Modeling of Vocational Excellence: An International Perspective

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Abstract

This paper provides an overview of the findings from a Finnish Ministry of Education sponsored project called 'Modeling of Vocational Excellence' (MoVE) and an Australian application and adaptation of this research: 'MoVE Australia'. The Finnish MoVE research project was conducted by the Research Centre for Vocational Education at the University of Tampere explored WorldSkills as a site for the development of expertise and pursuit of excellence. It addressed questions about the abilities and attributes of competitors, and the social and environmental factors which influenced their skill development. The Australian project administered the Finnish MoVE survey to the Australian international WorldSkills team which will compete in London in October 2011 and introduced a second survey about competitor experience, designed to give voice to the young people involved in WorldSkills. This survey was administered to competitors, trainers and judges participating in the WSA National Competition held in Brisbane in May 2010, and later to employers and families. The Australian extension of the Finnish research has generated a rich source of experiential data, providing fresh insights into career choice and training. The findings of the research offer opportunities for reviewing elements of trade training and raise questions about the role of a competitive community of practice in quality skill formation and about the current level of research on this aspect of Australia VET practice.

Introduction

The focus of this research is on quality vocational practice, and the attributes and experiences which facilitate the development of expertise and the pursuit of excellence. Vocational practice refers to the execution of skills and knowledge relevant to effective work performance. The term 'expertise' is used to refer to high quality practice attained through repeated application of skill and knowledge. 'Excellence' refers to the highest observed level of skill acquisition – exhibited, for example, by gold medal winners in an international skills competition. The objectives of the Finnish/Australian MoVE projects are to identify differences and similarities between the two national samples and to provide the Finnish and Australian WorldSkills teams with feedback which may support their training for international competitions. The longer term aim is to extend the project to include other WorldSkills members and to generate a platform for international benchmarking. The data will also offer VET researchers an opportunity to explore the educational and social dimensions of vocational practice in different VET systems.

The research site is the global WorldSkills organisation whose mission is to 'promote, through the cooperative actions of Members, a worldwide awareness of the essential contribution that skills and high standards of competence make to the achievement of economic success and individual fulfilment' (WSI 2011a). For the past 60 years this mission has been primarily pursued through regional and national skills competitions conducted by WorldSkills member organisations and an international competition hosted by nominated member countries every two years. The first national competition of the International Vocational Training Organisation (IVTO) took place in Spain in 1947. Portugal joined in 1950, and in 1953 competitors from five other European countries

participated. By 2010 membership has expanded to include 53 member organisations on all continents, most recently China (WSI 2011b). IVTO adopted the name WorldSkills International (WSI) in 2000.

The scale, content and structure of WorldSkills' competitions have changed considerably over 60 years. Traditional trade events, for example bricklaying, carpentry, plumbing, cookery and bread making are now joined by events in areas such as beauty therapy, web design, fashion design and CAD. The current competition framework consists of 2-day regional competitions from which place getters are selected to compete nationally in the following year. National gold medal winners who meet international standards may become members of their country's national team which competes at the four day international competition. The international competition held in Calgary, Canada in 2009 involved 850 competitors from 47 countries competing in 45 skill areas and over 250,000 members of the public who visited the four day event. While individual events dominate, there are now team events in which competitors must demonstrate a coordinated approach to the completion of a multidisciplinary project. 'Test projects' in individual and team events are assessed according to criteria contained in WSI 'Technical Descriptions' which define 'the name of the skill, the competency specification and scope of work … the conduct and assessment criteria of the competition, and any skill-specific safety requirements' (WSI 2010, p. 34). Criteria include planning, technical accuracy, innovative thinking, and problem solving (WSI 2011c).

