

What Contributes to Vocational Excellence?

Characteristics and experiences of Competitors and Experts in WorldSkills London 2011

A report to the WorldSkills Foundation on the MoVE International research project conducted at WorldSkills London 2011



April 2012

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1 Preface: WorldSkills International

The mission of the global WorldSkills organization 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, WorldSkills Member organizations have primarily pursued this mission through regional and national skill competitions conducted, and an international competition hosted, by nominated member countries every two years. The first national competition of the International Vocational Training Organization (IVTO) took place in Spain in 1947. Portugal joined in 1950, and in 1953 competitors from five other European countries participated. By 2010 membership had expanded to all continents and included 53 member organizations, 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 skills such as beauty therapy, web design, fashion design and computer-aided design (CAD). There are now 46 skills in the Competition¹.

While individual events dominate, there are now team events in which Competitors must demonstrate a coordinated approach to completing 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). Participants in international WorldSkills Competition events have usually been involved in regional and national Competitions in their home country. To meet exacting international standards, participants are involved in intensive training during the 12 months before the Competition, working with the support of an Expert in their skill.

The international Competition in Calgary, Canada, in 2009 involved 850 Competitors from 47 countries competing in 45 skills. More than 250,000 members of the public visited the four day event.

WorldSkills London 2011 was held at ExCeL London – the international exhibition and convention centre located at Royal Victoria Dock. Conducted over four days, from 5-8 October 2011, the Competition involved 931 Competitors from 56 WorldSkills Member organizations, along with 2000 officials, delegates and Experts. More than 200,000 members of the public visited the event which took over the entire 90,000 square metres floor space at ExCeL London.

¹ For a complete list of sectors, see Figure A3 in the Annex to this report.

2 What is MoVE International?

2.1 Introduction

Modelling Vocational Excellence (MoVE) International is a WorldSkills Member research initiative supporting:

- skills improvement and Competition best practice
- international skills benchmarking, and
- promotion of vocational excellence to young people, employers and policy makers.

MoVE International is the inaugural research project for the WorldSkills Foundation and is also supported by Skills Finland, WorldSkills UK, WorldSkills Australia and the Dusseldorf Skills Forum. The research team is a partnership between: University of Tampere, Finland; University of Oxford, UK; and RMIT University, Australia, with support from Deakin University, Australia.

The research initiative sets out to produce outcomes relevant to the interests of its major stakeholder groups. The data produced by the study offers WorldSkills International and individual WorldSkills Members a framework for international benchmarking on skills quality, and a window into the WorldSkills experience for Competitors and Experts. Through the research reports, WorldSkills Member organizations will also gain access to global data on WorldSkills Competitors and Experts which may be applied to improve training and professional development. Importantly, young people are afforded a global voice. In telling their own stories they can share their experiences with peers, and provide future Competitors with insights into the experience of being involved in international skill competitions. For WorldSkills International, the data is a source of promotional material, and may contribute to event and organizational evaluation.

The MoVE research project launches the WorldSkills Foundation's program of research, engagement and advocacy. MoVE offers the Foundation an opportunity to influence the global debate on vocational education and training, and to shift the orientation of VET research away from a 'deficit' framework to one which highlights benefits and opportunities (see section 2.2 for a fuller explanation of these research orientations).

The outputs of the 2011 MoVE international research project include this global report and case studies of the Australian, Finnish and British teams that competed at WorldSkills London 2011.

2.2 Historical background

MoVE International is an international pilot study, based on national level research initiated in 2007 by Professor Petri Nokelainen at the Research Centre on Vocational Education at the University of Tampere Finland, with the support of the Finnish Ministry of Education and Culture. The Finnish MoVE project was the first research project to address the individual attributes which characterise vocational expertise and support the pursuit of excellence. By focusing on quality vocational practice in skill competitions, MoVE departed from the mainstream of vocational research which has followed a deficit pathway, primarily concentrating on structural, economic and policy barriers to vocational participation and completion.

Data from the Finnish MoVE research has provided education authorities with strategies to improve vocational performance in skill competitions. The research also points to ways in which the quality and relevance of vocational outcomes can be enhanced by offering young people opportunities to develop the attributes and characteristics associated with excellence. Findings from this research have been reported in Finland and internationally (Nokelainen, Ruohotie & Korpelainen 2008; Nokelainen & Ruohotie 2009).

In 2009, Professor Nokelainen presented his research at the Calgary WorldSkills Competition seminar series, and invited other WorldSkills member organizations to join the MoVE research project. WorldSkills UK and WorldSkills Australia became involved in the research, and formed

partnerships respectively with the University of Oxford, UK, and RMIT University, Australia, to conduct national studies on key aspects of excellence in skill formation.

On behalf of WorldSkills UK, the UK Economic and Social Research Council (ESRC) Centre on Skills, Knowledge and Organizational Performance (SKOPE) at the University of Oxford conducted a study into the workplaces of the 2009 WorldSkills UK Calgary team. The study explored the role of the learning environment within the workplace environment in the formation of high level vocational expertise (Mayhew, James & Stevens 2009). In July 2011, the WorldSkills UK London squad completed an adapted version of the Finnish survey on the characteristics of vocational excellence (Nokelainen, Stasz and James, forthcoming).

In 2010, RMIT University, WorldSkills Australia (WSA) and the Dusseldorf Skills Forum conducted a study of Competitors and Experts participating in WorldSkills Australia's national competition held in Brisbane in May 2010. In the study, both groups were asked about their WorldSkills journey and how this experience had influenced, and may influence, their careers. In November 2010, WSA Competitors selected into the team for WorldSkills London also completed the Finnish survey on the characteristics of vocational excellence, thus enabling international comparisons between the Australian and Finnish teams (Smith & Rahimi 2011).

Through the work undertaken in Australia and the UK, the overall MoVE research program has expanded to include collecting narrative data which give voice to WorldSkills participants. Narrative data also supports analysis of the benefits of competition on skills formation, and analysis of the influence of workplaces on competition outcomes. As well as collecting data from WorldSkills Competitors, the MoVE research program now includes data on Competitors from the perspective of the WorldSkills Experts, and data from the Experts about their own involvement in WorldSkills.

2.3 Context and theoretical framework

The context of the investigation is the changing nature of work practice and its organization in globalising, technology dependent economies. One of the most striking impacts of information and communication technologies is the increasing demand for high level cognitive and affective skill development in occupations in which manual precision was previously the major priority. These changing skill requirements are having a profound impact on patterns of vocational learning. Training in skills which enable individual workers to manipulate and monitor machine operations is no longer sufficient. Young people need the opportunity to develop high order cognitive skills, including problem solving, decision making and teamwork, and they need to be able to transfer their learning from one organizational setting to another. This means that 21st century vocational learning needs to offer learners opportunities to participate in and resolve multifaceted work challenges (UNESCO 2002: 61; OECD 2010: 60, 69).

In this context the MoVE research project sets out to investigate the cognitive, affective and social dimensions of expertise, and the processes through which such expertise is most effectively acquired. The research encompasses two theoretical orientations.

1. The first theoretical orientation draws on research into individual attributes and characteristics and the dimensions of intelligence, including Barry Zimmerman's research on self-regulation (Zimmerman 1998, 2000, 2002), Francois Gagné's research on development of talent (Gagné 2004, 2010), and Howard Gardner's research on multiple intelligence areas (Gardner 1983, 1999).

Using these theoretical perspectives, the originator of the MoVE research, Professor Petri Nokelainen developed 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), work skills, influential individuals, and factors related to self-regulation (motivation, volition, and self-reflection). The major proposition derived from this aspect of the theoretical framework is that there is a relationship between key attributes and characteristics, and vocational performance. In the

case of the WorldSkills International Competition, performance is measured by Competition results, and comparisons are drawn between the different perceptions of attributes and characteristics held by medal winners and other Competitors.

2. The second field of enquiry uses the work of Etienne Wenger, who pioneered the concept of communities of practice, and focuses on the settings in which vocational expertise is acquired. Wenger argues that learning involves participation in social settings and is a consequence of belonging to a group or community which has particular meaning in the lives of the learners (Lave & Wenger 1991; Wenger 1998). In other words, in addition to individual volition and cognitive development, learning involves interaction and communication. Wenger uses the concept of 'community of practice' to describe the social context of learning and identifies 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 regards communities of practice as sites in which identity is formed and points out that learning is a process of identity formation. In this context, as well as leading to the acquisition of skill and knowledge, vocational learning is a process of professional identity formation. The specific communities in which vocational learning takes place thus influence the formation of identity, the values and attitudes individuals adopt, and the ways they perform as professionals. Identity and practice are mirrors of each other. Being a particular type of professional – a bricklayer, a carer, a doctor, a mechanic – gives us a certain focus (Wenger 1998, p. 148, p. 152). The practices and values of particular professional communities are the framework for developing competence as a community member and as a professional.

For the MoVE research, the proposition drawn from the work of Wenger (and others who have used and adapted his framework) is that WorldSkills is a site for developing professional identity. From this perspective, WorldSkills plays a role as a community of practice which promotes vocational learning: WorldSkills offers Competitors a pathway to professional identity, and for those who maintain their involvement over many years – including Experts – it offers a platform for lifelong learning related to their trades/professions.

2.4 Purpose of the study

By collecting and analysing data from Competitors and Experts participating in an international competition, MoVE International aims to:

- direct international attention to questions of quality in vocational skill
- explore how WorldSkills Competitors and Experts regard the impact of their experience on their skill development, and on their sense of identity as members of their trades/professions.

With its focus on understanding the factors which promote development of high quality vocational skills, rather than on barriers to skill development, MoVE also aims to promote a positive orientation toward vocational education and to encourage further research from this perspective.

2.5 Purpose of this report

This report to the WorldSkills Foundation Board of Trustees describes the findings from the analysis of data collected from WorldSkills Competitors and Experts at WorldSkills London 2011. The report also includes a brief discussion of these findings in the context of the theoretical frameworks described above. Because this was a pilot study, we do not set out to make generalisations on the basis of the data. Rather, in reporting on the outcomes, we identify areas of potential interest and significance for WorldSkills in the context of its mission and goals. We also suggest ways in which the research could be taken further to produce outcomes that can be generalised, and that can benefit quality vocational learning.

3 Method

3.1 Data collection

MoVE International's research involved two online surveys administered during WorldSkills London 2011: one administered to WorldSkills Competitors, and the other administered to Experts. The purpose of both surveys was to collect data on the individual characteristics of vocational excellence, and on the experience of being involved in world standard vocational competition.

Both surveys were in two parts:

- Part A addressed the experience of WorldSkills
- Part B addressed the characteristics of vocational excellence.

Part A of the Competitor survey focused on two areas: first, the Competitor experience of preparing for and participating in WorldSkills, and second, Competitor perceptions of the influence of WorldSkills on their development and its importance to their future careers. Part B of the Competitor survey focused on their perceptions of their own attributes and characteristics.

The Expert survey included similar questions. Part A sought information about the Experts experience of, and attitudes to, WorldSkills. Part B of the Expert survey asked Experts to reflect on the Competitors in their teams, and to answer questions about Competitor attributes and characteristics.

Both Competitors and Experts were asked to tell a brief story about their WorldSkills experience, in their own words. The Competitors' narratives were framed by the following prompt in the survey:

Congratulations! You've made it to WorldSkills London. Please use the space below to write what you would tell your friends about the experience of getting ready for the Competition.

Experts were given a slightly different prompt:

You've been asked to talk to a group of members of your trade/profession about what it means to be involved in WorldSkills as a skills Expert. What would you tell them based on your own WorldSkills experience? Please use the space below to write what you would tell them.

Different question types were used in Part A of each survey to enable us to test the validity of the data by comparing responses to questions about the formation of professional identity. Details of question types are provided in Table 1 below. The two sets of survey questions are included in chapter 3 of the Annex to this report.

Table 1: Classification of survey questions

Survey question type	Competitor survey	Expert survey
Survey Part A		
Demographic questions	✓	✓
Questions about success at school	✓	
One open ended question about WorldSkills involvement, training and attitudes to the skill, asking for a narrative response and a title for the narrative	✓	✓
Questions about the narrative using triangle images to explore the relative significance of three factors	✓	✓
Multiple choice question about the narrative	✓	✓
Scaled questions about the WorldSkills Competition and experience, and the development of Competitors' emerging professional identity	✓	✓
Descriptive multiple choice questions about the WorldSkills experience	✓	✓
Questions about self-perceptions using a continuum image ²	✓	
Questions about Expert perceptions of Competitors in their team using multiple choice questions and continuum image		✓
Survey Part B		
Questions about sectors, and level of involvement and ranking in national and international WorldSkills competitions	✓	✓
Scaled questions about the characteristics of excellence Competitor self-perceptions Expert perceptions of Competitors	✓	✓

The surveys were available to participants online through SenseMaker Collector³. A paper and pencil version of the survey was made available for any respondents who did not have Internet access during the event. The survey language was English; however, participants were able to answer the narrative question in their own language. Arrangements were made for translations of non-English narratives in the paper-based surveys by professional translators prior to entry into the SenseMaker Collector database by the research team. Non-English narratives in the online surveys were translated using Google Translate and checked by professional translators.

3.2 Data collection process

The survey was administered during WorldSkills London 2011, held from 5-8 October 2011. In the lead-up to the Competition, existing WorldSkills organizational structures and methods of communication were used to inform WorldSkills members about the research project, and to promote participation. Official delegates were invited to attend a seminar on 5 October 2011 to hear about the research, and a total of 30 delegates attended. A high level of support was received from Team Leaders and Jury President Team Leaders who agreed to distribute the surveys and encourage their Experts and Competitors to participate. The WorldSkills research team attended two team meetings to provide additional information and to answer Team Leaders' questions.

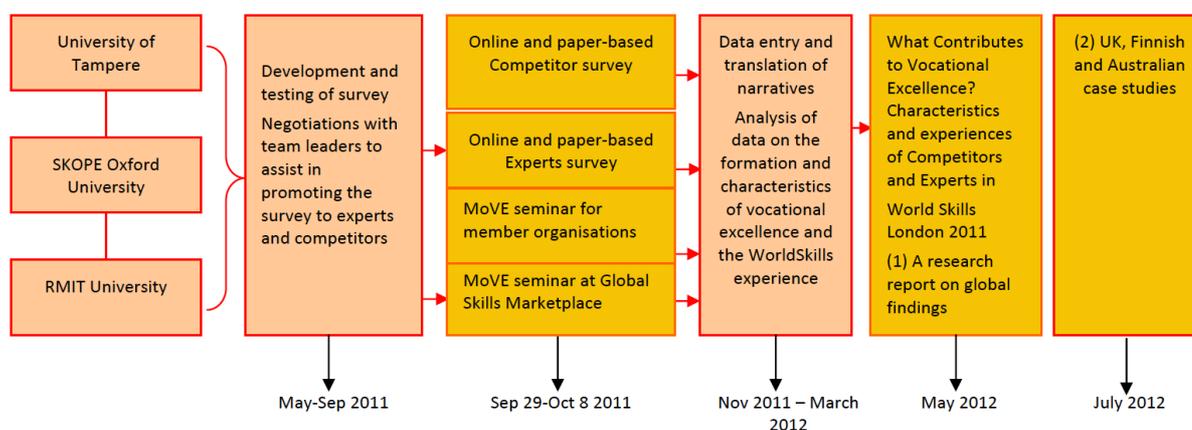
² Data were collected and part-analyzed using the SenseMaker suite of software (<http://www.sensemaker-suite.com/>). This SenseMaker survey tool asks respondents to select a point along a bar to show a relative position between two opposites.

³ Details of SenseMaker Collector can be found at: <http://sensemaker-suite.com/sensemaker-collector.html>

Competitors completed the survey before they knew their WorldSkills London Competition results and rankings.

The research team planned for the survey to be completed online at the Competition venue where all Competitors had laptop access at multiple locations to the Internet site. However, quite a number preferred to complete the survey in the evening after they had returned to their accommodation. Because Internet access at most hotels in which teams were accommodated was an additional (and not inconsiderable) charge, many Team Leaders requested paper copies of the survey. There was a subsequent need to manually enter responses from 309 Competitor surveys and 29 Expert surveys into the database. This eventuality extended the data analysis process, which was originally to be completed by December 2011. Further time was taken in checking Part A survey responses for validity, and a total of 54 of the total 467 completed surveys were classified as invalid. Ten were empty or not sufficiently completed to enable analysis, and 44 had been completed by an estimated four people. There were no meaningful narratives in the invalid surveys, and the answers to multiple choice and scaled questions produced non-meaningful and contradictory patterns. The amended timeline for the project is shown in Figure 1 below.

Figure 1: Amended MoVE research project timeline



3.3 Presentation of quotes from Competitors' and Experts' narratives

Quotes from narratives written by Competitors and Experts are included often in this report and the Annex to the report. We recognise that many narratives were written in an informal tone, and that some respondents who elected to write in English do not use English as a first language.

We wish to ensure that the intended meanings in the narratives are accessible to as many readers as possible, including those who are not readers of English as a first language. We also wish to ensure that translation of this report in full or in part is not unnecessarily complicated by unfamiliar English usage.

The MoVE International research team retains the original versions, and the original translations into English, of all narratives that form part of the study.

3.4 Privacy and confidentiality

The privacy of respondents has been protected at all times. Competitors and Experts are not named in the reports, nor has data been released which enables individuals to be identified by association. National Member organizations of WorldSkills International have been identified as participants in the research in two ways: first, via the number of Competitors and Experts who contributed valid data through completing surveys, and second, in relation to data which are published on the WorldSkills International website (for example, Competition outcomes). In all other

cases in this global report, Member organization data are coded to enable comparisons while protecting privacy.

3.5 Note on methodological limitations

As the first study of its kind, the 2011 Move International research project is very much a pilot study which has produced indicative rather than conclusive results. The original Finnish study included interviews and surveys of a control group of young people within the same age group and trades/professions who had not participated in WorldSkills. However, given the international pilot nature of this MoVE study, it was not possible to include a control group. Thus, the findings relate to young people and Experts who participate in skill competitions at the world class level, but the findings are not generalisable.

The survey has all the usual limitations associated with self-reported data: for example, it is not possible to verify responses provided on past school and competition performance. Further it should be noted that the survey was produced in English, which is the WorldSkills official language. We cannot be sure that all Competitors and Experts completing the survey fully understood the meaning of the questions. Additionally, while many Competitors completed the narratives in their own language, more Competitors whose second language was English declined to provide a narrative than did native English speakers. This has resulted in narrative data which are not representative of the full range of cultural backgrounds included in the survey sample. The short timeframe available to design and test the surveys meant that Team Leaders did not have time to organise translations, which some later said they would like to have done. This issue is addressed in the recommendations at the end of this report.

3.6 Participants

3.6.1 Competitors

For Part A of the Competitor survey, a total of 413 valid responses were received from Competitors representing 38 WorldSkills Member organizations. There were 409 valid responses to Part B of the Competitor survey. This represents 43 per cent of all Competitors and 68 per cent of the Member organizations present at WorldSkills London 2011 (see Figure A1 in the Annex to this report). This is a statistically significant return rate as a response rate of 40 per cent is considered by academic researchers to be a reliable sample to represent a population (in this case, the total number of Competitors at WorldSkills London 2011).

All six WorldSkills sectors featured at WorldSkills London 2011 were present in the sample: Transportation and Logistics; Construction and Building Technology; Manufacturing and Engineering Technology; Information and Communication Technology; Creative Arts and Fashion; and Social and Personal Services. (See Figure A3 in the Annex to this report – the table lists all skills in the Competition). Seventy-eight per cent of Competitors in the sample were male, and 22 per cent were female. Competitors' ages varied from 15 to 22 years ($M=20.6$, $SD=1.238$), with the upper limit reflecting the WorldSkills Competition's maximum age for participation⁴. More than 90 per cent of respondents reported their age.

The survey responses revealed that most Competitors had competed at least once in national ($n=356$, 87.0%) or international ($n=273$, 66.7%) vocational skills competitions. Their past competition success was excellent with most having won gold, silver or bronze medals ($n=298$, 72.9%) prior to WorldSkills London 2011. This is to be expected, as most Member organizations have a selective process for identifying those young people with the qualities and skills to compete at world class level.

⁴ The upper age limit to compete at a WorldSkills Competition is 22. The exception to this rule is for the skills of Information Network Cabling, Manufacturing Team Challenge, Mechatronics, and Aircraft Maintenance. For these skills, the age limit is 25 years in the year of competition

3.6.2 Relating WorldSkills performance to school performance

Competitors were asked to think back to when they were in school and to rate their success in general and vocational subjects using a five point scale from poor to excellent. The responses to these questions are shown in Table 2.

Table 2: Competitors' ratings of their success in general and vocational subjects at school

Competitor self-rating	Rating of success in general subjects ^a		Rating of success in vocational subjects ^b	
	<i>n</i>	per cent ^c	<i>n</i>	per cent ^c
Poor	12	3.1	3	0.8
Satisfactory	27	6.9	10	2.6
Average	88	22.7	46	11.9
Good	194	50.2	163	42.4
Excellent	65	16.8	162	42.1

^a *n*=409 with 386 (94%) usable responses and 23 (6%) missing responses.

^b *n*=409 with 384 (94%) usable responses and 25 (6%) missing responses.

