sophistication.

Skill terminology privileges discipline-specific skills over interpersonal skills. Occupational information fails to represent how career progression may increase the need for higher level interpersonal skills. Combined, this construction of occupations may in turn help perpetuate gender segregation in technical occupations.

Respect for interpersonal skills needs to be reflected in terminology and information. Rethinking distinctions to remove implied secondary status is an essential step.

Visibility of the diverse range of occupations that contributes to projects could be increased by public acknowledgment onsite and online.

Career practitioners have a vital role to play in fostering clients' critical consciousness about taken-for-granted knowledge concerning how the world works, particularly in relation to the need for and value of interpersonal skills for 'Realistic' work.

The Australian Blueprint for Career Development (ABCD)^{xii} is a framework for designing, implementing and evaluating career development programs. The framework identifies the skills, attributes and knowledge people need to make sound choices and effectively manage their career. Eleven Career Management Competencies are grouped into three areas with each competency expanded across four developmental phases throughout the lifespan.

Several competencies are relevant to this research. Competency 2: Interact positively and effectively with others, is mainly about interpersonal and communications skills that enable people to cooperate and collaborate. Competency 5: Locate and effectively use career information, concerns knowing how to use various sources of career information. Competency 7: Secure/create and maintain work, is about being able to work and collaborate with different people and demonstrate employability skills. And Competency 10: Understand the changing nature of life and work roles, has a strong focus on being aware of stereotypes, biases and discriminatory behaviours that limit women and men in certain work roles. Not only does this research highlight the importance of these competencies for both career development practitioners and their clients, it points to the inter-relatedness of these skills and attributes in managing a career across the lifespan.

Table 1: Enlarged Cotter Dam Project: Occupational Roles

Over 100 of the trades and professions that contributed to the project

Arborist	Environmental scientist	Mechanical engineer
Accountant	Estimator	Mechanical fitter
Administrator	Events manager	Moxy driver
Architect	Excavator operator	Nozzleman
Artist	Executive	Performance coach
Auditor	Explosives expert	Personal assistant
Barrister	Fire warden	Photographer
Biologist	Fireman	Planner
Bookkeeper	Fish expert	Plumber
Botanist	Foreman	Procurement officer
Bulldozer driver	Form worker	Project engineer
Carpenter	Fuel tank driver	Quality assurance officer
Carter (truck)	Geomorphologist	Quarrying and crushing operators
Civil engineer	Geotechnical testers	Rock scalers
Commercial manager	Geotechnician	Roustabout
Commissioning Officer	Grader operator	Safety officers
Concrete batch plant operators	Graphic designer	Scaffolder
Construction supervisor	Grouter	Scraper driver
Contract manager	Headworks operator	Security officer
Contractor	Helicopter Pilot	Shotcreter
Dam designer	Historian	Site supervisor
Dam safety expert	Hydrologist	Solicitor
Document controller	Ichthyologist	Spotter
Dogman	Illustrator	Storeman
Draftsman	Industrial archaeologist	Structural engineer
Ecologist	Industrial diver	Tower crane operator
Economist	Industrial relations officer	Town planner
Editor	IT & systems roles	Traffic controller
Educator	Laboratory services	Videographer
Electrical linesman	Labourer	Water cart operator
Electrician	Landscape designer	Welder
Engineer testers	Landscaper	Writer
Engineering geologist	Leading hand	Yardman
Environmental engineer	Manager	Zoologist
	Mechanic	

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Notes:

ⁱ <http://industry.gov.au/skills/ForTrainingProviders/CoreSkillsForWorkDevelopmentalFramework/Pages/default.aspx>, Accessed 12 March 2015

ⁱⁱ Part of signage along the Cotter Dam Discover Trail.

ⁱⁱⁱ This dichotomy is explored in my article 'Soft/Hard Skills: A false dichotomy', <http://www.selectioncriteria.com.au/a-softhardskills.html>

^{iv} David Blustein, Alexandra C Kenna, Nadia Gill, Julia E DeVoy, The Psychology of Working: A new framework for counselling practice and public policy, *The Career Development Quarterly*, June 2008, Vol 56, pp. 200-301

^v JL Holland, *Making Vocational Choices: A theory of vocational personalities and work environments*, Odess, Florida, 1997

^{vi} <http://www.jobguide.thegoodguides.com.au/occupation/Horticultural-Assistant>, Accessed 25 May 2015

^{vii} <http://joboutlook.gov.au/occupation.aspx?search=alpha&tab=skills&cluster=&code=3622>, Accessed 28 May 2015

^{viii} <https://www.onetcenter.org/>, Accessed 28 May 2015

^{ix} Stephen A. Woods and Sarah E. Hampson, Predicting Adult Occupational Environments from Gender and Childhood Personality Traits, *Journal of Applied Psychology*, 2010, Nov; 95(6): 1045-1057, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2964386/#R46>, Accessed 20 April 2015

^x Women's Affairs by New Zealand Council for Educational Research, Trading Choices: Young people's career decisions and gender segregation in the trades, Report prepared for the Ministry of, September 2008, <http://women.govt.nz/documents/trading-choices-young-people%E2%80%99s-career-decisions-and-gender-segregation-trades-2008>, Accessed 1 June 2015

^{xi} Ibid. p. vi

^{xii} <https://education.gov.au/australian-blueprint-career-development>, accessed 9 June 2015

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