Australia has been a member of IVTO/WSI since 1982 and has sponsored the involvement of 70,000 apprentices and trainees in regional, national and international competitions (WSA 2009). WorldSkills Australia(WSA) is incorporated as a not-for-profit organisation which receives funding from Commonwealth and state governments, and cash and in-kind support from philanthropic foundations, industry organisations and enterprises (WSA 2011). Total income from all sources in 2008-9 was $A3.6m (WSA 2009, p. 24) WSA operations rely heavily on over 5000 volunteers who organise, design, coordinate and judge competitions, and train and mentor competing apprentices, trainees and VET in Schools students in up to 45 skill categories. Despite its modest financial backing, WSA regularly punches above its weight in international competitions and was ranked 6th in total medal points following the Calgary competition (WSI 2011d). Since the late 1990s Australian regional and national competition projects have been aligned to the elements and performance criteria specified in units of competency from national industry Training Packages. Projects include activities which test underpinning skills and knowledge as dimensions of quality practice. WSA has actively promoted the development of team skills, problem solving and communications skills through the Manufacturing Team challenge and real-life carpentry projects (Costin 2003). The members of the Skillaroos – the Australian international WorldSkills team – are supported and mentored by category experts and trainers, undergoing intensive rounds of training and preparation in the ten months leading up to each international competition.

Theoretical framework

The research sits within two broad fields of enquiry. The first encompasses investigations of the cognitive, affective and social dimensions of expertise and the processes through which is acquired. The social context of the investigation is the changing nature of work and the increasing demand for high level cognitive and affective skill development in occupations in which manual expertise was previously the highest priority (Lowry et al 2008; Richardson & Teese 2008). Nokelainen and Ruohotie argue that all workers are now

required to have cognitive skills and to take part in decision-making process at work.

> Work life requires experts to own a strong professional knowledge, ability to transfer their skills and knowledge, and high meta-cognitive skills. In other words they need to be both competent and qualified (Nokelainen and Ruohotie 2009, p. 5).

Using the work of Pillay (1998) Nokelainen and Ruohotie argue that workplace cognition involves complex domain-specific knowledge and that expert work practice requires high-level abilities to analyse domain-specific information and understand the meaning of different work tasks (Ruohotie 2004). Further they argue that the structure of work-based knowledge is different from declarative (propositional or scholarly) knowledge in that the former relates to the active performance of knowledge – analysing, problem solving and applying knowledge in new situations, whereas the latter is a matter of learned facts (Nokelainen and Ruohotie 2009). On the basis of these analyses, Nokelainen and Ruohotie draw on multiple perspectives, including Zimmerman on self regulation (Zimmerman 1998, 2000, 2002), Gagne on giftedness (Gagne 2004) and Gardner's theory of Multiple Intelligences (Gardner 1983, 1998) to develop a theoretical model to explore the acquisition of vocational expertise. The model maps the development of vocational competence in terms of cognitive skills and affective abilities (expressed as Multiple Intelligences domains); attributes, work skills, influential individuals and intrinsic and extrinsic motivational factors.

The second field of enquiry focuses on the sites and relations in and through which expertise is acquired. Without denying the significance of cognitive, institutional and environmental *structures*, this field of enquiry, exemplified in the work of Lave and Wenger, regards learning as a participative *practice:* emphasizing social engagement, and shared perspectives as important elements of learning (Lave & Wenger 1991; Wenger 1998). In other words, learning is more than a process of individual volition, cognitive development and interaction with formal structures and personnel. It is importantly a consequence of belonging to a group or community which has meaning in the lives of the learners. Lave and Wenger use the concept of 'community of practice' to describe the social context of learning. They identify three dimensions of practice which characterise a 'community': mutual engagement; a joint enterprise; and a shared repertoire of routines, stories, and ways of doing things (Wenger 1998, pp. 73-85). Wenger also draws attention to the many layers of practice which are mediated through multiple (perhaps overlapping) local communities which are tied into larger 'constellations' (Wenger 1998, p.131). These constellations may encompass considerable diversity but nevertheless pursue related enterprises and have members in common. Using this framework we conceptualise the global phenomenon of WorldSkills as a constellation of interconnected practices, comprising many local/global communities of practice. These include WorldSkills International as a global community whose enterprise is 'promoting skills across the world', and individual WorldSkills members as local communities of (expert) practice which promote and develop excellence in skills within their own jurisdictions.