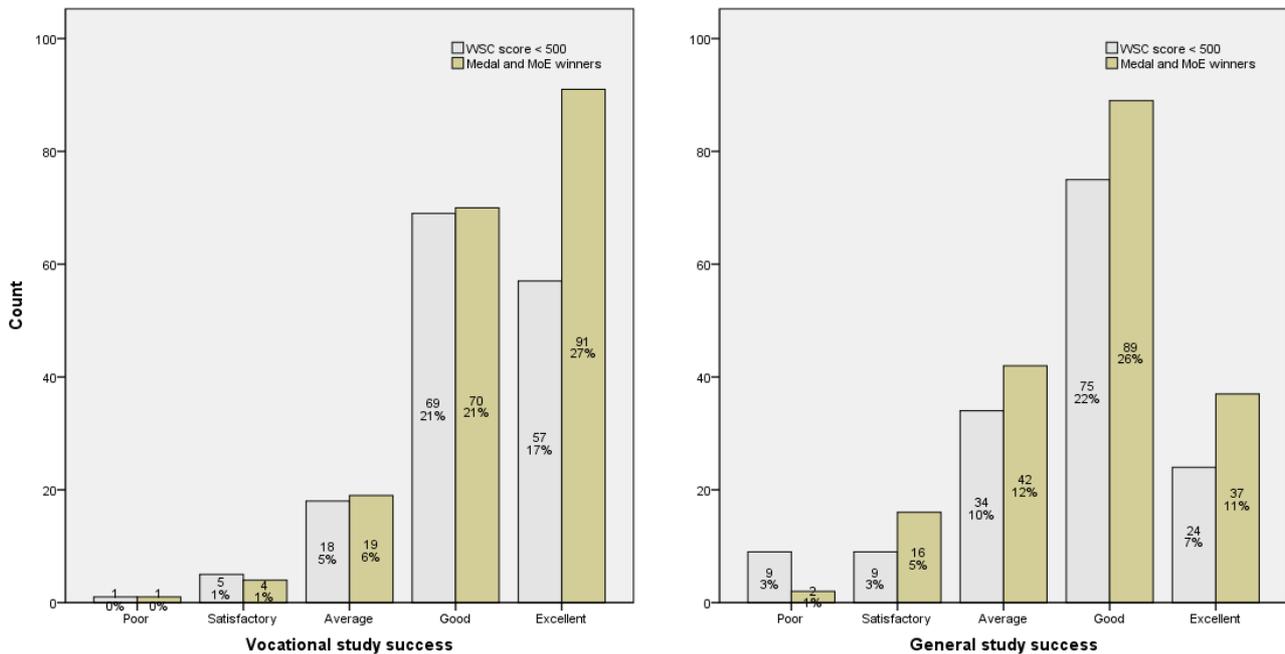
^c Valid per cent based on usable responses.

Sixty-seven per cent of 386 Competitors who answered these questions rated themselves as either 'good' or 'excellent' in general subjects. The overwhelming majority – 85 per cent – rated themselves as 'good' or 'excellent' in vocational subjects.

After WorldSkills London 2011, Competitors' results were entered into the database and compared to their self-ratings of success in general and vocational subjects. Figure 2 shows these relationships for two groups:

- Group 1: Gold, silver and bronze medallists, and Medallion for Excellence award winners who achieved 500 points or more at WorldSkills London 2011
- Group 2: Competitors who achieved less than 500 points.

Figure 2: Relationship between past school success and WorldSkills London 2011 results



Twenty-seven per cent of Group 1 Competitors ($n=9$) rated their success in vocational subjects as 'excellent' compared to 17 per cent ($n=57$) of Group 2 Competitors.

Correlational analysis showed that self-rated general subject study success was positively related to vocational study success, and that both general and vocational subject success was related to WorldSkills Competition outcomes.

3.6.3 Relating WorldSkills performance to prior vocational competition experience

Competitors reported the number of national and international vocational skills competitions they had participated in prior to WorldSkills London 2011. Table 3 shows that prior participation ranged from one to nine skill competitions. The majority of competitors had taken part in two national competitions (70 per cent) and one international competition (75 per cent).

Table 3: Participation in national and international vocational skills competitions prior to WorldSkills London 2011

Competitor self-rating	Number of national competitions ^a		Number of international competitions ^b	
	<i>n</i>	per cent ^c	<i>n</i>	per cent ^c
One	158	44.4	204	74.7
Two	92	25.8	39	14.3
Three	41	11.5	11	4.0
Four	29	8.1	6	2.2
Five	18	5.1	4	1.5
Six	5	1.4	1	0.4
Seven	5	1.4	4	1.5
Eight	7	2.0	3	1.1
Nine	1	0.3	1	0.4

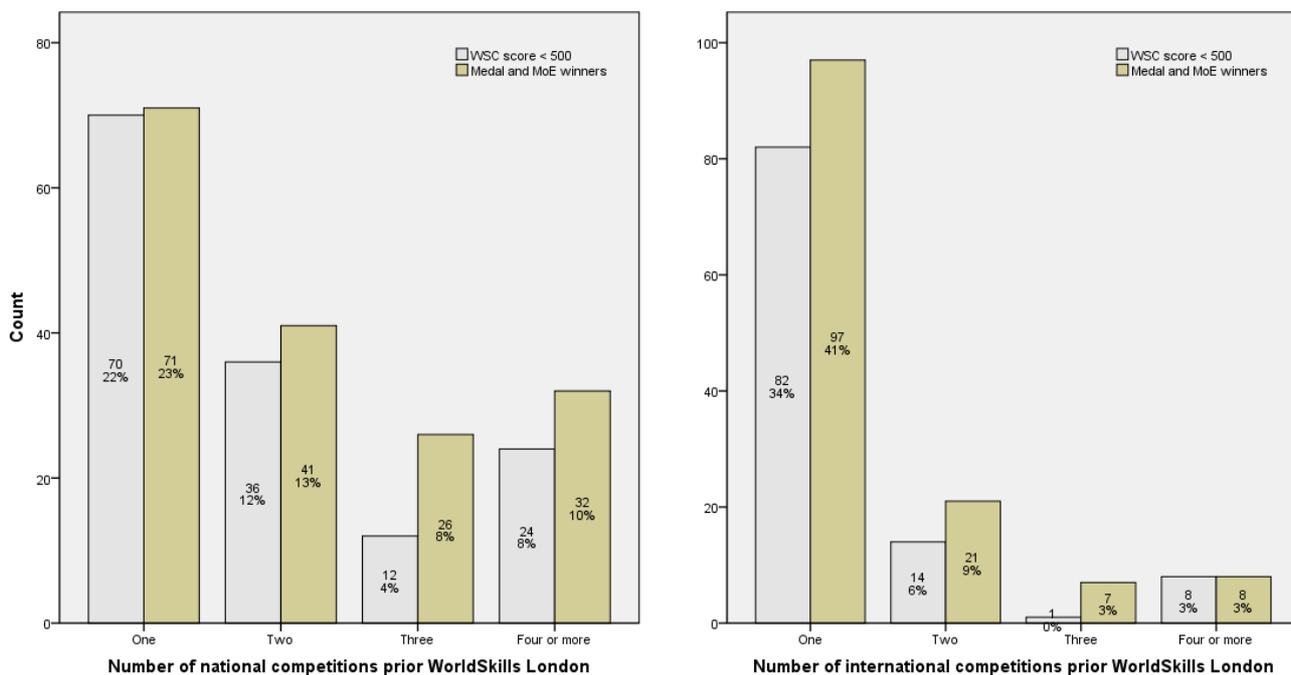
^a *n*=409 with 356 (87%) usable responses and 53 (13%) missing responses.

^b *n*=409 with 273 (67%) usable responses and 136 (33%) missing responses.

^c Valid per cent based on usable responses.

Competitors' success in WorldSkills London 2011 (Group 1, medallists and Medallion for Excellence winners who achieved 500 points or more; and Group 2, Competitors who achieved less than 500 points) was compared to assess whether prior experience was related to their performance at WorldSkills London 2011 (see Figure 3). Prior experience was based on participants' self-reports in the Competitor survey. For the purpose of the analyses the number of past competitions was recoded into four classes (one, two, three, more than three).

Figure 3: Relationship between participation in national and international vocational skills competitions and WorldSkills London 2011 results



Correlational analysis showed a positive relation between the number of national and international competitions [$r_S(263)=.36, p<.001$]. This means that those who had participated in several national level competitions had also competed most frequently in international level competitions.

Examination of the contingency table showed that the majority of the Competitors who reported the number of competitions ($n=96, 37\%$ out of 263) had competed in one national and one international competition. On the other hand, we identified a small group of 'veteran Competitors' ($n=17, 6\%$) who had competed in four or more national and international competitions prior to WorldSkills London 2011. However, the veteran Competitors did no better than other Competitors participating in WorldSkills London 2011.

Results of correlational analyses confirmed the finding that for Competitors in WorldSkills London 2011, there was no statistically significant relationship between success at WorldSkills London 2011 and the number of previous national or international competitions in which they had participated.

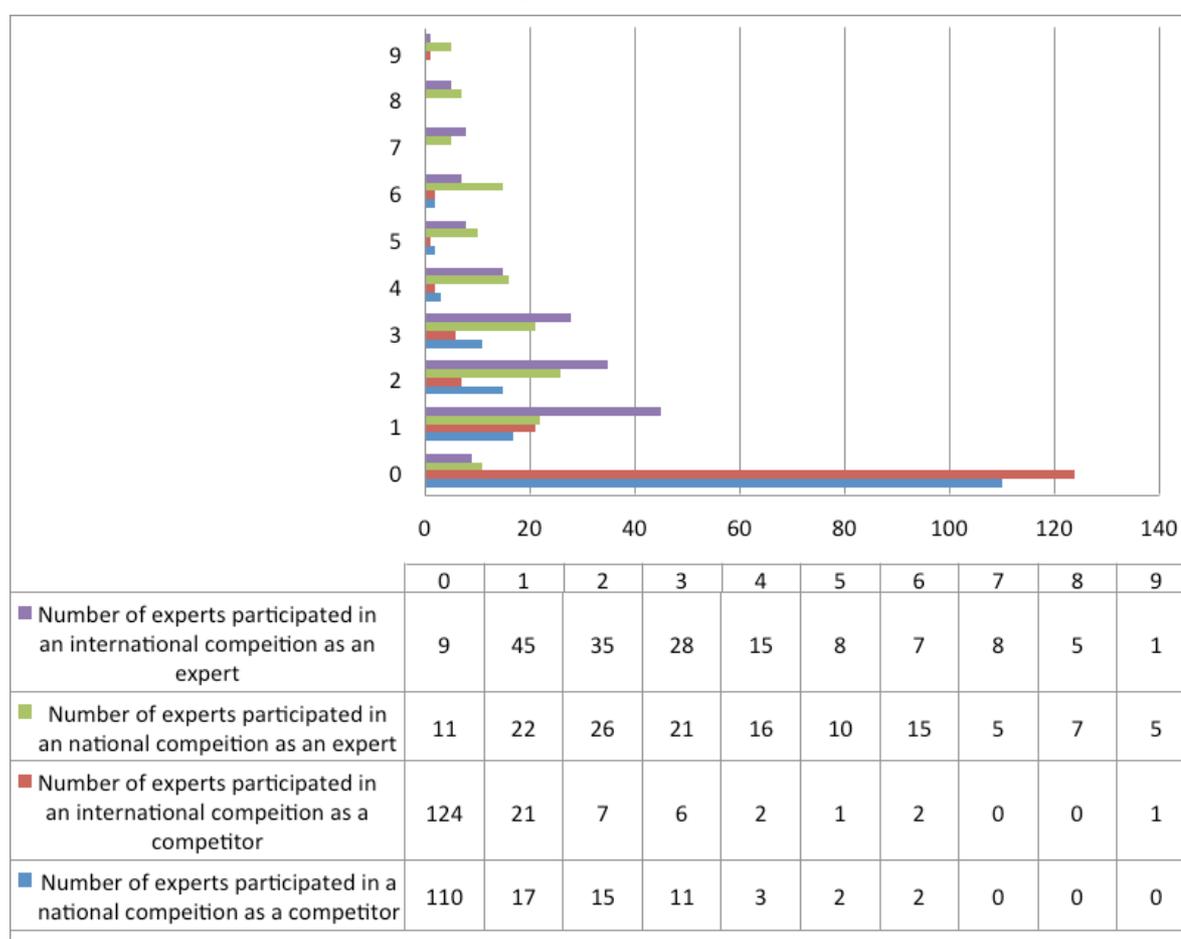
3.6.4 Experts

Experts from 38 WorldSkills Member organizations provided a total of 165 valid responses. This represents 17 per cent of Experts from 67 per cent of the member organizations present at WorldSkills London 2011 (see Figure A2 in the Annex to this report). Possible reasons for the low Expert participation rate are discussed in chapter 7 of this report and recommendations made accordingly.

The survey was completed by Experts from 43 of the 46 skills represented at WorldSkills London 2011 (see Figure A4 in the Annex to the report). Four experts did not provide information about which skills they represented.

Data on the number of skill competitions in which Experts have participated (see Figure 4) shows that a relatively small number of those Experts who responded to the survey had participated as a competitor in national or international competitions. One hundred and twenty-four experts reported that they had not competed in an international competition, and 110 reported that they had not competed nationally. As this is a small sample of the total number of Experts at WorldSkills London 2011, this result may not be representative.

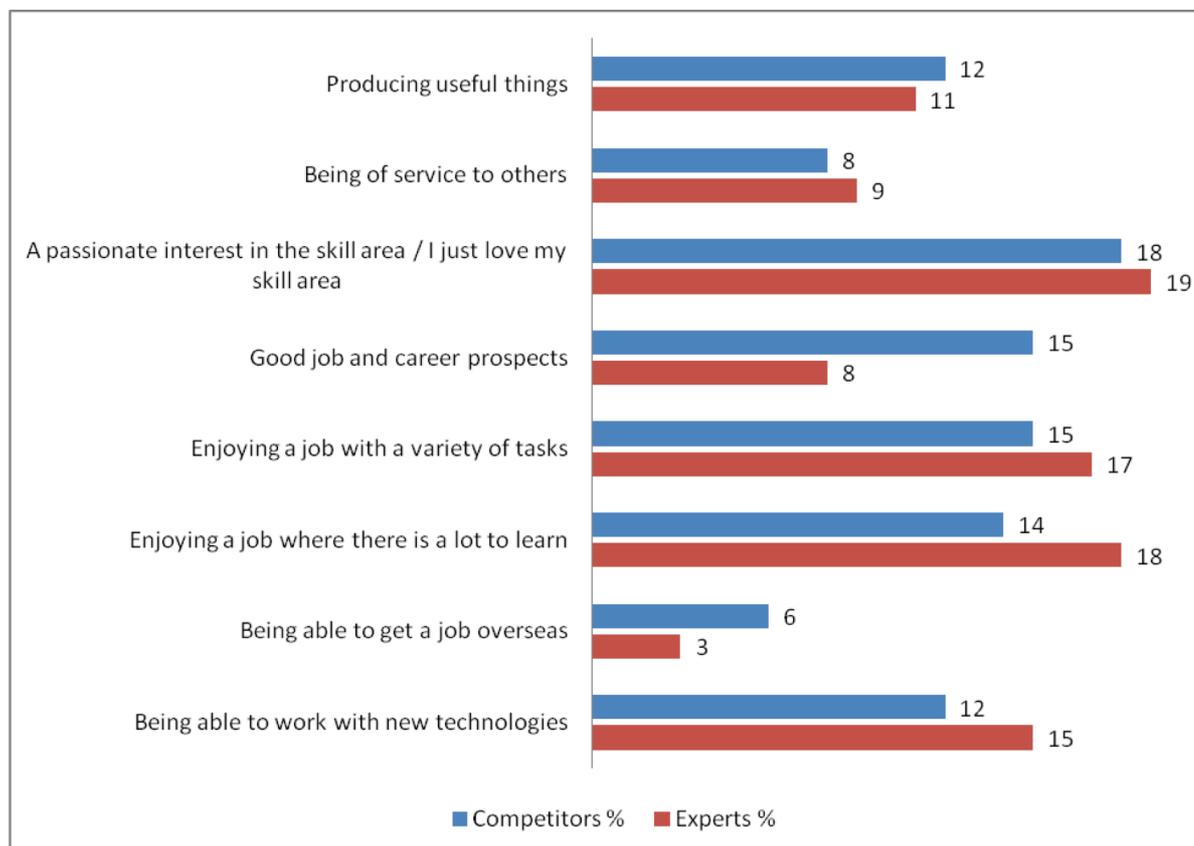
Figure 4: Number of competitions participated in by WorldSkills London 2011 Experts who responded to the survey



3.6.5 Competitor and Expert attitudes toward their trades/professions

WorldSkills London 2011 Competitors and Experts were asked to identify from a list the factors what attracted them to their chosen trades/professions. They could select as many factors as applied to them. The results are shown in Figure 5. (Detailed results for each group are presented in pie chart form in the Annex to this report – see Figure A5 and Figure A6.)

Figure 5: Factors that attracted Competitors and Experts to their chosen trades/professions



The pattern of results indicates that the two groups – young people starting out on their careers and experienced professionals – share similar attitudes. Both groups are most attracted to their chosen field by intrinsic factors, such as a passion for the work, an enjoyment of learning, the appeal of variety in work tasks, and working with new technologies. Understandably, compared to the adult Experts, job and career prospects are twice as important to young people who are just starting out in their chosen professions.

4 How Competitors and Experts experience WorldSkills

4.1 What the narratives tell us

A casual reading of the Competitors' and Experts' stories tells us many things about the ways in which they experience WorldSkills. Many of the stories refer to a sense of excitement. They wrote about an unforgettable experience which was, at the same time, rewarding, tiring, fulfilling, stressful, hard work and challenging. The following example from a story written by an Austrian Competitor is illustrative:

It was absolutely unique! Just fantastic. The preparation was tough because you sacrifice a lot of free time and it is not always easy, but it is worthwhile in any case. I will never forget this experience. I will definitely tell my grandchildren: have it! The whole atmosphere, especially at the closing ceremony was just awesome. I really had goose bumps!

A Spanish Expert provides a succinct promotion of what he regards as the professional benefits of involvement in WorldSkills for teachers and trainers:

Want to learn more in your career? Want to better educate your students? ... Do you want to thrill with the excitement of your students? Want to learn from the best professionals in the world? Want to share what you know with the best professionals in the world? Want to know your technical level in relation to other countries in the world? Would you like to become the best professional trainer in the world? Would you like to see your high professional level recognised? If the answer is yes, come to WorldSkills Competition.

Whether a page, a paragraph or a few words, the majority of stories carry similar messages:

It was difficult but totally worth it.

- Competitor, Estonia.

An extraordinary and rewarding experience.

- Expert, Belgium.

Tough job. Long days. You need to have enthusiasm, also interest. I was looking forward to London.

- Competitor, Finland.

Experts also spoke of their commitment to helping young people:

It is something you need to be passionate about in order to do it well. We put in many long days without a break and it is a great experience, but not something you'd enjoy if you weren't interested in investing in young people.

- Expert, Canada.

It is a very good opportunity for young people from all over the world to show their skills ... I love to see them work and competing with each other. They are all winners to me, working in a concentrated way.

- Expert, The Netherlands.

Others used the narrative to explain what the role of Expert involved, or provided advice and recommendations about aspects of the Competition. A small number of stories expressed frustration:

It's a good experience, but I think the panel should be more open to technological changes in the profession and apply those more often in the competition.

- Expert, Spain.

Perhaps surprisingly, given that this survey took place during an international competition, there were only a few stories which focused on the goal of winning a medal. Many Competitors and Experts said that WorldSkills was about more than medals – that being part of the Competition was what counted, and that all Competitors were winners. Above all, the narratives convey a sense of engagement with, and belonging to, WorldSkills. They convey the feeling that WorldSkills has been, and may continue to be, a significant part of their working lives.

4.2 Interpreting the narratives

4.2.1 Major narrative themes

Beyond this casual reading, we used NVivo software⁵ to code the narratives according to their major themes, thereby allowing us to identify how Competitors and Experts described their experiences. Table 4 lists the themes identified in Competitors' and Experts' stories. The themes are presented in order, from the most to least number of references made to each theme across each set of narratives⁶.

Table 4: Themes in Competitor and Expert stories, from most to least number of references

Themes identified in Competitors' stories	Themes identified in Experts' stories
Learning and upskilling	Learning and upskilling
Unique and life-changing experience	Networking
Rewarding	Rewarding experience (general)
Amazing	Pleasant and enriching
Hardship	Knowledge exchange
Meeting new people	Benchmarking skills
Perseverance	Rewarding for Experts
Professional development related to future career	Professional growth
Professional development	Proud
Professional development – professional growth	Rewarding for Competitors
Hardship – stress	Personal growth
Eye-opening	Hardship
Hardship – time consuming	Cultural exchange
Mental change	International teamwork
Fun	Life-changing
Medals	Beneficial to employers
Teamwork	Teamwork
Discovering other cultures	English language

⁵ NVivo is a qualitative research tool which enables analysis of unstructured information, including narratives, audio and video material: http://www.qsrinternational.com/products_nvivo.aspx

⁶ Details of the number of coding references are included in the Annex to this report – see Figure A7 and Figure A8

The most dominant theme referred to in Competitors' narratives is 'learning and upskilling', often accompanied by references to WorldSkills as a 'life-changing experience'. The following Competitors' stories⁷ are indicative.

Shaping you

WorldSkills training was intense. It was 5 years long & a total commitment from every aspect of my life ... As a commitment I gave up soccer & dance to focus on training the 3-4 days a week ... Training at times was intense, repetitive boring, funny, challenging but most of all it has 'shaped' me as the person I am today. I don't know what I would do or be doing if I didn't enter the Competition all those years ago ... Thank you WorldSkills!!

- Competitor, Australia.

Life's adventure

Getting ready for the WorldSkills is a once in a lifetime situation. Training (depending on the trade) can take up most if not all the time. However, not many people can say they have ever made it this far in any way. That's kind of amazing to me ... Sure training takes a lot of focus, motivation, support, patience and time. But at the end of the day I want to be able to say: I did the absolute best I could and I feel great. It is not about winning a medal; sure that's a bonus. It's about everything else that comes along with it. It is an experience of a lifetime, and I would not pass that up ...