Research methods

Within this theoretical framework, the MoVE project poses two sets of research questions: about the cognitive, affective and environmental dimensions of expertise; and about how young people experience their involvement in WorldSkills and whether this experience makes a meaningful contribution to skill development and engagement in their chosen trade.

The first research question was addressed through an interview schedule based on the multidimensional model of vocational competence, which was tested with members of the 2005 (Helsinki) and 2007 (Shitsuoku, Japan) Finnish WorldSkills teams: two groups of young workers who Nokelainen and Ruohotie classify as 'expert' practitioners by virtue of their selection into an international team, and their access to specialised training and support from previous medal winners who had achieved vocational excellence. Having analysed data from the interviews with a sample of competitors, and their trainers, employers and family representatives (a total of 30 interviewees), Nokelainen and Ruohotie designed a survey containing multiple choice and open-ended questions to enable data to be captured online from larger samples in multiple locations (Nokelainen 2008). In November 2010 this survey was administered to the Australian WorldSkills team which will compete in London in 2011, to generate data about the attributes of the Australian WorldSkills team, and explore similarities and differences between the Australian and Finnish WorldSkills teams.

The second research question was addressed through the design of a survey which prompted competitors, judges, trainers, employers and families to contribute stories about their WorldSkills experience. For example, the competitor prompt questions were:

- You meet someone you don't know that well and they ask you why you chose your skill area. What would you tell them?
- Think of a time when you found training really hard but you chose to keep going. What happened?
- You've been asked to explain the benefits of participating in World Skills competitions to a group of potential competitors who are thinking about becoming involved. What would you tell them?

Participants were also invited to give their story a title. Multiple choice questions linked to the stories probed the reasons for telling the story, influences on what was recounted and attitudes linked to what was told and enabled individual stories to be indexed to themes. A second set of multiple choice questions collected data on competitor attitudes to the competition and WorldSkills itself. This survey was completed by 254 national competitors (of a total of 500), 86 judges and 36 trainers at the National WorldSkills Competition in May 2010, and by the 29 member Skillaroos team and 25 experts (national trainers and judges supporting the international team) in November 2010. The collection of data from national as well as international competitors aimed to identify differences in attitudes and self-perceived attributes in the two groups.

Findings

Three sets of selected findings are summarised here: from the interviews with Finnish International WorldSkills teams; from the Finnish survey completed by the Australian International WorldSkills team; and from the data on the experiences reported by WorldSkills national competitors collected at the National WorldSkills competition in May and November 2010 including observations on WorldSkills as a community of practice.

Selected findings from the Finnish 2005-7 WorldSkills teams

Nokelainen and Ruohotie's data shows that members of the Finnish International WorldSkills team exhibited the following characteristics of vocational excellence – listed here in overall order of significance: self-reflection and stress tolerance; perseverance and time management (volitional) skills; cognitive skills (developmental potential); external goal-orientation (competitiveness, ambition); internal goal-orientation (interest in work home support); and social skills (Nokelainen & Ruohotie 2008, 2009). They found that the

significance of manual training, and non-domain specific factors decrease as expertise develops and the significance of mental training and workplace factors correspondingly increase; and that social skills also increase in importance as young people moved into full time work. They further found that motivational factors were important in all skill development stages, and that internal goal-orientation was more important at the beginning and end of the process of expertise development, with external goal-orientation (winning, achieving recognition) becoming important during the competition itself.

The findings on motivation are interesting in the light of international research in this area. Nokelainen & Ruohotie report Gagne's 2004 finding that there is no evidence to date of a causal relationship between motivation and actual task performance. They also note that their results show that external and internal motivational factors decrease relative to other factors as competitors reach mastery level and raise the need for further exploration of this question (Nokelainen & Ruohotie 2008). In regard to environmental influences on the development of expertise, they found that domain-specific factors (training, school, interest in trade) were more significant than non-domain specific factors such as family and friends. In regard to the relative weight of different essential natural abilities (using Gardner's multiple intelligences index), the most significant was *Bodily-kinesthetic*, followed by *Interpersonal, Logical-mathematical, Environmental, Spatial and, Intrapersonal*.