- Competitor, Canada.

Learning

The experience of training for WorldSkills has been fantastic, and more so it has been a wonderful journey of learning, experience and exposure to the new and latest things happening around the world. From what I have learnt ... WorldSkills is a platform to showcase your skills and give the best output using the latest and modern techniques. It is not important to win a medal but the experience that you get while training for WorldSkills surely makes you a winner in the long run. WorldSkills is a lifetime opportunity. I am sure it changes life, and in a good way.

- Competitor, Hong Kong China.

[no title]

I have not only learned new knowledge and skills, but also acquired new capabilities during the process of preparation. This has been very helpful.

- Competitor, China.

Competitors' stories revealed many references to various aspects of hardship: having to give up social activities to concentrate on training; long hours of training; being stretched to learn new skills; being stressed. However, hardship was not necessarily a negative aspect of the Competition as it brought rewards.

First hard but good

It's been absolutely fantastic to be able to participate in a competition like World Skills. This has led me to develop myself in my profession, but also as a person ... But just as amazing as it has been, it has also been hard. I've had to push myself to the extreme, and during training my stress level has probably been somewhat higher than what is completely healthy. But also when I look back now, I have nothing to regret. And I know that I have moved my limit to what I can cope with mentally.

- Competitor, Denmark.

[no title]

Preparing has been tough and boring but sometimes also rewarding. I've had to take the responsibility for my independent study in acquiring both practical and theoretical knowledge.

⁷ The ways in which themes are clustered in the competitors' and experts' stories are shown in the Annex to this report – see Figure A9 and Figure A10

Preparing has given me a lot of new information and skills to benefit my career that I would not have learned at lessons. It has prepared and developed my teamwork skills. Preparing, for example for the national team camps, has given me opportunities to make new friends with experts from different professional fields. During preparation I have had a lot of stress because it has taken place at the same time as the matriculation examination, practicing, vocational studies and working my summer job. I have had to be flexible to perform at least at the average level in all of those areas. I have just had to tolerate the stress and fulltime work and study days.

- Competitor, Finland.

The most dominant reference in Experts' narratives was also 'learning and upskilling', often accompanied by references to 'networking', 'benchmarking of skills', and 'knowledge exchange'.

We all win

We are friends from many countries and careers.

- Expert, Vietnam.

Amazing

This is the most amazing experience! To be among the top Experts in the world under one roof allows for exchange of knowledge and trade ideas. The Competitors are all winners, coming from each nation. The experience for the young people is a chance of a lifetime. The week is full of fun and hard work.

- Expert, USA.

Skills benchmarking

This is a valuable experience to be part of. It showcases your Competitors' skills against a benchmark of other countries. This gives you an indication of how other countries train and what you need to be doing to get yourself into a competitive position.

- Expert, UK.

The exciting journey

To be involved in WorldSkills means for me: to share knowledge of my profession with other caring experts from around the world ... advertise the profession so that more young people start to get involved with my profession ... It was a lot of work for me but also a lot of fun ... The coaching of my competitors was great. To give them my experience in the profession, I liked that very much. It was great to see how they developed in the profession and also personally...

- Expert, Switzerland.

International Expert

WorldSkills challenges young individuals by benchmarking their skills against one another. Being involved as an Expert is rewarding as you can set the challenges and watch the Competitors perform at their best to achieve them. As an Expert you can discuss your industry with colleagues from around the world. You can see what skills training works for other countries and look at implementing this in the training and selection of the Competitors from your own country. Valuable relationships are formed with fellow Experts.

- Expert, Australia.

Absolutely fantastic

Working at World Skills is a very rewarding experience because being able to share experiences with people of other nationalities greatly enriches you ... You can improve your day to day work, implement new ideas and open your mind to new work options.

- Expert, Spain.

4.2.2 Exploring meanings in Competitors' stories

After the narrative question, the Competitor survey included a set of questions which asked the Competitors to mark the relevant point within a triangle to indicate the relative importance of three

factors in the story they had just told ('triad' questions). Competitors were able to mark any of these questions as 'not applicable' if the factors were not relevant to their story.

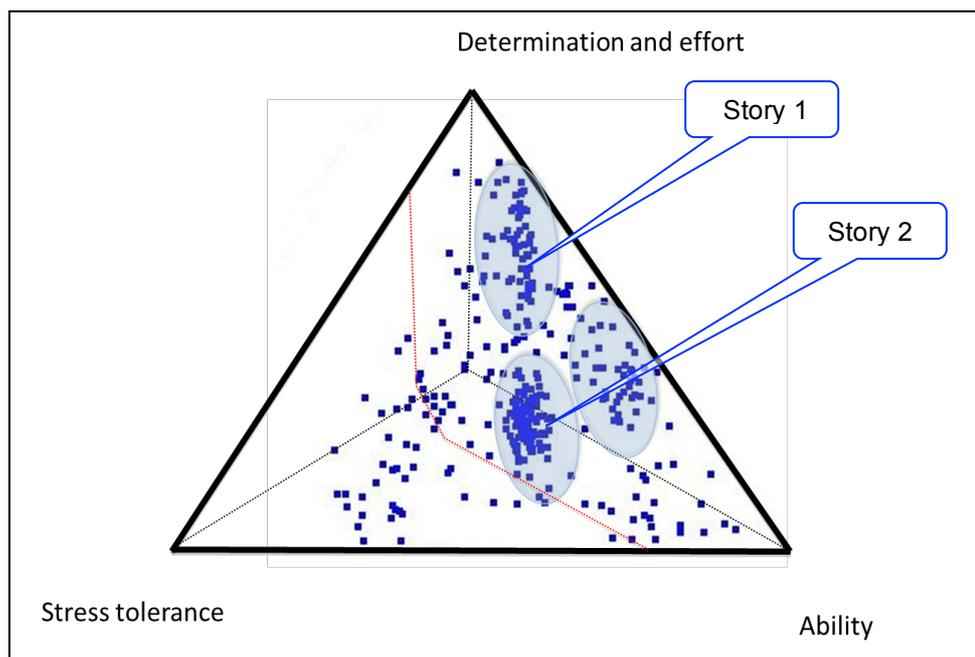
Each triad explored one of the following six sets of factors:

1. important attributes: determination and effort, ability, stress tolerance
2. skill types: technical, planning, communication
3. difficulties and challenges: managing to keep going, learning lots of new things, satisfying my trainer
4. motivating factors: enjoying a challenge, learning new things, wanting to succeed
5. self-perceptions about identity: a master/expert, a skilled worker, a student/apprentice
6. important influences and reference points: family, workplace, WorldSkills training.

The relative importance of these sets of factors is interpreted according to the density of dots inserted by survey respondents, with each dot representing a survey respondent and cross-referenced to their story. For example, Triad 1 dealt with important attributes. It asked Competitors: 'What mattered most in this experience was: determination and effort; ability; stress tolerance'.

Figure 6 shows the pattern of responses for this question. There are more dots in those parts of the triangle associated with 'determination and effort' and 'ability' than in the part of the triangle associated with 'stress tolerance'. This result is interpreted as meaning that in the stories they told, determination and effort, and ability, mattered more to Competitors than did stress tolerance.

Figure 6: Responses to the prompt 'What mattered most in this experience was...'



The stories of two Competitors illustrate how they thought about determination and effort, ability, and stress tolerance.

Story 1: Good things are not just good things

When I started the skill training, I was only thinking of getting a job at the big companies. My school days were the beginning of building my career. I started to learn by doing tasks one by one, from simple cleaning through to all sorts of miscellaneous work. That means not only the skills I was learning, but also I was learning the ethics for technicians. Learning skills was one thing. There were other things that I need to overcome, such as people's wrong ideas about technicians. Sometimes people looked down on us because we were manual workers and only a few people knew about the vocational training competitions. I did my best but mentally I got stressed a lot and the training was hard too. Also it was a huge burden to participate in the

Competition only once after the 3 years of training. After all the tough work, I won the gold medal at the National Skills Contest and then trained further to be selected for the national team. It was a big deal to become a member of the national team. Also the levels of the skills among the Competitors were quite similar and we all were afraid of making mistakes. At last, when I was selected for the national team, I became sceptical. Had I become so greedy about money and honour? Was I still on the right track? Did I deserve to be in this position? Could I really do it? ... I was thinking about those questions every day and when the Competition period came closer, I really did work hard and train harder, aiming for the gold medal.

- Competitor, Korea.

Story 2: [title deleted]⁸

Two years of training squeezed into 4 days; that makes six months training for each day I competed. Every day and every minute of training was worth it. It paid off and I did my best. I lived out of a suitcase basically, and travelled around the UK every other week. I've made friends for life who can only relate to the same pressure and intense experience I went through. We went through it together. As a 21 year old, this can only lead to doing even greater things in life as not many at my age can say they've achieved at something like WorldSkills. I have made a huge leap in industry and I am a 200% improved since I started. I've gone leaps and bounds with no breaks or holiday to try be the best in the world. This Competition has changed my life and I will cherish every moment forever. I will carry on what I do and reach new goals. I will be forever grateful to all who trained me and brought me up to world standard, and to all of those who supported me.

- Competitor, United Kingdom.

The results for the other five sets of factors are summarised in Table 5. Further details of the responses are included in the Annex to the report.

Table 5: Summary of Competitors' responses to triad questions

Triad focus	Summary of Competitor responses
Skill types	Technical and planning skills regarded as more important.
Difficulties and challenges	Managing to keep going and learning lots of new things were regarded as more challenging than satisfying trainers. Slightly more Competitors identified 'managing to keep going' as a challenge.
Motivating factors	Equal importance was given to the three factors: enjoying a challenge, learning new things, and wanting to succeed.
Self-perceptions about identity	Results show that in their stories more Competitors regarded themselves as a 'skilled worker' than as 'a student/apprentice'. A number selected a point towards 'master/expert', and a third cluster of responses suggest self-perceptions somewhere between 'skilled worker' and 'master/expert' ⁹ .
Important influences and reference points	The strongest cluster of responses was within the zone representing 'my WorldSkills training', with smaller numbers of responses in the 'workplace-family' domain. A strong cluster towards the middle of the triad indicates that the supportive roles of family and workplace are regarded by Competitors as important.

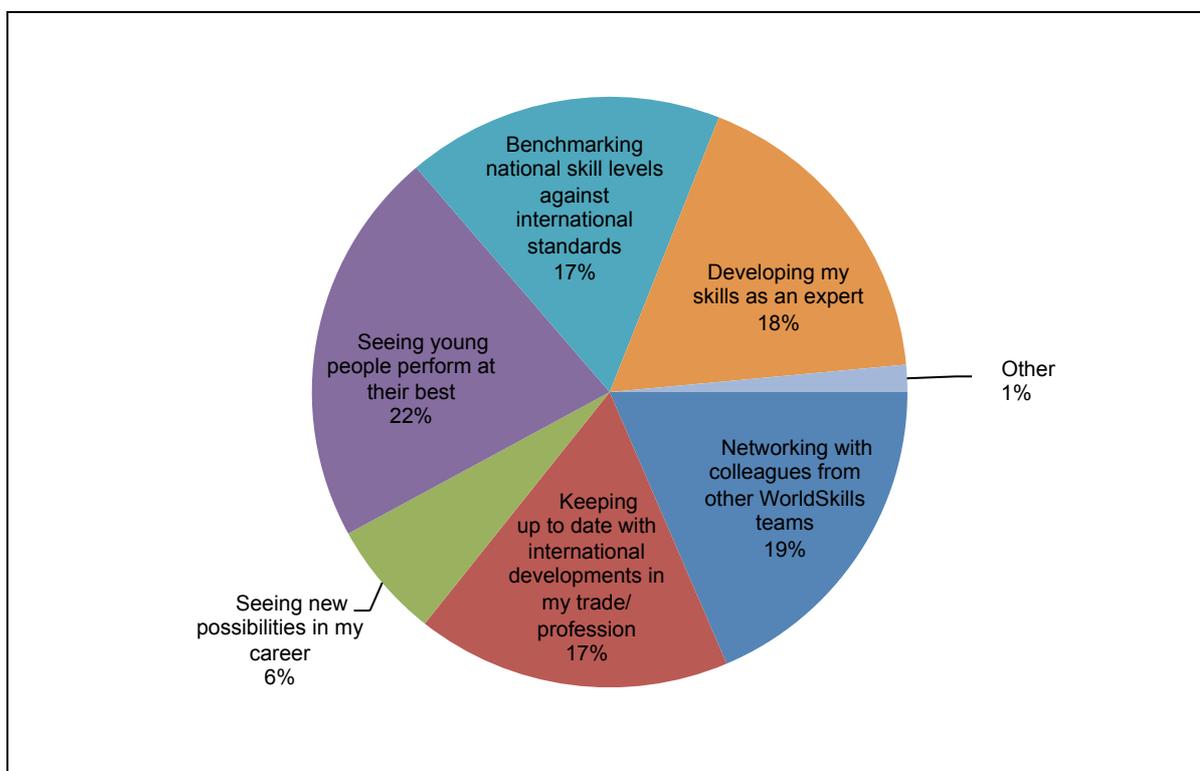
4.2.3 Exploring meanings in Experts' stories

Experts were asked to describe the experience they wrote about by selecting from six descriptive statements. Experts could select as many statements as were relevant. The findings from this question are shown in Figure 7.

⁸ Title removed to preserve the participant's anonymity.

⁹ Perceptions of identity are further explored in section 6.1 – Exploring emerging Competitor professional identity.

Figure 7: Experts' selections of descriptors for their stories – 'My experience was about'



The descriptions selected by Experts (see Table 6) are broadly consistent with dominant themes identified by the researchers' analysis of the narratives and discussed in section 4.2.1.

Table 6: Comparison of Experts' dominant themes and selected descriptors

Most dominant themes in Experts' narratives	Experts' selected descriptors for their stories
Learning and upskilling (17%)	Developing my skills as an expert (18%)
Networking (10%)	Networking with colleagues from other WorldSkills teams (19%)
Rewarding experience (10%)	Seeing young people perform at their best (22%)
Pleasant and enriching (9%)	
Knowledge exchange (8%)	Keeping up to date with international developments in my trade/profession (17%)
Benchmarking skills (8%)	Benchmarking national skill levels against international standards (17%)
Professional growth (4%)	Seeing new possibilities in my career (6%)

4.3 Rating the WorldSkills experience

The sense of engagement with, and belonging to, WorldSkills conveyed in the narratives is also borne out in the survey responses. For example, when Competitors and Experts were asked to rate their experience of WorldSkills, the majority (62 per cent of Competitors, and 63 per cent of Experts) said it was better than expected. A small minority (12 per cent of Competitors, and 6 per cent of Experts) found the experience disappointing – see Figure 8 and Figure 9 below.

Figure 8: Competitors' ratings of their WorldSkills experience

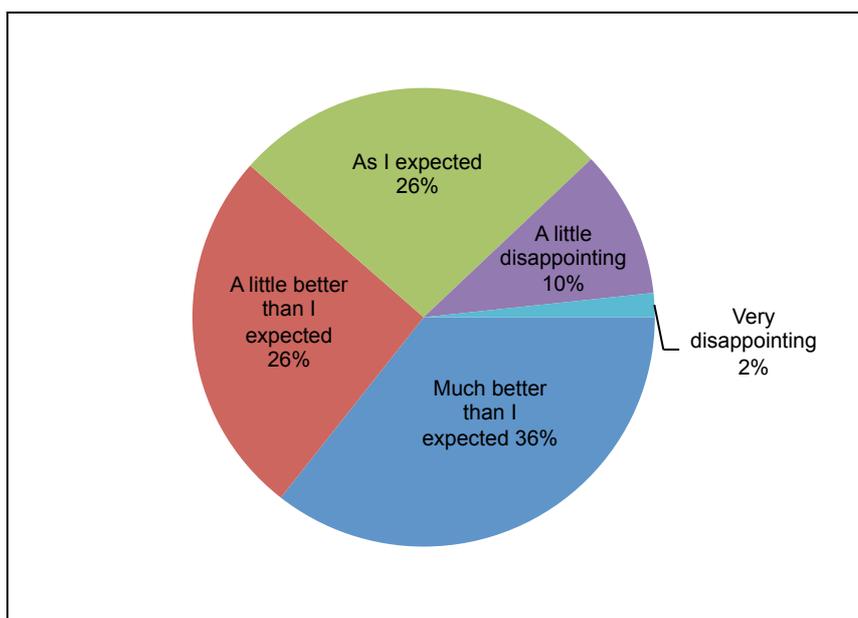
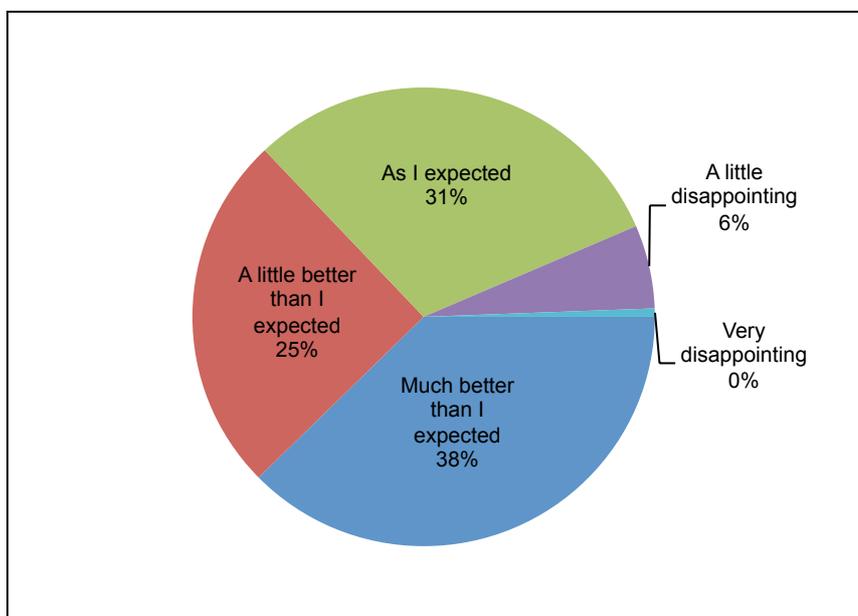


Figure 9: Experts' ratings of their WorldSkills experience



Competitors and Experts were also asked how important they thought WorldSkills would be to the next stage of their careers. Fifty-two per cent of Competitors thought WorldSkills would be significant to their careers, and 26 per cent thought it would be essential (see Figure 10), while 40 per cent of Experts selected 'significant' and 9 per cent selected 'essential' (Figure 11).

Figure 10: Competitors' ratings of the importance of WorldSkills to the next stage of their careers

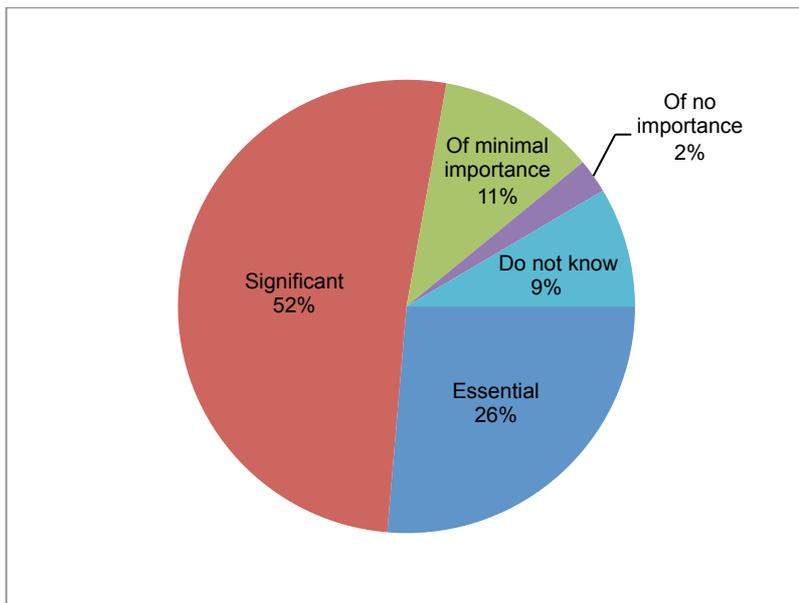
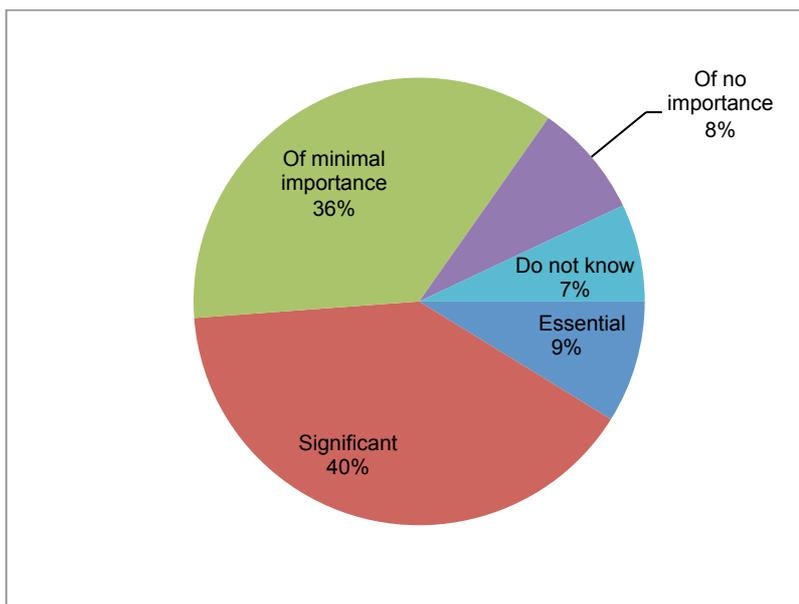


Figure 11: Experts' ratings of the importance of WorldSkills to the next stage of their careers



While Experts rated participation in WorldSkills as less important to their career than did Competitors, this may reflect the career position to which Experts have already advanced. Additionally, it should be noted that Experts' narrative responses and the themes they associated with their stories (as summarised in Figure 7 and Table 6 in the previous section) indicate clearly that participation in WorldSkills rates highly on other dimensions of importance to Experts. Note also that the number of Expert responses was quite small and may not be representative.

5 Characteristics of vocational excellence

This chapter of the report presents the results of the analysis of data from Part B of the survey which explores the characteristics of vocational excellence. The analysis is based on a conception of vocational excellence derived from the work of Gagné (2004, 2010) who developed a Differentiated Model of Giftedness and Talent (DMGT). Gagné's model distinguishes the two frequently intertwined concepts of giftedness and talent and comprises six components:

1. Chance (for example, genes)
2. Gifts (that is, intellectual, creative, socio-affective, sensorimotor, other natural abilities)
3. Intrapersonal characteristics (physical, motivation, volition, self-management, personality)
4. Environmental conditions (milieu, important persons, provisions, events)
5. Developmental processes (informal learning, formal learning, practicing)
6. Talents (systematically developed skills).

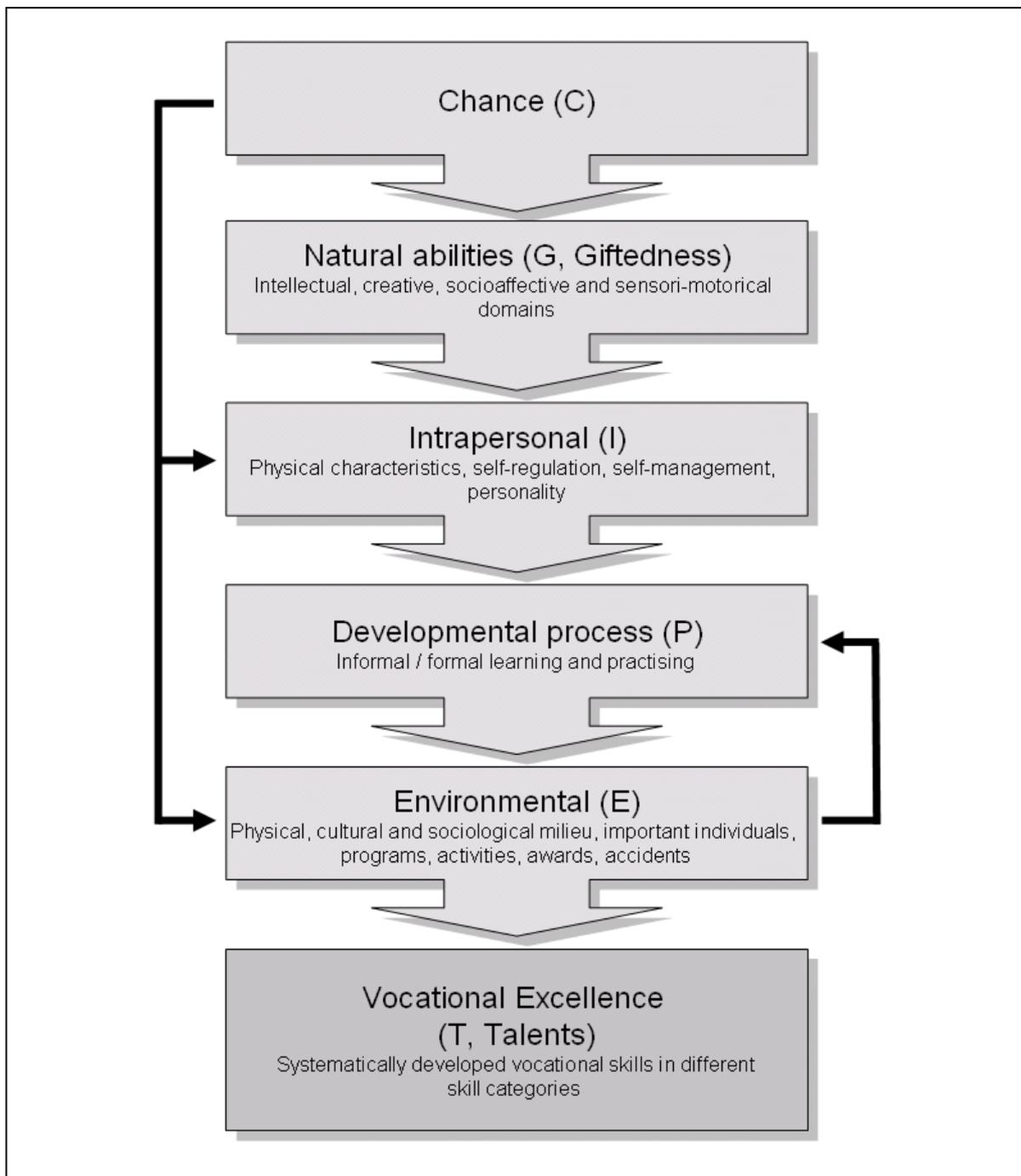
The causal order of these components is presented in Figure 12. According to Nokelainen (2012), chance (C) affects: natural abilities (gifts, G, such as intelligence, creativity, social skills, sensorimotor skills); intrapersonal characteristics (I, personal traits, self-regulation); and factors related to the environment (E, available hobby, leisure, and educational opportunities). Thus, one's natural abilities determine one's eligibility to successfully practice a profession. For example:

- a plumber must have bodily-kinesthetic abilities, such as muscular strength
- a programmer must have logical-mathematical thinking abilities
- a hairdresser must have both bodily-kinesthetic and social abilities.

Intrapersonal characteristics regulate both one's interest in a certain vocational skill, and one's commitment to deliberate practice to become an expert in the field. Deliberate practice is the development process that incrementally improves skills. The amount and quality of informal practice (that is, practice carried out on one's own time), and in formal practice (that is, instructed practice) both affect the level of professional field-specific knowledge and skills one will be exposed to. Environmental factors, such as one's parents' educational background, family, friends, and place of residence, affect one's choice of profession¹⁰.

¹⁰ Further details of this theoretical framework are provided in the Annex to this report – see section 1.1.

Figure 12: Causal order of components in the Development of Vocational Excellence (Nokelainen 2012, adapted from Gagné 2004, p. 121)



Results for Competitor self-ratings on the characteristics of excellence are presented in relation to the model of vocational excellence as follows:

- Section 5.1 – Multiple intelligences
- Section 5.2 – Ethical sensitivities
- Section 5.3 – Domain and non-domain specific influential factors
- Section 5.4 – Domains of expertise
- Section 5.5 – Goal orientation
- Section 5.6 – Self-regulation.

5.1 Multiple intelligences

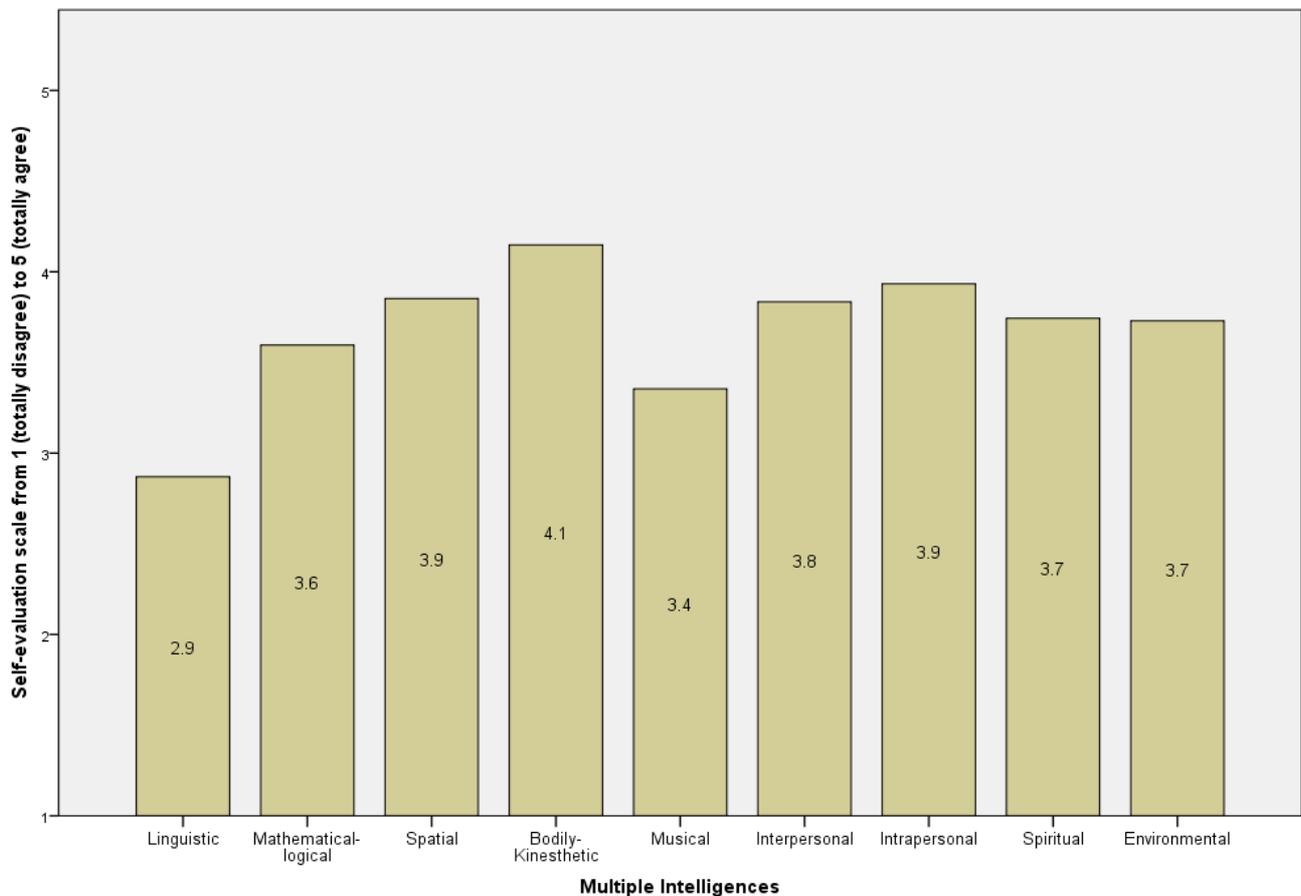
Competitors were asked to rate themselves on a five point scale (1 = totally disagree, 5 = totally agree) on a series of items that measured nine dimensions of ability (for details, see Tirri & Nokelainen 2011; Nokelainen 2012) based on Howard Gardner's multiple intelligences theory (Gardner, 1983). The survey questions used to measure each dimension are listed below.

Table 7: Survey questions aligned with Gardner's dimensions of ability

Gardner's dimensions of ability	Survey questions
1. Linguistic	Writing is a natural way for me to express myself
2. Mathematical-logical	At school, I was good at mathematics, physics or chemistry
3. Spatial	It is easy for me to conceptualize complex and multidimensional patterns
4. Bodily-kinesthetic	I can easily do something practical with my hands, e.g., knitting and woodwork
5. Musical	When listening to music, I am able to pick out individual instruments and recognize melodies
6. Interpersonal	I connect easily with other people
7. Intrapersonal	I am able to analyse my own motives and ways of action
8. Spiritual	In my busy everyday life I find it important to take time to think and reflect
9. Environmental	Protecting the environment is important to me

Figure 13 shows the average ratings for each of the nine dimensions.

Figure 13: Competitors' self-evaluations of their multiple intelligences

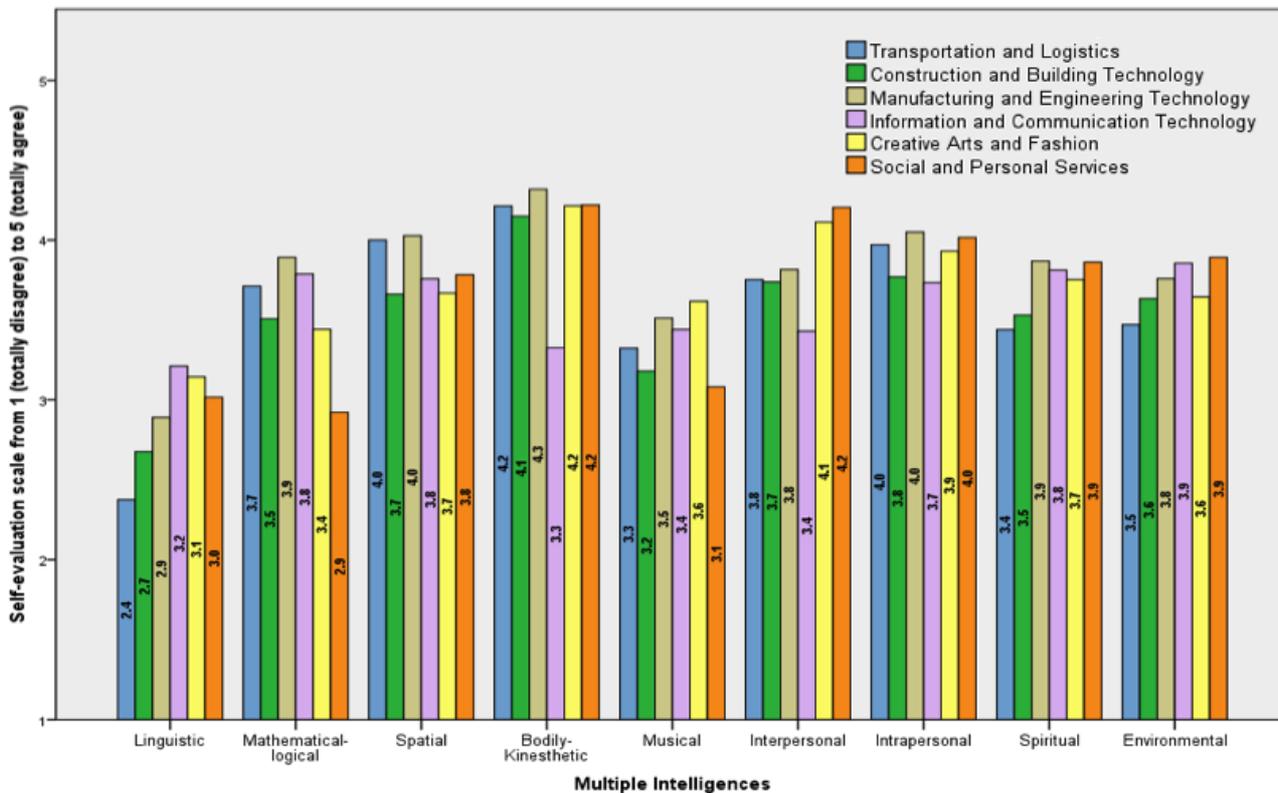


^a $n=409$ with 397 (97%) usable responses and 12 (3%) missing responses.

Most dimensions were rated highly (between 3 and 5 on the scale), with bodily-kinesthetic abilities ranked highest ($M=4.1$) and linguistic abilities the lowest ($M=2.9$).

The distribution of average scores by the six WorldSkills sectors is presented in Figure 14.

Figure 14: Multiple intelligences by WorldSkills sectors



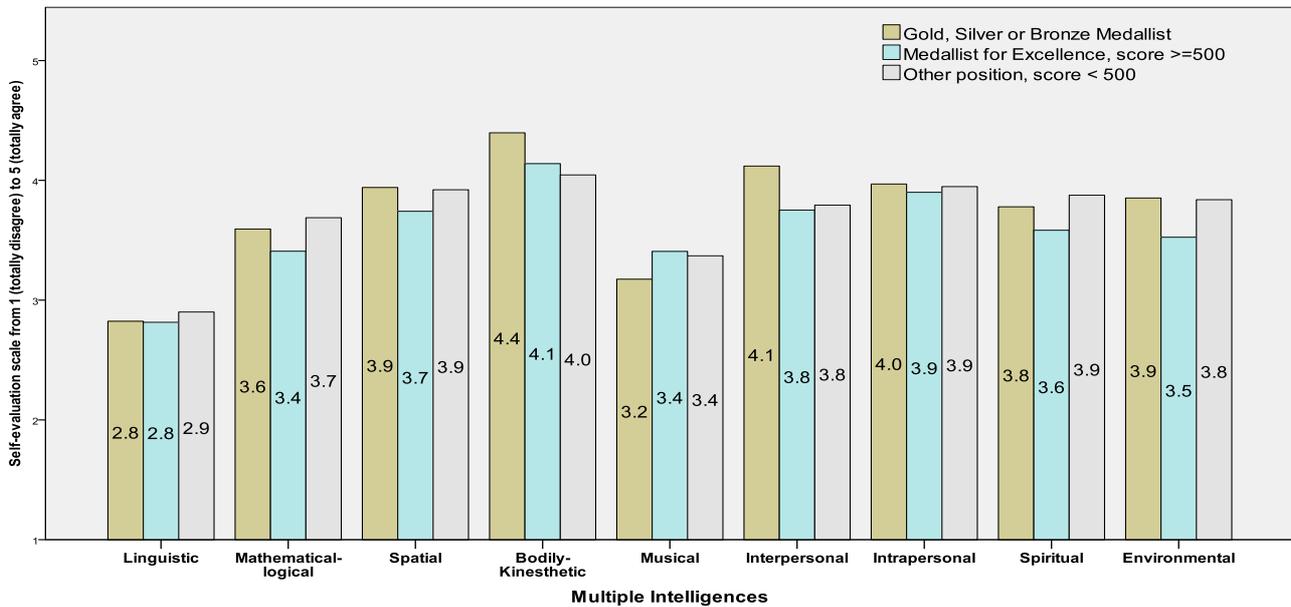
This analysis shows that:

- linguistic and intrapersonal (social) intelligences have a more important role in service occupations such as those covered by the following WorldSkills sectors:
 - Information and Communication Technology (for example, Offset Printing and Web Design)
 - Creative Arts and Fashion (for example, Floristry and Jewellery)
 - Social and Personal Services (for example, Restaurant Service and Hairdressing)
- mathematical-logical intelligence is least important in skills covered by the Social and personal Services sector
- bodily-kinesthetic and interpersonal intelligences are least important in skills covered by the Information and Communication Technology sector
- musical intelligence is strongest in Creative Arts and Fashion sector, and weakest in Social and Personal Services sector.

Figure 15 shows multiple intelligences mean scores for three groups of Competitors:

- Group 1 comprises gold, silver and bronze medallists ($n=71$, 20%)
- Group 2 comprises Medallion for Excellence winners ($n=125$, 35%)
- Group 3 comprises Competitors who achieved below 500 points ($n=157$, 45%).

Figure 15: Multiple intelligences by success in WorldSkills London 2011



The data show that medal winners (Group 1) evaluated their bodily-kinesthetic ('practical') and interpersonal ('social') capabilities higher than did other Competitors. The difference in interpersonal intelligence was statistically significant [$\chi^2(2, 342)=7.600, p=.022$].

5.2 Ethical sensitivities

Measures of ethical sensitivities are based on a theory developed by Darcia Narvaez (1993) and assess Competitors' orientations on ethical issues. Ethical sensitivities are operationalised in this study with the six dimensions shown below, along with the survey questions used to measure each dimension (for more details, see Tirri & Nokelainen 2011).

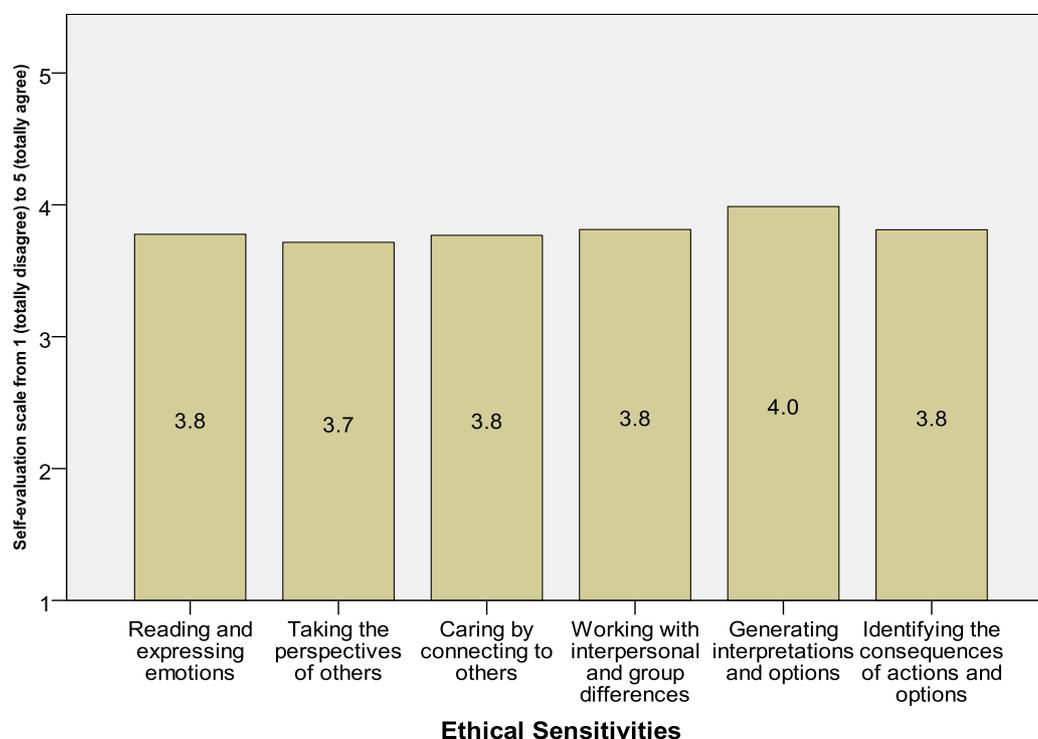
Table 8: Survey questions aligned with ethical sensitivities dimensions

Ethical sensitivities dimensions	Survey questions
1. Reading and expressing emotions	I notice if someone working with me is offended at me
2. Taking the perspectives of others	I get along with people who think in different ways than me
3. Caring by connecting to others	I feel responsible for other people's well-being
4. Working with interpersonal and group differences	I take other peoples' viewpoints into account before making important decisions in my life
5. Generating interpretations and options	I think about the consequences of my actions when making ethical decisions
6. Identifying the consequences of actions and options	I notice when I am facing an ethical issue at school, WorldSkills training or work

The results of the analysis of ethical sensitivities are shown in Figure 16, Figure 17 and Figure 18.