Selected findings from the 2011 'Skillaroos' Australian WorldSkills team

The preliminary data available from the Finnish survey completed by the Australian Skillaroos team shows that there is little difference overall in the characteristics of expertise between the two international teams[1]. Both Finnish and Australian samples reported higher levels of intrinsic goal orientation than external; and showed that domain specific factors were more important than non-domain specific factors. Two minor differences were identified between the samples. The first relates to natural abilities. While the Finnish and Australian samples both rated *Bodily-kinaesthetic* intelligence highest, the Australian sample rated *Logical-mathematical intelligence* second (c/f *Intrapersonal* in the Finnish sample). Further, there was a wider self-reported gap in the Australian sample between bodily-kinaesthetic and other intelligences (Nokelainen, unpublished data Jan. 2011). The second difference relates to competitor self-perception. The Finnish sample responses showed that they rated effort as a more significant factor in success than natural ability, whereas the Australian sample rated natural ability over effort. Nokelainen notes that this belief in ability over effort is likely to change during the intensive training for the WorldSkills International competition (which had just commenced when the survey was administered). He further notes that a belief in the significance of effort is related to later WorldSkills success (Nokelainen, unpublished data Jan. 2011).

Selected findings on the WorldSkills experience

In May 2010 data on the WorldSkills experience was collected from over 50% of the national WorldSkills competitors in forty competition categories including building, automotive, electrical trades; hospitality, hairdressing, beauty therapy, IT, printing, jewelry and garment production. The overall finding from the survey is that the competitors highly valued their association with WorldSkills. Only 9% of competitors responded that their experience was disappointing. Twenty per cent said that it was much as they expected, with the remainder saying it was either better (26%) or much better

[1] Note that the Australian team data is drawn from one survey only, compared to the Finnish data which is based on initial interviews and a follow-up survey. Accordingly, the findings should be read as indicative.

(45%) than expected. In the Skillaroos survey the proportion saying WorldSkills was much better than expected rose to 59%.

An overwhelming majority of national competitors also regarded WorldSkills as likely to be beneficial in their career. Sixty-two percent said it would be significant and 15% said it would be crucial to their career. Not surprisingly given their elite status, 38% of Skillaroos said WorldSkills would be crucial, with 48% saying it would be significant. These findings are amplified in the narratives, for example as a refrigeration mechanic who titled his story *The rollercoaster ride of a lifetime* explains in answer to the prompt question about what he would tell potential competitors:

> I would tell everyone that competition in WorldSkills is the best thing that has ever happened to me to date. It gives you the chance to represent Australia in your trade, meet new people from all over the world, gives you the confidence to believe in yourself at work and at home and not to doubt your judgment. It also gives you the chance to network yourself within your industry, to gain a name as the best, and lots of respect

WorldSkills was also clearly regarded as an important learning opportunity. Forty-five percent of the national competitors said that being 'stretched to learn new skills was most important, with 34% reporting that benchmarking and receiving feedback was important. The Skillaroos' responses were 45% and 48% respectively.

The responses of the national competitors echoed the Finnish findings regarding the relative importance of domain specific and non-domain specific factors on their skill development. Thirty one percent of competitors said their training was the most important factor and 32% said that their job and workplace were most important. The findings on natural abilities (measured as Multiple Intelligences) were the same as for the Skillaroos and showed the same difference to the Finnish findings, with national competitors reported that bodily-kinesthetic skills were most important, followed by logical-mathematical skills.

WorldSkills as a community of expert practice

Drawing on Wenger's dimensions of practice: mutual engagement; joint enterprise and shared repertoire (Wenger 1998, pp 72-85), we note a clear sense of belonging in competitor narratives – of being mutually accountable, involved in a joint enterprise and sharing ways of doing things. A sense of accountability (to promote WorldSkills; to 'spread the word') is conveyed in the responses to the question: why did you share your experience? Forty-four percent of competitors said they told their story to encourage others; 24% aimed to 'inspire' and 'influence' and 9% to share their achievements. Seventeen percent sought to 'inform' and only 3% intended to criticise or complain. There are also indications that competitors experience 'shared ways of engaging in doing things together' which are illustrated in the values orientations of stories from different skill areas and industries. For example, the competitors in hairdressing, beauty therapy, and hospitality whose stories were about a commitment to 'helping people' and quality service:

> …I chose beauty because in life I want to help people and make people feel good about themselves.
>
> …I love helping people with their skin care issues and being involved with clients.
>
> I love meeting people and helping them discover new and exciting ways of doing and styling their hair.
>
> ... My goal is to present an excellent service regarding food and beverage.

Secondly, are the stories contributed by competitors in traditional craft areas such as

carpentry and joinery and cabinet making which spoke to ideals of quality, love of natural materials and craft processes:

> I have a passion for the industry and love to make or construct things
>
> I have a passion for creating timber furniture and love everything that goes with it. I get great feeling upon finishing what ever it is. My trade is such an attention to detail and I love a challenge;
>
> I have always enjoyed making things from scratch. Timber is my favourite material to use.

Throughout the narratives there is a strong sense that competitors are engaged with WorldSkills as a community, deriving meaning from their involvement which extends beyond winning medals, as illustrated in the two narratives below:

> WorldSkills is more than just a competition. It's a chance to showcase your skills against the best in the world. For all of the youth out there who have no idea what WorldSkills is, I will tell you that if you compete, it will be the best experience of your life. You may think it sounds cheesy and generic but the truth is WorldSkills is a journey that you will receive more than just the reward of the gold, silver or bronze medal. Whether you medal or not, we all gain the awesome experience of meeting new people, making life friends and growing within yourself.
>
> There is nothing to lose. All competitors are winners. Just to be selected as one of the top young people in their trade category they win the opportunity to meet and work beside the best in our nation. As well as seeing all the different ideas, approaches and outcomes. In my category I am sure everyone will be taking someone else's ideas home to further their wealth of knowledge and experience."

Discussion

Following the implementation of the MoVE Australia project, we are led to make three observations about the research method and the Australian VET context within which the research has been conducted.

First, an analysis of the rich stream of data generated by the narratives validates the decision to use a survey instrument which enabled direct access to the voices of the WorldSkills participants. The use of prompts to generate personal narratives has provided a cost effective way to collect more nuanced data than is usually possible in large samples and helped to identify significant factors which may otherwise have been overlooked or underplayed. This becomes clear in the analysis of data related to questions about factors influencing career choice. For example, in answer to the multiple choice questions:

> 31% of respondents selected the response "because of good job and career prospects";
>
> 18% selected "I like to produce useful things";
>
> 13% selected "a career which offered opportunities to learn";
>
> 9% selected "being of service to others".

An analysis of the narratives revealed another set of drivers for career choice which had not been included in the multiple choice questions. One third of the competitors told enthusiastic stories about their attraction to their chosen career which revealed a personal passion for their work as the two examples below illustrate:

> Story title – **'A dream'**: I love to work with my hands and enjoy working in cold storage rooms. Getting down and dirty with carcasses on the rail and enjoy slicing!!
>
> Story title – **'Love at first sight'**: The reason I entered IT is that it is like a second language to me. When I was 8, the CD Drive broke and therefore I was forced to investigate more about the computer. It all went from there. It's progressed into my learning of programming and love of

technology.

Eleven percent of the competitors said they chose their career as an outlet for creativity; 11% said they enjoyed variety in their work and 9% said they enjoyed a challenge. Only 8% of the stories referred to financial rewards.

As well as enriching the picture of what was being played out through the WorldSkills competition, the narratives will also inform the framing of questions for subsequent stages of the research. Further, while acknowledging that participants in the MoVE surveys may have been more motivated to contribute their stories, given their high level of engagement at the time of the survey, it is nevertheless a method worth testing with wider populations – for example when seeking feedback from students on the quality and relevance of their learning.