Figure 16 shows the average ratings for each of the ethical sensitivity dimensions.

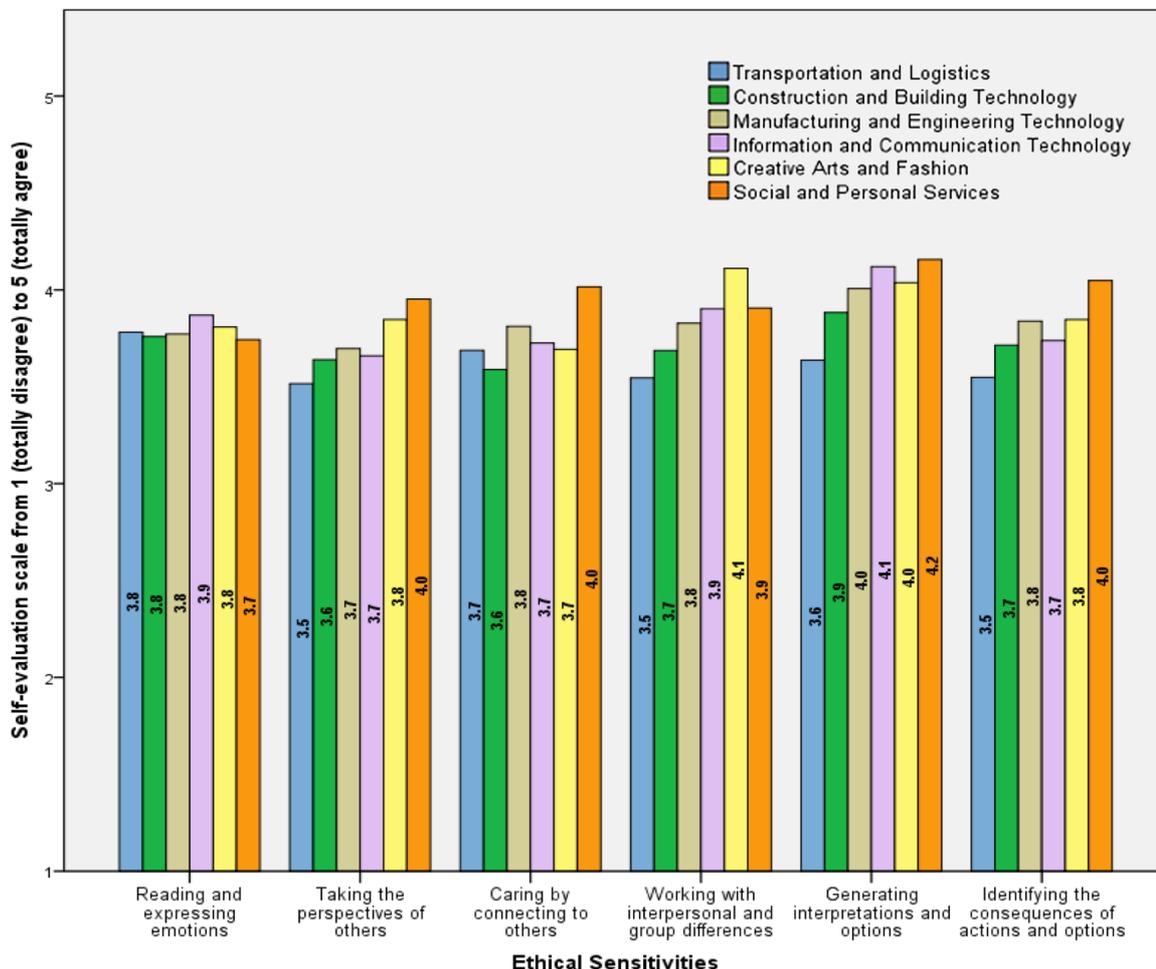
Figure 16: Competitors' self-evaluations of their ethical sensitivities



The pattern of results shows that Competitors' self-evaluations were similar across the six dimensions.

The distribution of average scores on ethical sensitivities for the six WorldSkills sectors is presented in Figure 17.

Figure 17: **Ethical sensitivities by WorldSkills sectors**



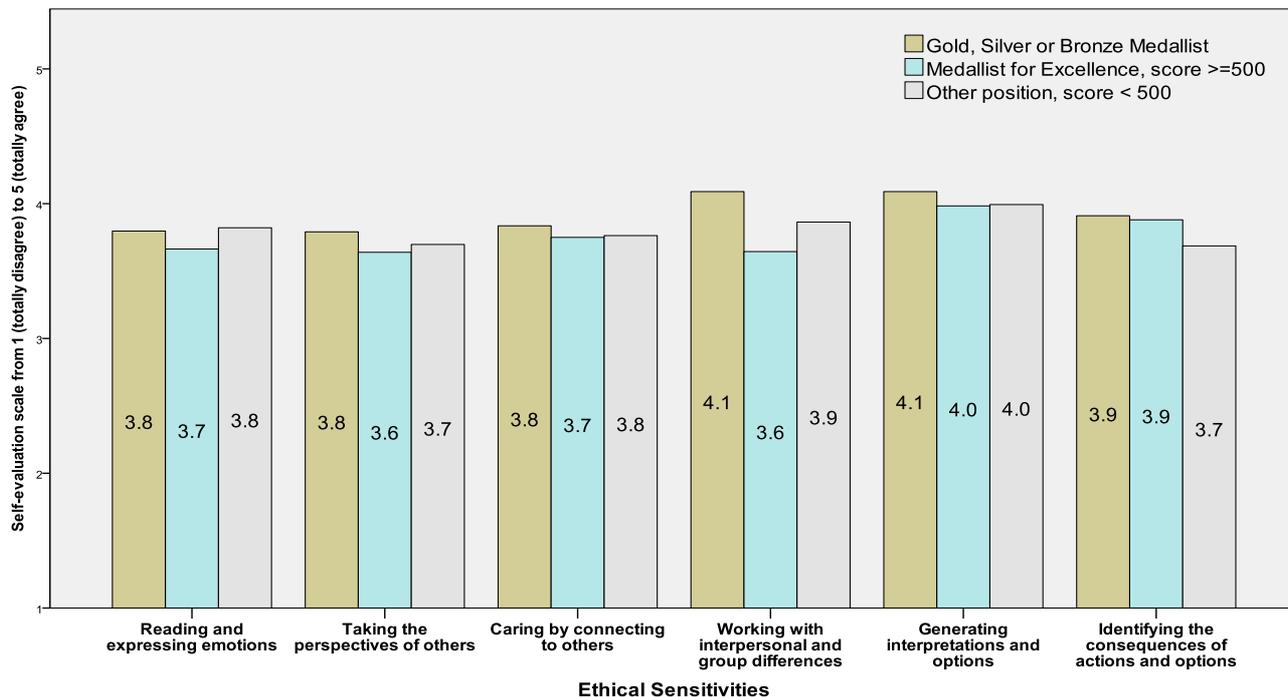
The results in Figure 17 show the following differences between sectors:

- Competitors in the Social and Personal Services sector (for example, Cooking and Beauty Therapy) have self-evaluated their ethical skills to be the highest on four out of six dimensions
- Competitors in the sectors of Transportation and Logistics (for example, Automobile Technology and Autobody Repair) and Construction and Building Technology (for example, Landscape Gardening and Carpentry) have the lowest averages on all except one ethical sensitivity dimension (Reading and expressing emotions).

Figure 18 represents ethical sensitivities mean scores for the three groups of Competitors:

- gold, silver and bronze medalists
- Medallion for Excellence winners
- Competitors who received less than 500 points.

Figure 18: Ethical sensitivities by success in WorldSkills London 2011



The results do not show any remarkable differences between the three groups. However, gold, silver and bronze medal winners did have the highest average self-evaluation scores on all ethical sensitivity dimensions. The following differences between the groupings are identified:

- Group 1 (medallists) reported statistically significant higher ability to work with interpersonal and group differences than did the two other groups [$\chi^2(2, 333)=9.254, p=.01$]
- Group 3 (less than 500 points) had a slightly lower average ($M=3.7$) than Groups 1 and 2 on the sixth dimension (Identifying the consequences of actions and options).

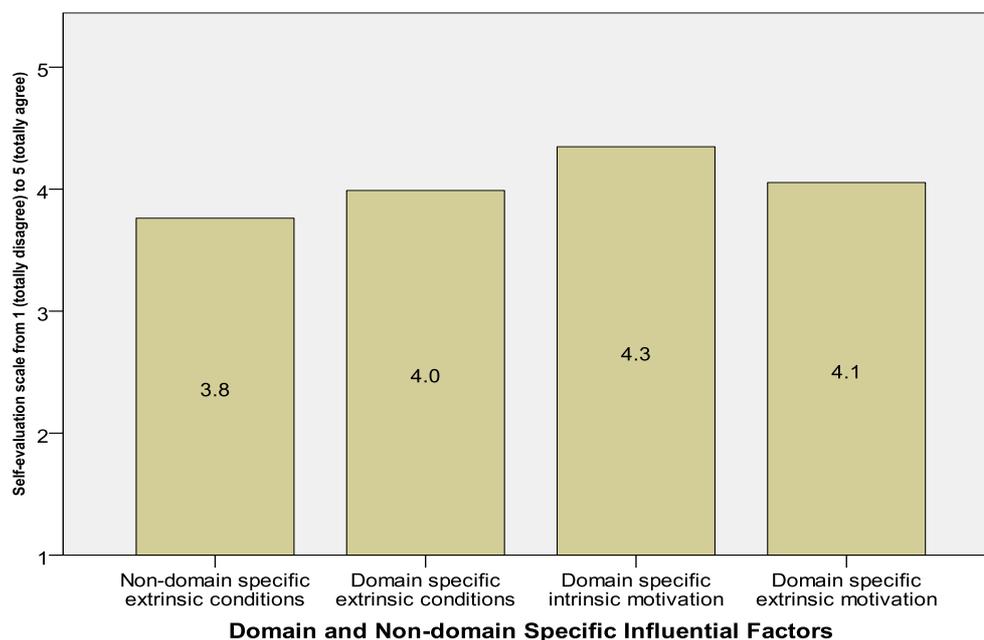
5.3 Domain and non-domain specific influential factors

Domain specific factors relate directly to skills, such as welding or hairdressing, while non-domain-specific factors, such as family and friends, are not directly related to vocational talent development. These four dimensions are based on research by Campbell (1996) and Nokelainen (2012):

1. non-domain specific extrinsic conditions (for example, 'An encouraging home atmosphere')
2. domain specific extrinsic conditions (for example, 'Seeing impressive demonstrations of skill')
3. domain specific intrinsic motivation (for example, 'My own interest in the field')
4. domain specific extrinsic motivation (for example, 'Interest in competing with others in vocational skills').

Figure 19 shows average ratings for each of the four dimensions.

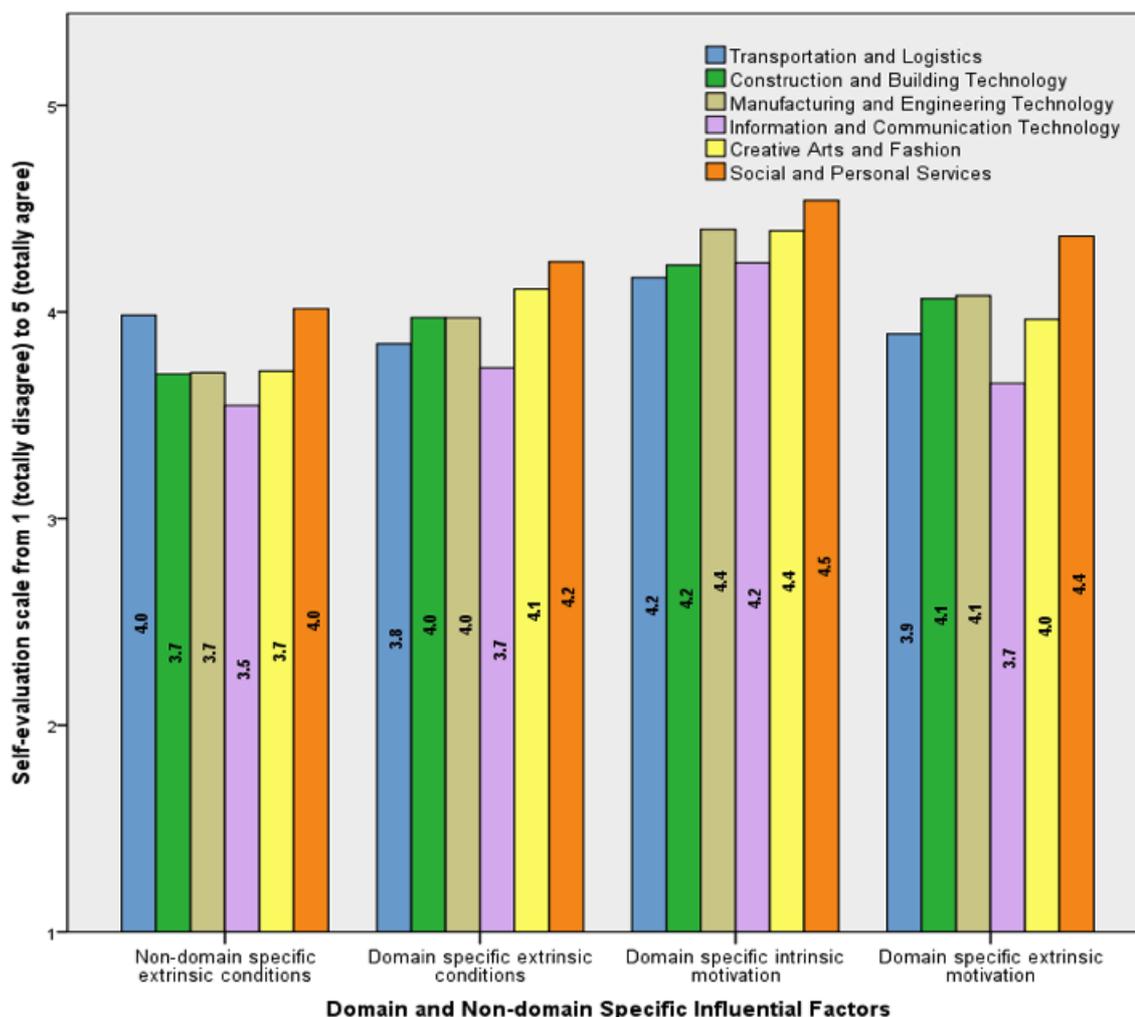
Figure 19: Competitors' self-evaluations of domain and non-domain specific influential factors



Domain specific intrinsic motivation was rated highest ($M=4.3$, $SD=.764$), and non-domain specific extrinsic conditions were rated lowest ($M=3.8$, $SD=.930$).

The distribution of average scores on influential factors for the six WorldSkills sectors is presented in Figure 20.

Figure 20: Domain and non-domain specific influential factors by WorldSkills sectors



The data here indicate that:

- Competitors in the sectors of Transportation and Logistics (for example, Aircraft Maintenance and Car Painting) and Social and Personal Services (for example, Bakery and Caring) reported having had more support from non-domain related individuals (family, friends) to take part in WorldSkills training than did other competitors
- Social and Personal Services Competitors' average scores were somewhat higher on all four dimensions.

Figure 21 represents average scores on domain and non-domain specific influential factors for the three groups of competitors, categorised by their success in WorldSkills London 2011.

Figure 21: Domain and non-domain specific influential factors by success in WorldSkills London 2011

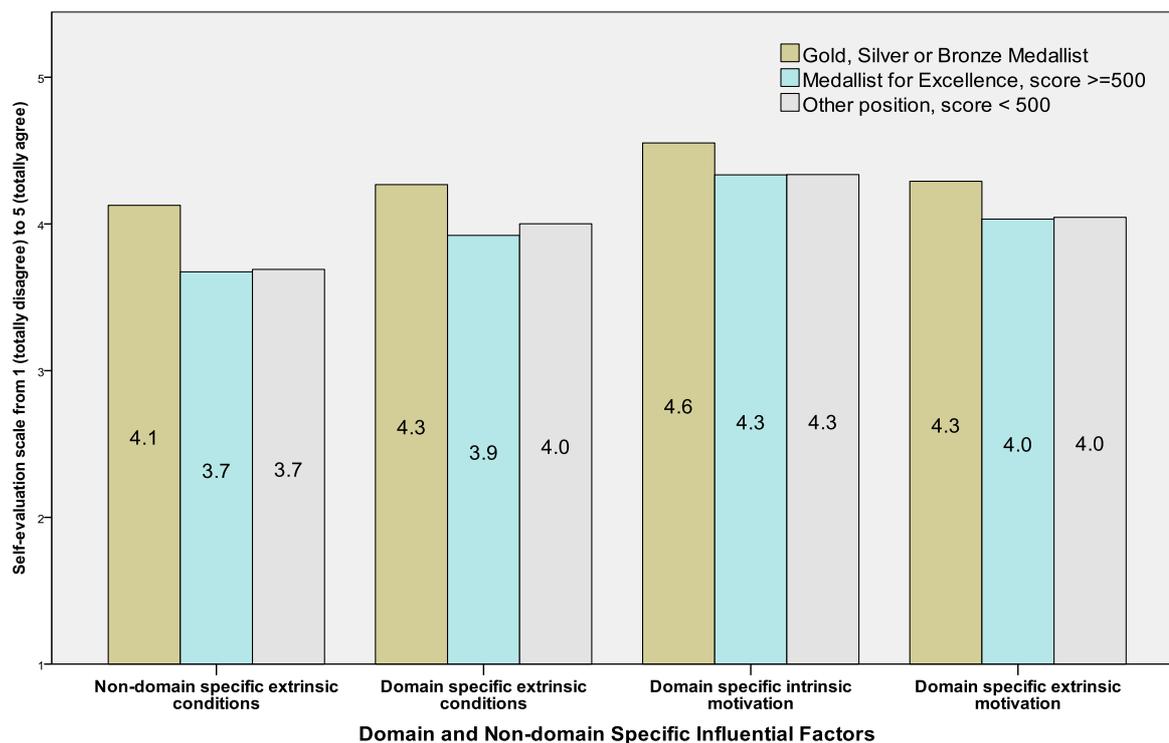


Figure 21 shows clearly that medal winners rated all four motivational factors highest. Their difference to the two other groups is statistically significant for both non-domain specific extrinsic conditions [$\chi^2(2, 342)=13.325, p=.001$] and domain specific extrinsic conditions [$\chi^2(2, 343)= 9.231, p=.01$].

5.4 Domains of expertise

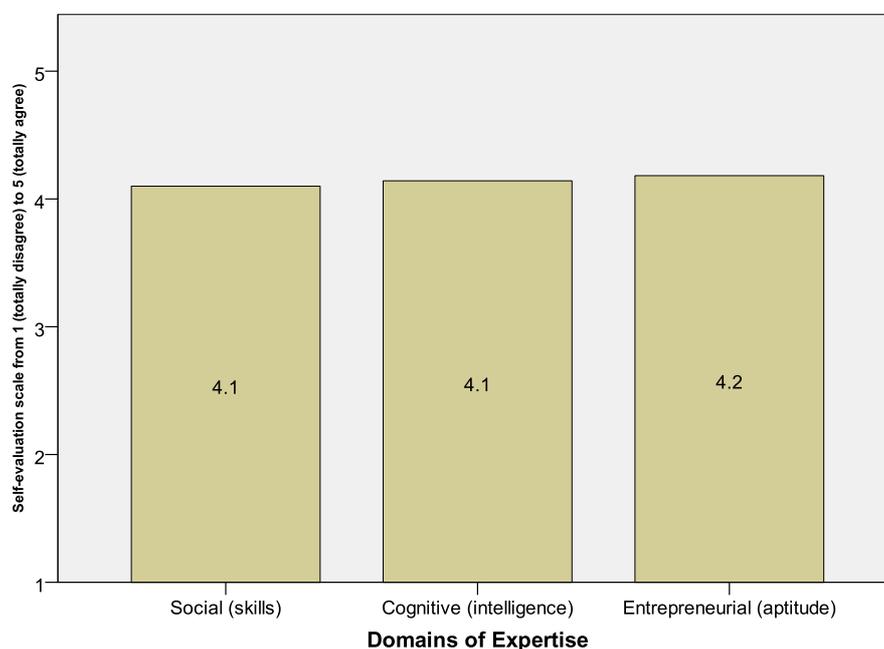
Earlier research (Nokelainen 2012) indicates that essential abilities to succeed in WorldSkills training can be divided into the following three domains of expertise:

- domain 1: social (for example, 'Bounce back from failures or injustices')
- domain 2: cognitive ('Apply new work methods')
- domain 3: entrepreneurial ('See problematic work tasks as positive challenges').

Domain 1 represents skills; domain 2 represents intelligence; and domain 3 represents aptitude.