Secondly, MoVE Australia has highlighted a gap in the research fields and perspectives reflected in Australian VET research publications. Searches of the NCVER, ACER and VOCED catalogues and AVETRA archives have not turned up research on high performing students and practitioners, or studies which seek to identify the characteristics of skilled performance; nor do there appear to be any studies of the impact of competition, and membership of a competitive community on skill development. A search of PhD topics has revealed just one study of WorldSkills – an historical and philosophical account of changes in the WorldSkills Australia carpentry competition to include team events and to increase the focus on communication and problem solving skills (Costin, 2003). Australia has been engaged in a long process of system building in vocational education and training: a period preoccupied by getting the policy settings right; identifying enablers and barriers to participation; analysis of funding regimes; reviews of program design and the efficacy of competency-based assessment. Unsurprisingly these preoccupations have been reflected in VET research – particularly studies supported by government funding. To note this state of affairs is certainly not a criticism of the current research effort. Australia produces exemplary systemic and population data and a wealth of data on the problems of system innovation and approaches to improvement. It is simply to say that the time has come to take a look at our system's performance in a new light.

Just a tradie?

Finally, we believe that the data also tells a story about the problematic place of vocational training in Australian culture, in particular in regards to the rewards and recognition received by young people graduating with vocational qualifications. An overwhelming majority of competitors who completed the survey wrote with enthusiasm about what their WorldSkills experience had meant to them. Many expressed surprise that they had got so much from the experience. Of course heightened enthusiasm may be expected during a national competition, but so might anxiety and stress. And given that the competitors were drawn from a diverse range of cultural backgrounds, and different work and training conditions, there is reason to expect a quite wide spectrum of attitudes rather than near unanimity. So we ask what this acclaim for the WorldSkills experience means. Does it perhaps have something to do with Australia's lukewarm attitudes to vocational training and practice, which, for example, traditionally see TAFE ranked lower than university studies? Might this attitude influence apprentices and trainees to regard their choice of career as just 'ordinary'? Do young people who are passionate about their craft nevertheless assume that any rewards for quality work will be a matter for private satisfaction? Compare for example young people who strive to excel in sport. They are offered regular opportunities to benchmark their skills against the best, and role models to

emulate. They can expect to receive public recognition in the arenas in which they achieve success. Compare also the opportunities for recognition of achievement offered to young university graduates who proudly don their caps and gowns, and ceremoniously receive their award before their family and peers. Apart from receiving (at last) an adult wage, graduating apprentices simply go on as they had before, with the possibility of owning their own business, and the private satisfaction of a job well done as incentives to achieve quality performance. In this context WorldSkills is a unique source of personal affirmation and possibility: in the words of the titles which competitors gave their stories: '*Amazing!*' a '*Life-changing experience!*' a '*Chance of a lifetime*', and a '*Stairway to success*'.

Conclusions

The MoVE project addresses two important elements of vocational practice: the factors which contribute to the development of expertise and the ways in which the journey towards expertise is experienced. The findings in relation to the contribution of self-regulation and self management and the significance of effort over natural ability in the development of vocational expertise, and the increasing importance of mental training as expertise develops, point to the need for further research to assess how these findings may contribute to improvements in entry level training outcomes. The findings regarding the success of WorldSkills as a community of expert practice in engaging and motivating its competitors suggest that WorldSkills Australia could play an important role as an aspirational community for vocational students. However, given that Australian apprentices and trainees are not likely to be aware of WorldSkills unless one of their trainers is involved, or someone they know has been a competitor, there is clearly a need for action to promote the WorldSkills experience, and to profile its participants as role models.

In concluding we pose the question of whether offering more young people an opportunity to engage in the pursuit of excellence as a normal part of their skill formation could enhance the status of vocational learning and benefit the overall quality of vocational practice in Australia. Since 2005 when Skills Finland hosted the WorldSkills competition in Helsinki and engaged in an active campaign to promote WorldSkills to Finnish secondary students, the percentage of young people entering vocational training increased from 40 to 60 per cent. This suggests an important area for Australian vocational research: to assess the relationship between the level of national investment in WorldSkills and key quality indicators such as vocational participation levels, completion rates, student satisfaction levels, and occupational retention. This and related questions about high quality performance represent a new field of engagement for Australian VET researchers.

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