Figure 22 shows average ratings for each of these three dimensions.

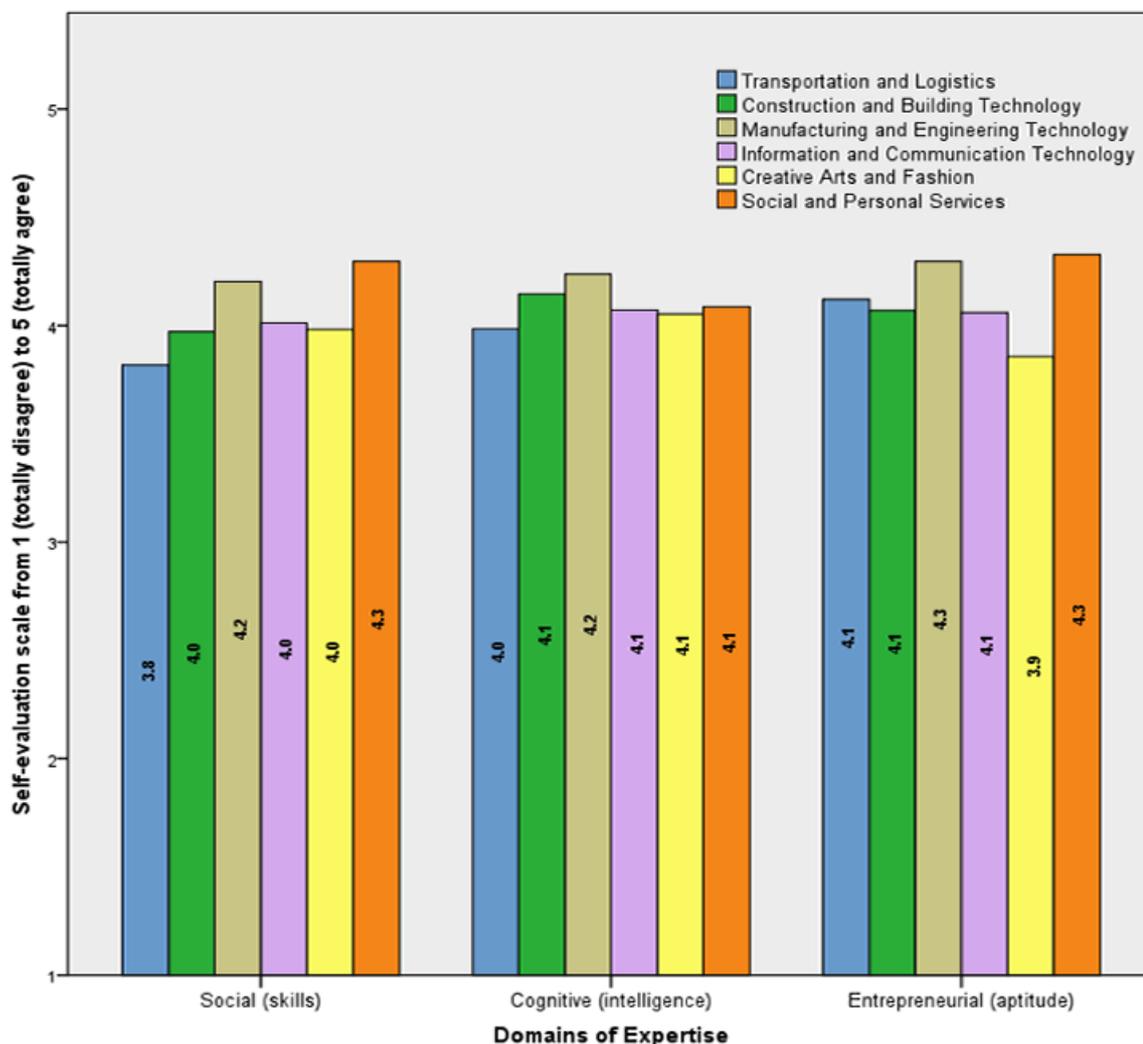
Figure 22: Competitors' self-evaluations of domains of expertise



Competitors rated themselves highly on all three domains ($M=4.1-4.2$). This represents a coherent result as the standard deviations are quite small ($SD=.748 - .793$).

The distribution of average scores on domains of expertise for the six WorldSkills sectors is presented in Figure 23.

Figure 23: Domains of expertise by WorldSkills sectors

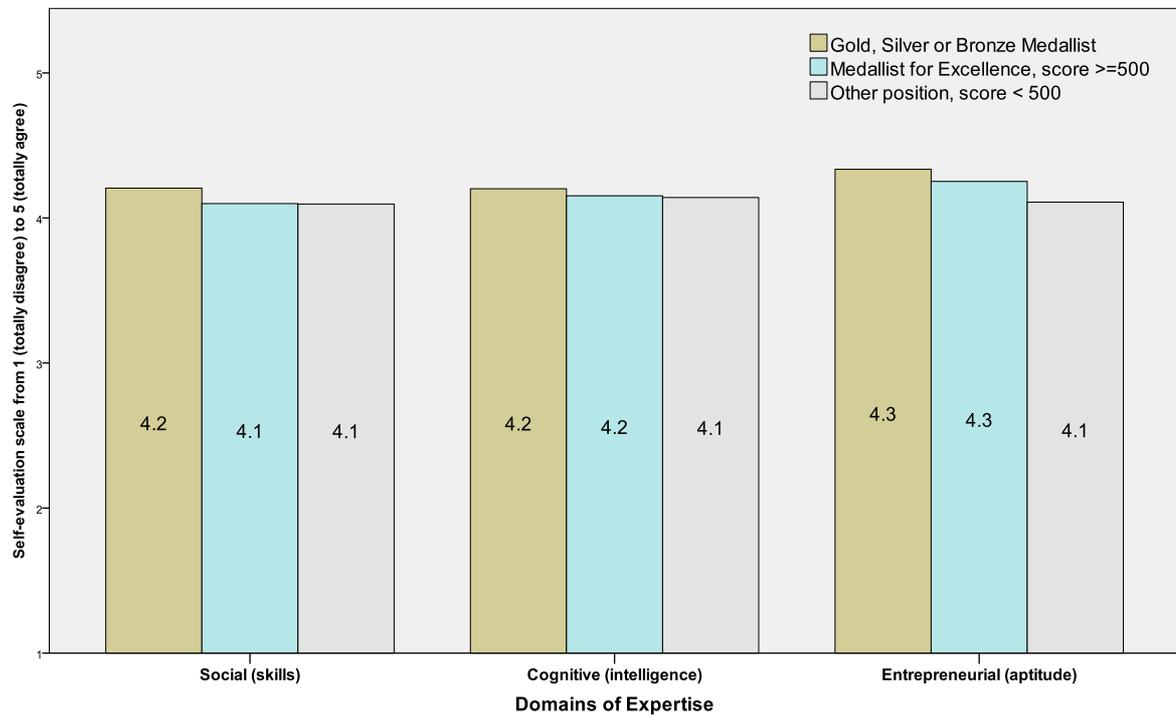


The results show that:

- social skills seem to be most important in Social and Personal Services (for example, Bakery and Caring), and Manufacturing and Engineering Technology (which includes the teamwork skill of Manufacturing Team Challenge)
- Competitors in the Manufacturing and Engineering Technology sector reported high averages on all three domains of expertise
- Competitors in the Social and Personal Services sector reported high averages in social and entrepreneurial categories.

Figure 24 represents domains of expertise mean scores for the three groups of Competitors, categorised by their success in WorldSkills London 2011.

Figure 24: Domains of expertise by success in WorldSkills London 2011



The results show that average scores for all three Competitor groups are quite high ($M=4.1-4.3$). However, self-evaluations by gold, silver and bronze medallists, and Medallion for Excellence winners, on their entrepreneurial abilities were statistically significantly higher compared to other Competitors [$\chi^2(2, 343)=6.700, p=.035$].

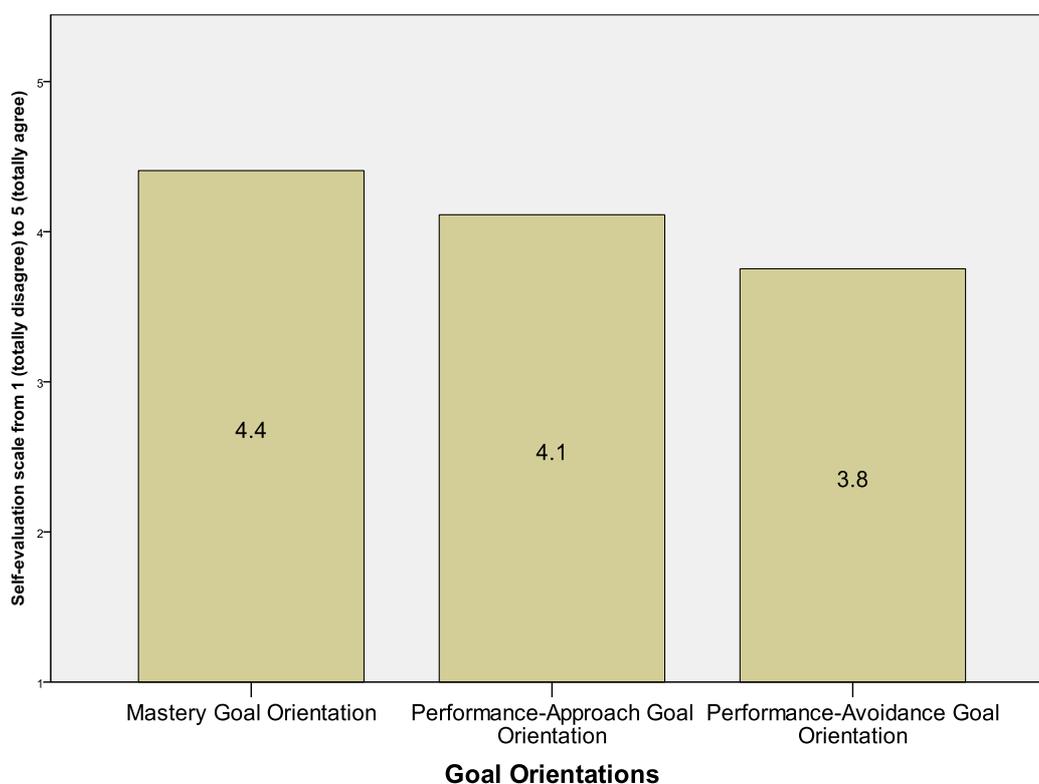
5.5 Goal orientation

Goal orientation relates to Competitors' reasons for learning new work methods as thoroughly as possible, for showing others their level of expertise, and for seeking or avoiding new challenges related to WorldSkills training. Goal orientation theory (for example, Ames 1992) operationalises these concepts into the following three categories:

1. mastery goal-orientation (for example, 'I want to be as good as possible in my own skill')
2. performance-approach goal orientation (for example, 'My aim is to show others that I am in the top level in my skill')
3. performance-avoidance goal orientation (for example, 'I avoid showing others if I am facing difficulties in WSC training exercises').

Figure 25 shows the average ratings for each of the three dimensions.

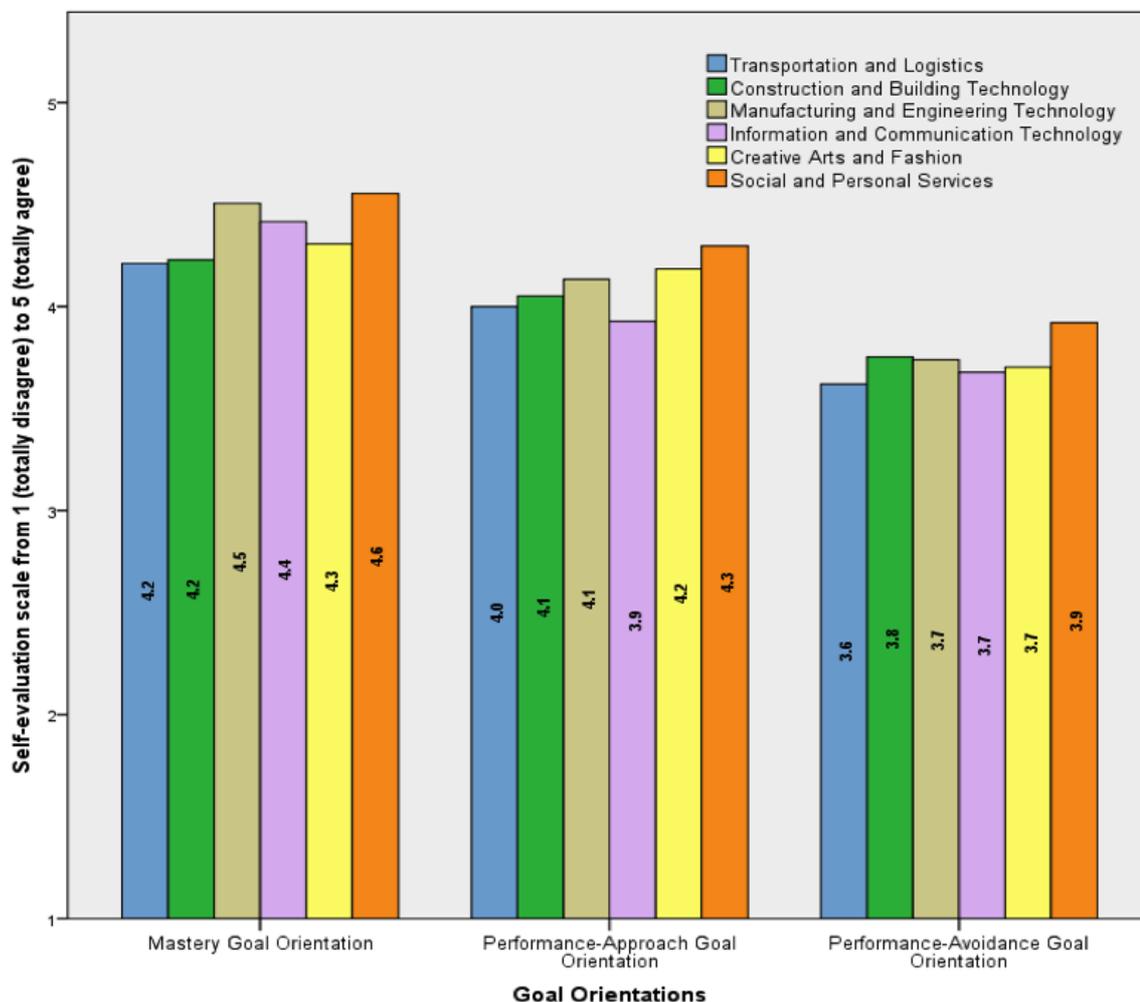
Figure 25: Competitors' self-evaluations of goal orientation



Mastery goal orientation and performance-approach goal orientation are rated higher than performance-avoidance goal orientation (that is, the tendency to avoid situations where there is an increased risk of failure in front of others). This finding is expected as the sample consists of individuals who have chosen to compete in skill competitions.

The distribution of average scores on goal orientation for the six WorldSkills sectors is presented in Figure 26.

Figure 26: Goal orientation by WorldSkills sectors

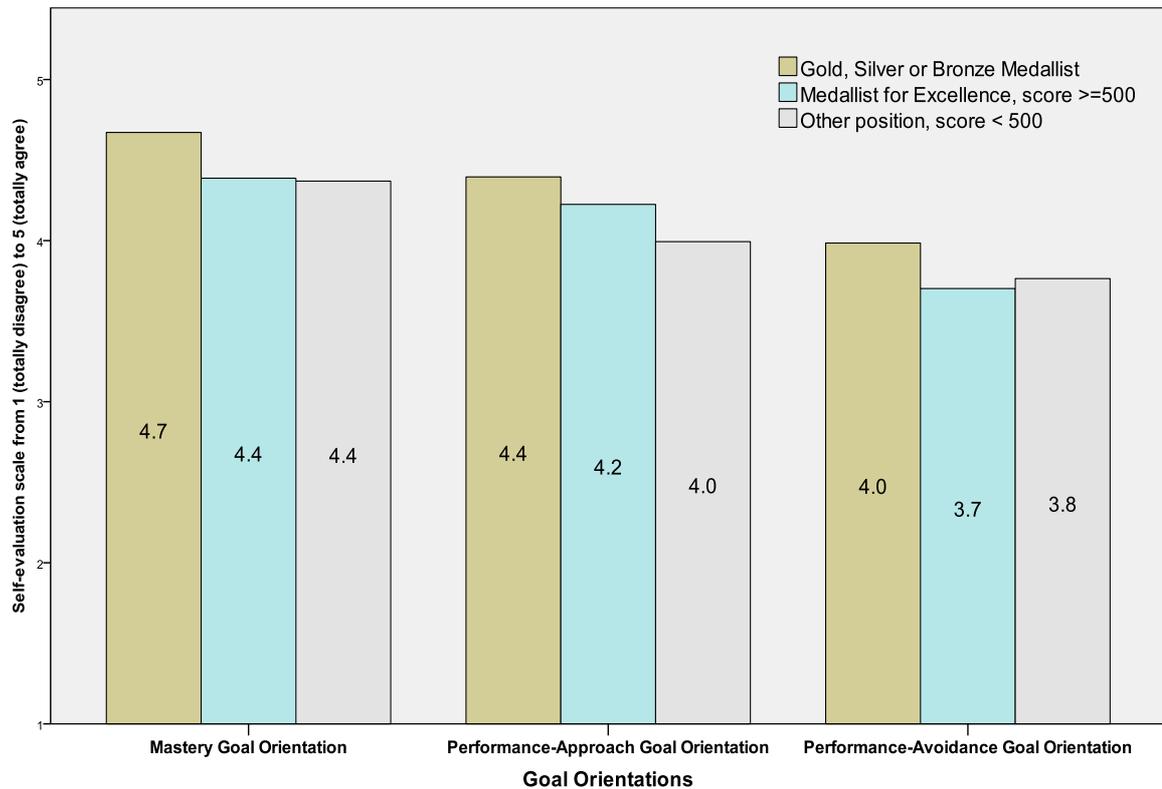


The results show that:

- Competitors have higher mastery (to learn things as deeply as possible) and performance goal orientations (to be as respected as possible) than performance-avoidance goal orientation (fear of doing things badly in front of others)
- Competitors in Social and Personal Services sector (for example, Bakery and Caring) appear to have high mastery and performance-approach goal orientations in this sample, but also the highest performance-avoidance goal orientation.

Figure 27 represents goal orientation mean scores for the three groups of Competitors, categorised by their success in WorldSkills London 2011.

Figure 27: Goal orientation by success in WorldSkills London 2011



The results of statistical analysis showed that medal winners had statistically significant higher self-reported mastery goal orientation than the two other groups of Competitors [$\chi^2(2, 343)=11.095, p=.004$]. Another statistically significant finding was that medal winners, together with Medallion for Excellence winners, had higher self-reported level of performance-approach goal orientation than did their non-winning peers [$\chi^2(2, 343)=14.204, p=.001$].

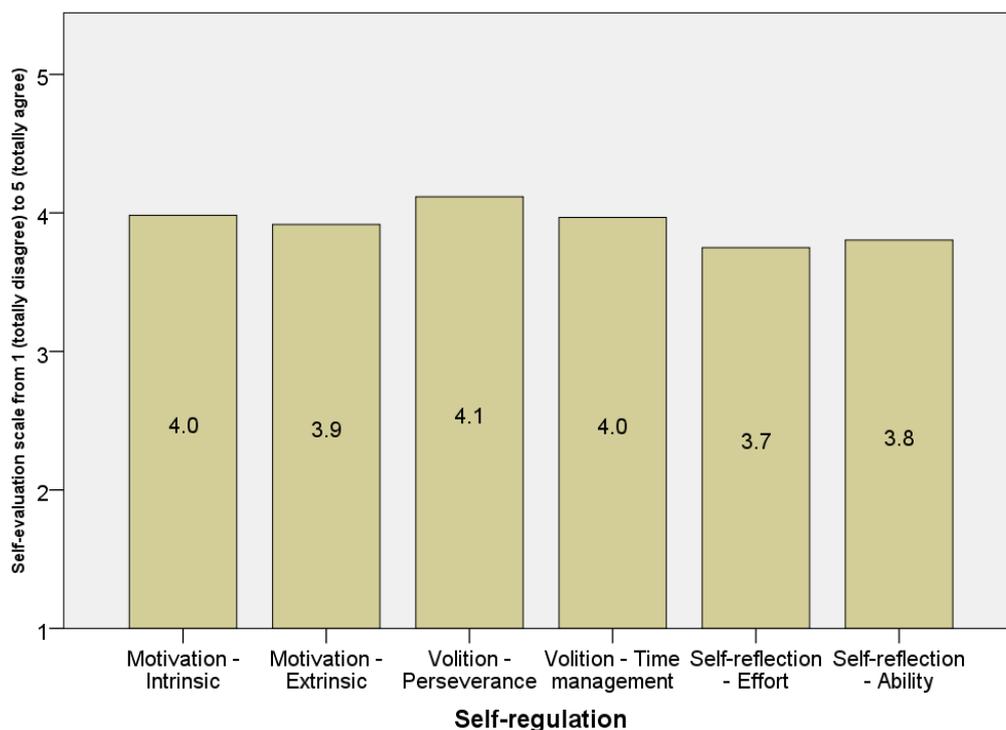
5.6 Self-regulation

Measures related to self-regulation are based on the Motivated Strategies for Learning Questionnaire by Paul Pintrich and his colleagues (1991), but adapted for vocational education (Abilities for Professional Learning Questionnaire; for details, see Nokelainen & Ruohotie 2002). In this study, we used six dimensions to measure participants' self-regulation. These dimensions are shown below with examples of the questions used to measure Competitor responses:

1. motivation – intrinsic (for example, 'I prefer to try challenging work methods from which I can learn something new')
2. motivation – extrinsic (for example, 'I want to be number one in my skill in the WorldSkills 2011 Competition')
3. volition – perseverance (for example, 'I am focused')
4. volition – time management (for example, 'I set clear goals for my learning')
5. self-reflection – ability (for example, 'I am confident that I will master even the most difficult work methods in my WSC training')
6. self-reflection – effort (for example, 'I am able to learn even the most difficult work methods if I practice hard enough').

Figure 28 shows average ratings for each of the six self-regulatory dimensions.

Figure 28: Competitors' self-evaluations of self-regulation



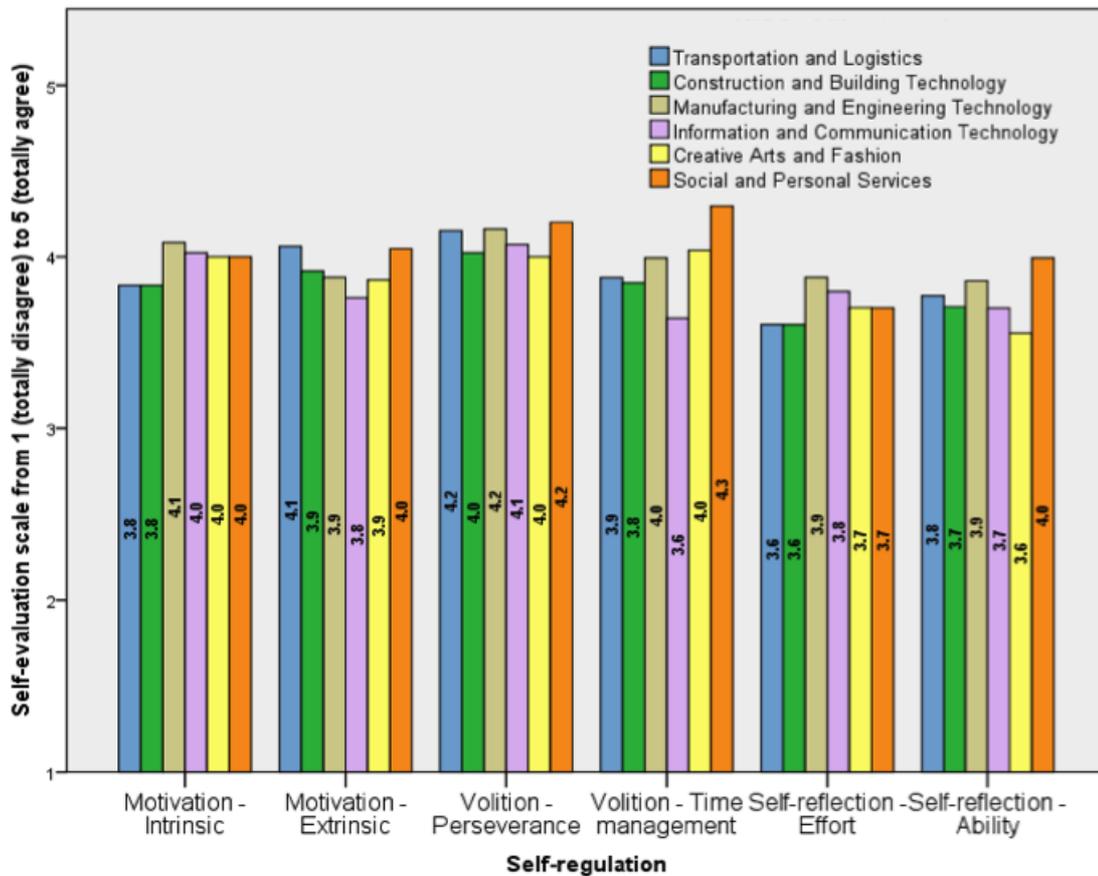
According to Competitors' self-evaluation of their self-regulation, the will to perform and complete each task at hand (Volition) has the highest mean value ($M=4.1$). The other five dimensions also have high mean values.

It is interesting to note at this point that:

- intrinsic motivation is self-reported as slightly more important than extrinsic motivation
- success due to ability is reported as more important than success due to effort.

Distribution of mean scores on self-regulation for the six WorldSkills sectors is presented in Figure 29.

Figure 29: Self-regulation by WorldSkills sectors

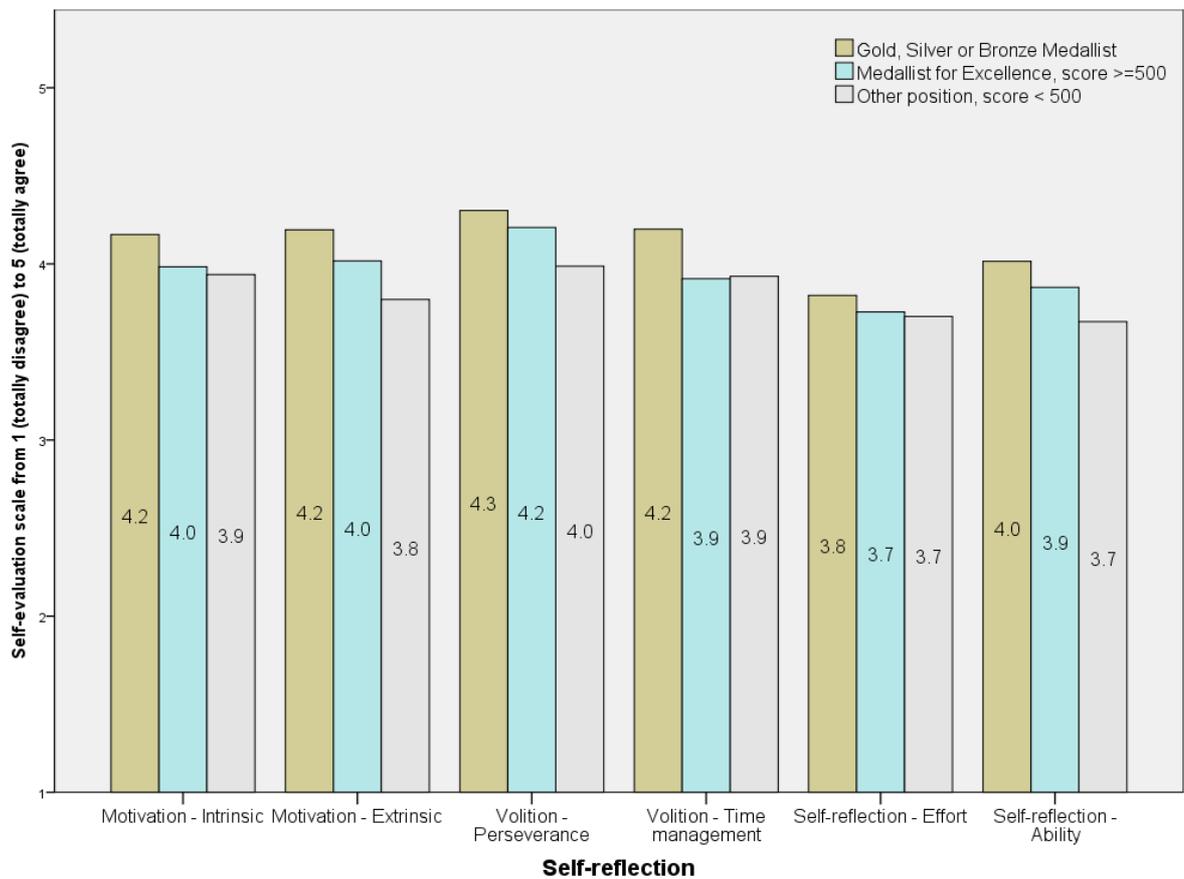


Data in Figure 29 indicate that:

- Competitors in the sectors of Transportation and Logistics (for example, Aircraft Maintenance and Car Painting) and Social and Personal Services (for example, Bakery and Caring) have the highest mean values in extrinsic motivation.
- Competitors in the sector of Social and Personal Services reported having volitional abilities (perseverance and time management). They also reported the highest score for belief in success due to ability.

Figure 30 represents self-regulation mean scores for the three groups of Competitors, categorised by their success in WorldSkills London 2011.

Figure 30: Self-regulation by success in WorldSkills London 2011



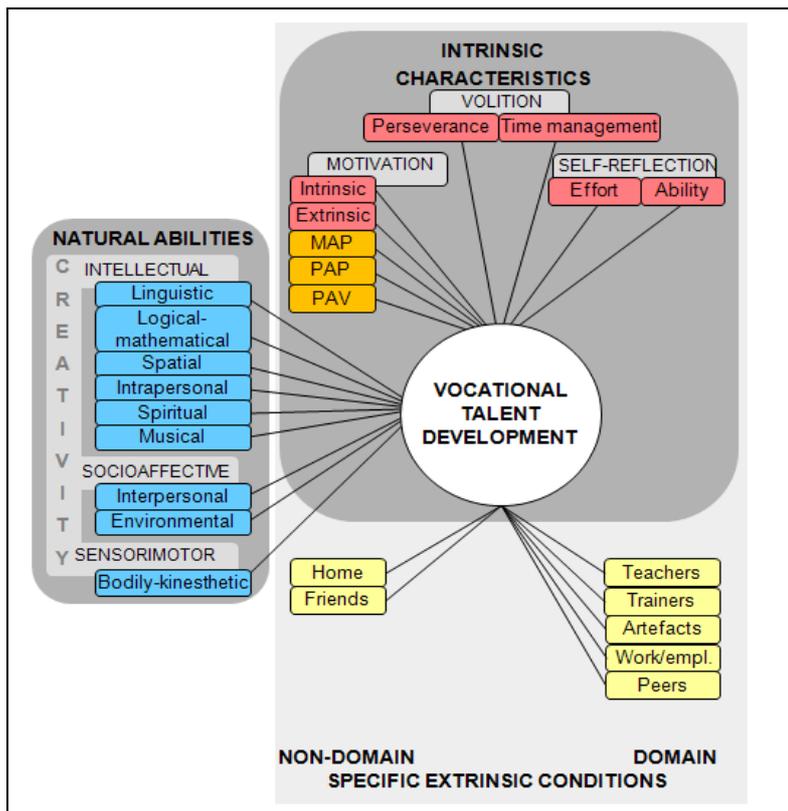
Medal winners rated all six self-regulatory dimensions higher than did other Competitors. Results of statistical analysis showed that medal winners had the highest self-reported level of extrinsic motivation [$\chi^2(2, 341) = 11.080, p = .004$]. They also reported the highest average rating for success due to ability [$\chi^2(2, 341) = 8.104, p = .017$]. Medalists and Medallion for Excellence winners both had higher self-reported levels of volition (perseverance) than did other Competitors [$\chi^2(2, 342) = 8.777, p = .012$].

5.7 Summary: Developmental Model of Vocational Talent

The Developmental Model of Vocational Talent, based on the concepts discussed in sections 5.1-5.6, is shown in Figure 31. The model incorporates the three main components related to vocational talent development:

1. natural abilities (multiple intelligences)
2. intrinsic characteristics (goal orientations, self-regulation)
3. extrinsic conditions (domain and non-domain specific influential factors).

Figure 31: Developmental Model of Vocational Talent



An important feature of the Model is that it can be used with empirical samples to investigate how factors relate to a variable that is believed to be a valid indicator of the level of vocational talent.

In the current study, an indicator variable for vocational talent is the results of Competitors in WorldSkills London 2011, which ranged from 411 to 588 points. High performance in the WorldSkills Competitions is set at 500 points which earns a Medallion for Excellence. In our sample of 409 Competitors, 196 (48 per cent) achieved this level. Less than 20 per cent of Competitors in this study won gold, silver or bronze medals ($n=71$). These highly successful Competitors were labelled as the 'A group'. In this study, they represent 'vocational excellence'. The study also contained 157 Competitors who achieved less than 500 points. They were labelled as the 'C group'. They represent 'vocational expertise'.

The left-hand side of Figure 32 summarises the characteristics of the 'A group' – gold, silver or bronze medal winners ($n=71$). The right-hand side of Figure 32 shows the corresponding results for the 'C group' – Competitors who achieved less than 500 points at WorldSkills London 2011 ($n=157$).

A weighted solid line indicates an important factor to vocational talent development. A thin solid line indicates a connection between the factor and vocational talent development. A thin dashed line indicates a weak relationship between a factor and vocational talent development. A factor with no

connecting line has been shown in our analysis to have no effect on vocational talent development for these two groups of Competitors.

Figure 32: Comparison of characteristics of Competitors in WorldSkills London 2011

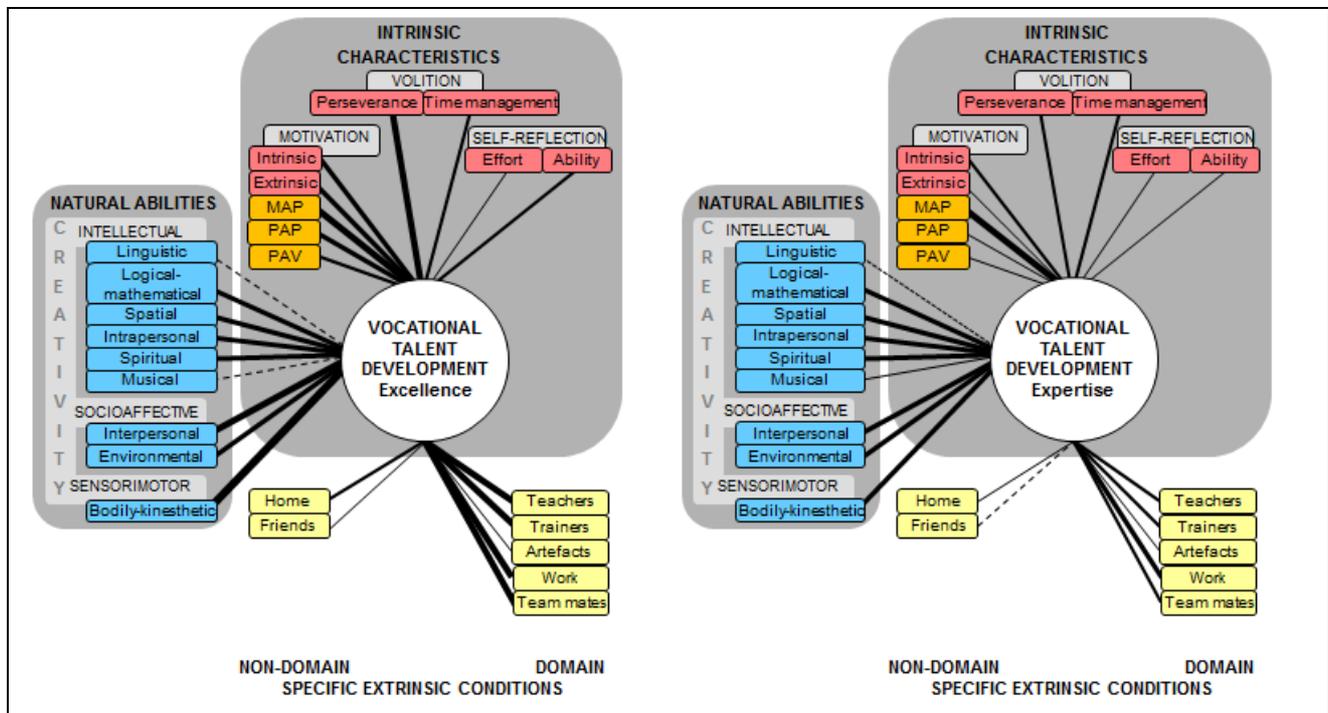


Figure 32 shows that there are differences in all three vocational talent development areas between the medallists ('excellence') and the lowest performing Competitors ('expertise'). In comparison to non-medal winners (those who did not receive at least 500 points at WorldSkills London 2011), medal winners reported:

- better bodily-kinesthetic and interpersonal abilities
- greater belief in ability rather than effort
- higher performance-related motivation (extrinsic motivation, performance-approach goal orientation) and determination (perseverance).

6 Formation and consolidation of professional identity

This chapter presents results of the analysis of data from Part A of the survey which explored the extent to which WorldSkills plays a role in the formation and consolidation of professional identity.

This aspect of the research grew out of the Australian MoVE pilot study in which national Competitors and Experts were asked to tell a story about their WorldSkills journeys. Analysis of the stories and related multiple choice questions caused the researchers to consider the way that participation in WorldSkills Competitions may influence the formation of professional identity for Competitors, and the further development and consolidation of professional identity for Experts.

In the MoVE International survey we asked questions aimed at exploring how the individual aspirations created by the WorldSkills experience trigger the transition towards a sense of belonging to a trade or profession, including:

- Competitor and Expert responses to statements about key elements of identity
- factors influencing the strength of their sense of belonging to their trades/professions
- Competitor self-perceptions of identity (student/apprentice, or skilled worker, or master/expert) and perceptions of the way their families, trainers and employers regarded them (student/apprentice versus member of trade/profession)
- Expert perceptions about Competitor professional identity.

Through the perspective of our theoretical framework (see section 2.3 and additional notes in the Annex to this report), which sees the formation of individual identity as a social process, we can explore Competitors' experiences at WorldSkills as a process through which a set of social and psychological attitudes emerge that influence the sense of belonging to a new community of practice. In turn, we can see the way that this sense of belonging influences the levels of expertise developed by each individual as they practice, compete for and settle their positions within the community.

We present the findings in this chapter with due caution. We have no control group data, and no way of accounting for other formative factors in the professional lives of the Competitors and Experts who responded to the survey. However, the extent to which we can explore this question through the current data provides a stepping stone towards a deeper investigation of the interplay between the characteristics of individual participants and the whole system of relations that is provided to them via engagement in WorldSkills.

6.1 Exploring emerging competitor professional identity

In this study, four dimensions of emerging professional identity are explored:

1. self-recognition and confidence
2. learning (including self-learning)
3. professional goal orientation
4. recognition by others.

The Competitors responded to three question types:

1. 'Triad' questions, which asked Competitors to indicate the relative importance of three factors by selecting a point within a triangle (as discussed in section 4.2.2)
2. 'Likert scale' statements on aspects of professional identity, in which Competitors were asked to express their level of agreement by selecting from five options ranging from totally disagree to totally agree
3. 'Polarities' statements, in which Competitors indicated their self-perception in relation to professional identity by selecting the appropriate point along a bar.

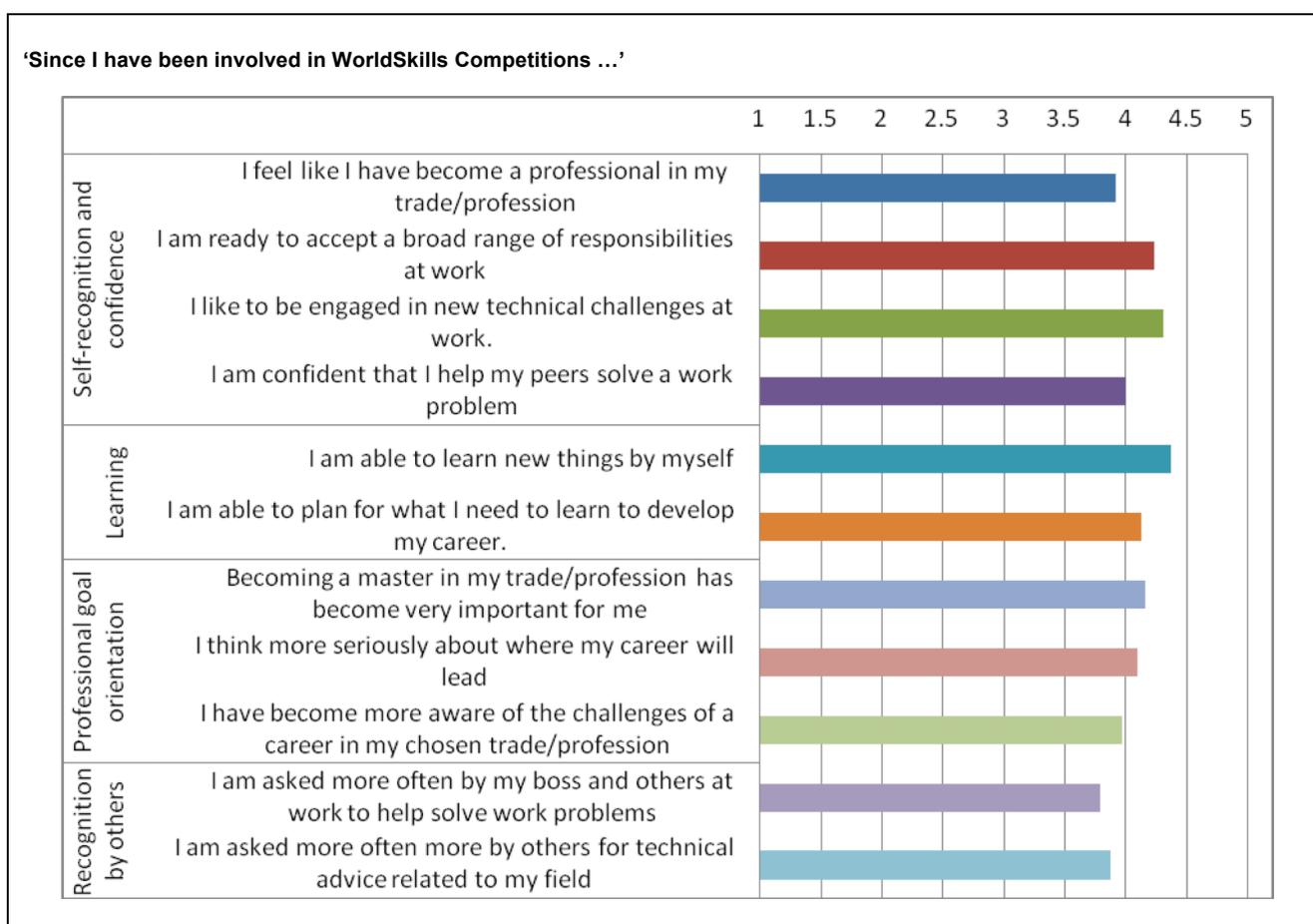
In addition, Experts were asked to provide their perceptions of aspects of Competitors' professional identity. Further, the coding of the narratives revealed themes related to aspects of professional identity, including 'professional development', 'professional growth', 'related to future career',

'learning and upskilling' (see section 2.4 of the Annex to this report). Examples from these themes are used below to illustrate Competitor perceptions.

Data from triads and polarities are presented in sections 6.1.2-6.1.5. The data show Competitor perceptions of each of the dimensions of professional identity. First, the overall trend in self-rating against each of the four dimensions is summarised in Figure 33, where agreement to the statements is graded as follows:

- a rating of 3 signifies Competitors' 'mild agreement'
- a rating of 4 signifies Competitors' 'strong agreement'
- a rating of 5 signifies Competitors' 'total agreement'.

Figure 33: Comparison of characteristics of Competitors in WorldSkills London 2011



The self-ratings for statements related to all four dimensions of professional identity are high, with at least one statement in each dimension rating above 3.5. Self-recognition is rated slightly higher than recognition by others. Within the self-recognition category, willingness to accept work responsibilities, and engagement in new technical challenges, scored most highly.

The narratives written by Competitors also highlight a strong sense of identification with WorldSkills as a site for raising vocational standards – and as a professional community:

Teaching/learning exists in WorldSkills

The experience is wonderful, after feeling the best in the country and then being surrounded by the best in the world, it is very rewarding because of all you learn. WorldSkills was created to help a country improving a country ... then and now it is improving the world. Technical knowledge shared here is what my country and the world loves to learn. And I think what unites all the Competitors here is that WorldSkills is more than just a Competition and a gathering of countries ... The skilled person who knows less learns more. Those who know more learn how to teach others.

- Competitor, China.

First hard but good

It's been absolutely fantastic to be able to participate in a competition like the WorldSkills. This has led me to develop myself in my profession, but also as a person

- Competitor, Denmark.

WorldSkills

It's an experience which is at the same time professional and personal, enriching from the point of view of your physical and mental capacity. All the preparation before WorldSkills is very important to feel comfortable on D Day. But I will retain one thing in particular: the power of concentration. It is one of the most difficult things to manage as you must work really hard to just think about one thing: 'your work'.

- Competitor, France.

6.1.1 Self-recognition and confidence

Data for self-recognition and confidence was provided via:

- four items in the Likert scaled statements (summarised in Figure 33)
- one triad
- one polarity statement about professional identity.

The responses to the Likert scale statements about self-recognition and confidence shown in Table 9 show a relatively high level of agreement (mean from 3.99-4.3).

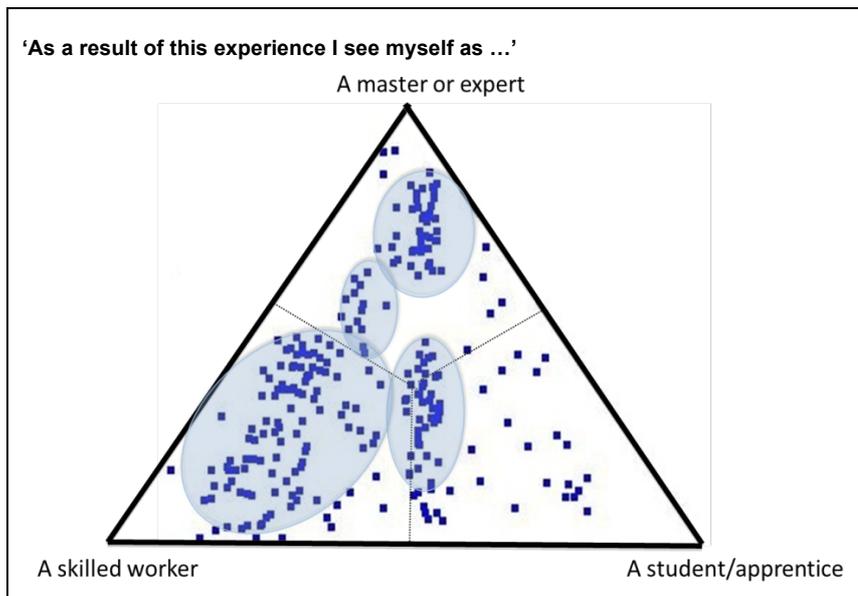
Table 9: Results of Competitors' responses to survey questions related to self-recognition and confidence

Likert scaled questions	Rating		
	<i>M</i>	<i>SD</i>	<i>n</i>
I feel like I have become a professional in my trade/profession	3.91	1.017	407
I am ready to accept a broad range of responsibilities at work	4.22	0.85	406
I like to be engaged in new technical challenges at work	4.3	0.878	409
I am confident that I help my peers solve a work problem	3.99	0.867	400

The two highest scoring responses, about accepting responsibilities, and engaging in technical challenges at work, may indicate that the WorldSkills training has helped to increase their confidence as individuals.

The responses to the triad statement, shown in Figure 34, verify the results from the Likert statements.

Figure 34: Self-recognition and confidence dimension of professional identity



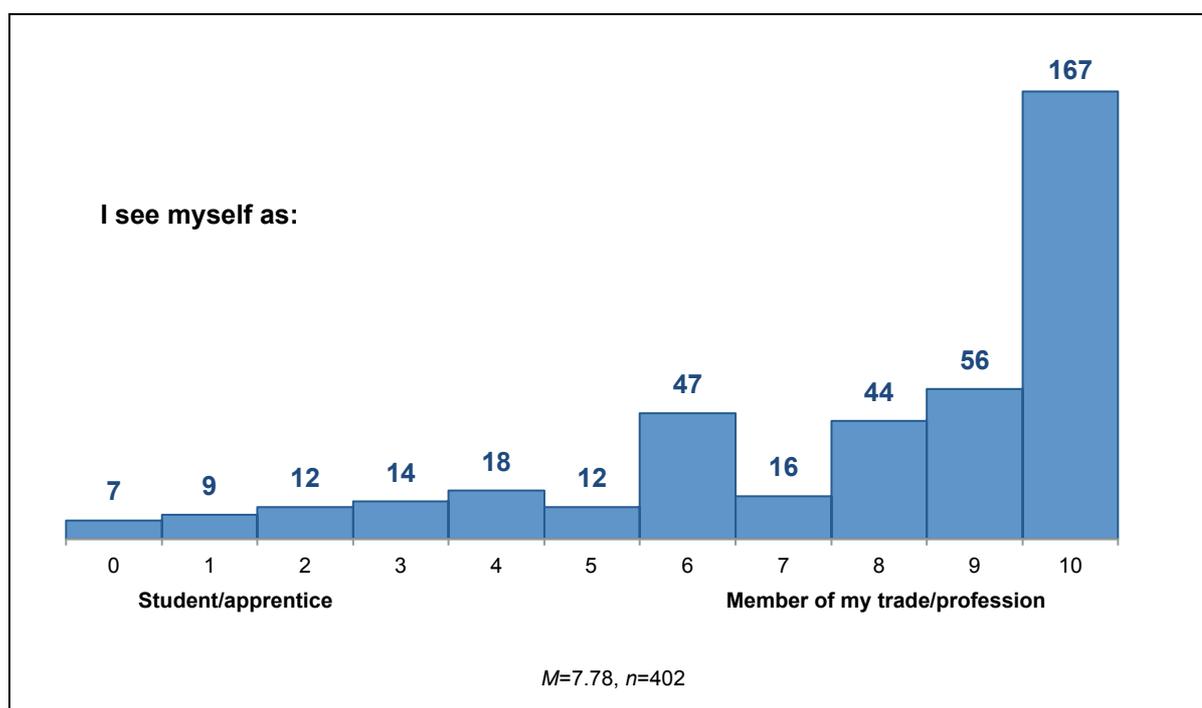
There is a clear trend in this response away from the status of 'student/apprentice' towards 'skilled worker'. The clusters in the middle of the triangle show that a number of Competitors see themselves at a mid-point in the transition towards 'skilled worker'. Two clusters towards the top of the triangle suggest that a smaller number are starting to see themselves as a 'master/expert'.

Overall, these results indicate a high level of self-recognition and self-confidence, particularly for young people who have quite recently started out in their profession. Without control group data, we cannot draw causal conclusions. Nevertheless the trend illustrated here suggests that competing at WorldSkills promotes a sense of transition towards the professional domain and calls for further investigation.

The results from the triad statement are confirmed in the polarity statement (Figure 35) which asked Competitors to complete the following exercise:

'Think about how you see yourself ... Then look at the sentence below. Complete the sentences by clicking at any point along the bar to shift the ball. There is no right or wrong answer.'

Figure 35: Competitors' self-perceptions of their professional identity



Again the trend in professional identification is confirmed by these data, with a majority of respondents seeing themselves moving towards the status of 'membership' of their trade/profession. Overall, the results of analyses of all types of items support the proposition that the Competitors' experience of involvement in WorldSkills promotes a self-perception of membership of trade/profession.

6.1.2 Learning, including self-learning

Data for 'learning, including self-learning' was provided through:

- two items in the Likert scaled statements (summarised in Figure 33)
- one triad statement about motivation.

Responses to the two Likert scale statements (see Table 10 below) show a high level of agreement.

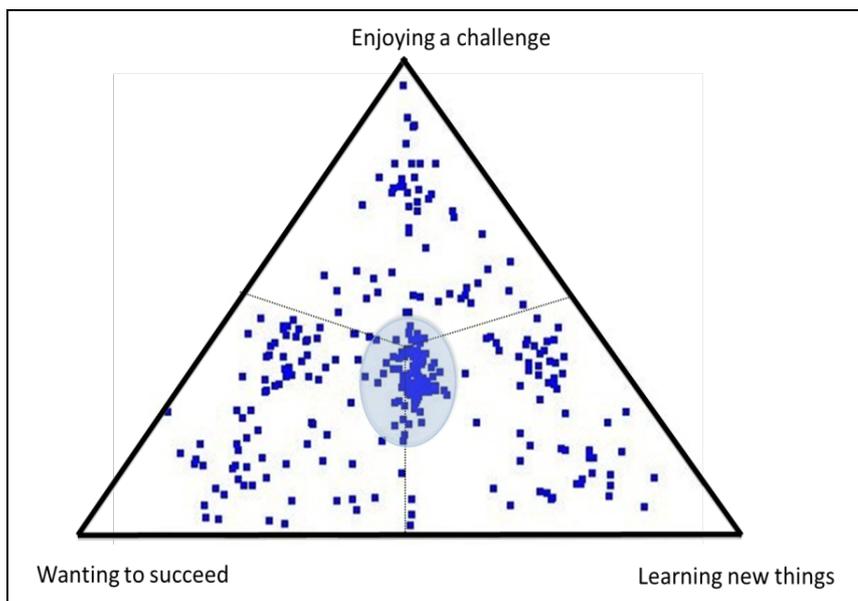
Table 10: Competitor survey questions related to learning, including self-learning

Likert scaled questions	Rating		
	<i>M</i>	<i>SD</i>	<i>n</i>
I am able to learn new things by myself	4.36	0.867	408
I am able to plan for what I need to learn to develop my career	4.12	0.898	409

The statement 'I am able to learn new things by myself' produced the highest average score for all Likert scaled statements in Part A of the survey. This indicates that Competitors agreed very strongly that their capacity to learn independently had increased with their involvement in WorldSkills.

The responses to the triad statement 'In this experience I was motivated by ...' are shown in Figure 36.

Figure 36: Competitors' responses to motivational factors



Competitors were asked to select between three motivational factors: 'learning new things', 'enjoying a challenge', and 'wanting to succeed'. The equal distribution of responses, and the cluster in the centre of the triangle, show that all three factors are regarded as important.

This pattern is also reflected in the coding of the narratives in which 'learning and upskilling' was revealed as the most dominant theme, showing it to be the strongest dimension of the WorldSkills experience. Analysis of the clustering of themes shows that 'learning and upskilling' was associated with the themes of 'hardship' and 'reward'. This is consistent with the clustering of the statements 'enjoying a challenge' and 'wanting to succeed' in the triad response. This is illustrated in the following Competitor narratives.

Swell

The experience was amazing. The journey has been great and I have learned & grown a lot ... Getting ready has been one of the toughest challenges of my life. It has gone for so long & now it is finally coming to an end ... There is a lot of stress involved but the reward far outweighs the negatives.

- Competitor, Australia.

[no title]

I have practiced a lot. I have gone through the whole Competition task five times. I have repeated and repeated things; that is what develops routines. You need to have a lot of motivation to practice. The employer needs to be encouraging and let a Competitor practice.

- Competitor, Finland.

Yay!

The experience has been a great learning curve. I am amazed by the rapid pace that my skills have improved. It has been hard work, but worth it. I have no regrets.

- Competitor, Australia.

6.1.3 Professional goal orientation

Professional goal orientation was explored through three Likert scale statements as shown in Table 11.

Table 11: Competitor survey questions related to professional goal orientation

Likert scaled questions	Rating		
	<i>M</i>	<i>SD</i>	<i>n</i>
Becoming a master in my trade/profession has become very important for me	4.15	0.929	409
I think more seriously about where my career will lead	4.09	0.949	405
I have become more aware of the challenges of a career in my chosen trade/profession	3.96	0.946	407

The high averages obtained for all the three items show that Competitors' goals are strongly aligned to a career in their profession and that they believe they are developing an understanding of the challenges involved in their profession. Analysis of the narratives coded to the theme 'Professional development – related to future career' show how Competitors express aspects of their professional goal orientation.

Experience for future

It was a great experience for me as a person, and for me as a professional. As I had a lot of publicity because of WorldSkills my door to an excellent future have been opened. People have more respect for me and wished me luck. That was a very good feeling.

- Competitor, The Netherlands.

Amazing things happen in life ...

WorldSkills is a fantastic experience; it has changed my life and my future. My career is progressing and I can see myself doing bigger and better things in the future. What you put into life you get out. I put in as much as I possibly could and it paid off, although this would not have happened without WorldSkills, my family and my work colleagues. Get prepared, get ready, excel at WorldSkills!

- Competitor, UK.

[no title]

I would say that it is a Competition which makes you grow as you learn so much about your job. You increase your skills. It's a sacrifice but this is really beneficial and you learn about yourself as you see yourself getting so much better that you don't want to hide anything. WorldSkills is worth 10 years of professional experience, and an unforgettable experience.

- Competitor, France.

The journey

The experience has changed my life in regards to how I see my future. Before WorldSkills I did not really have a goal. It has opened the door and presented me with all the opportunities I would have otherwise overlooked. Preparation has been difficult and time consuming but worth every second when I think about the knowledge, experience, friendships I have gained.

- Competitor, Canada.

This experience was fantastic

My experience was very satisfactory. I won't forget this competition. This helped me in my professional and personal life.

- Competitor, Spain.

6.1.4 Recognition by others

This dimension of professional identity was explored through:

- two Likert scaled statements
- three elements of the Competitors' polarities statements
- one of the Experts' polarity statements.

Responses to the Likert scaled statements are presented in Table 12.

Table 12: Competitors' self-perceptions in response to Likert scaled statements about recognition by others

Likert scaled questions	Rating		
	<i>M</i>	<i>SD</i>	<i>n</i>
I am asked more often by my boss and others at work to help solve work problems	3.78	1.037	382
I am asked more often more by others for technical advice related to my field	3.87	1.045	403

The averages obtained for these two items were relatively high, although somewhat lower than the results presented above for the other dimensions of professional identity. While Competitors' self-perceptions of their professional identity indicate an increase in self-recognition (see section 6.1.1.), they are slightly less sure that their employer and work colleagues share their perceptions.

This dimension of professional identity was also explored in the data obtained from three polarities statements. Competitors were asked to say where they thought others perceived them to be in relation to two identities, by placing a mark on a bar which showed 'A student/apprentice' on the left and 'A member of my trade/profession' on the right. Three statements were presented as follows:

- 'My family sees me as ...'
- 'My trainer sees me as ...'
- 'My employer sees me as ...'

The results for these polarities are shown in Figure 37 a, b and c.

Figure 37a: Competitors' perceptions of family perceptions

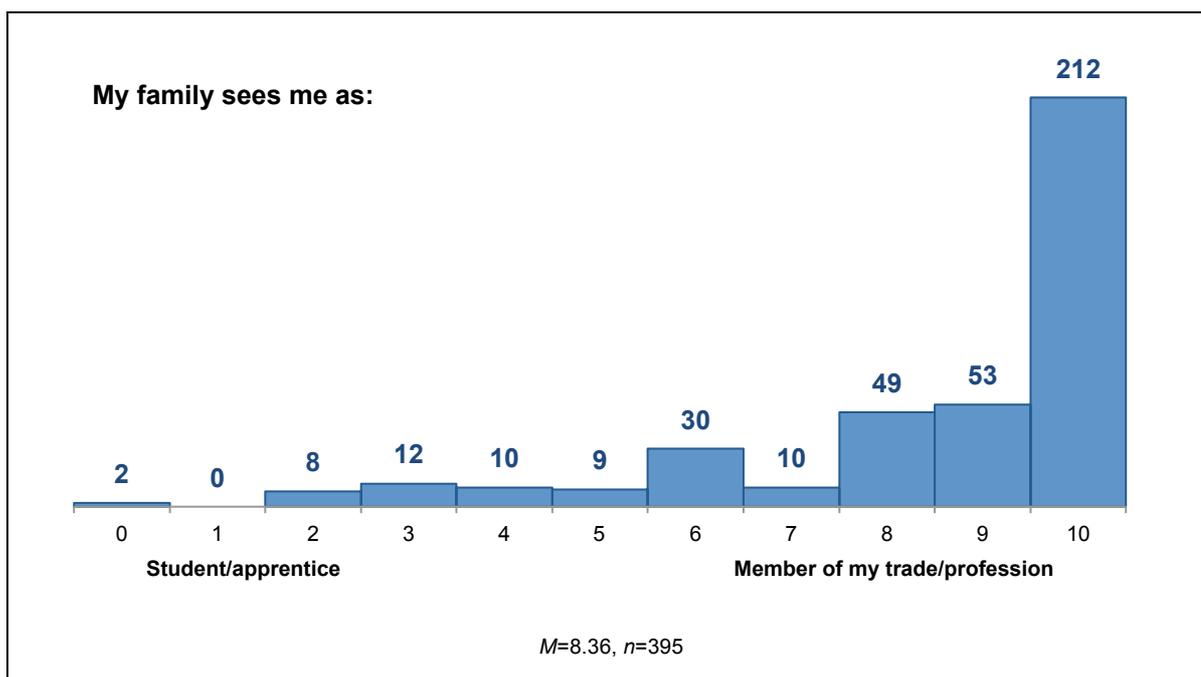


Figure 37b: Competitors' perceptions of trainers' perceptions

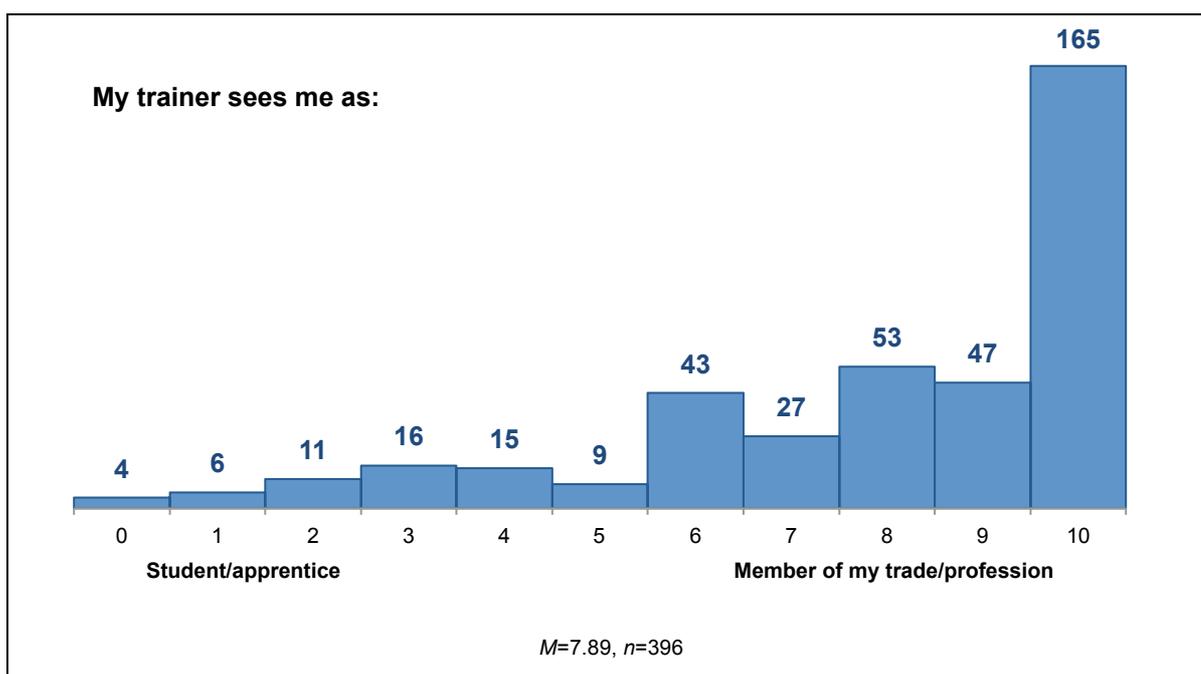
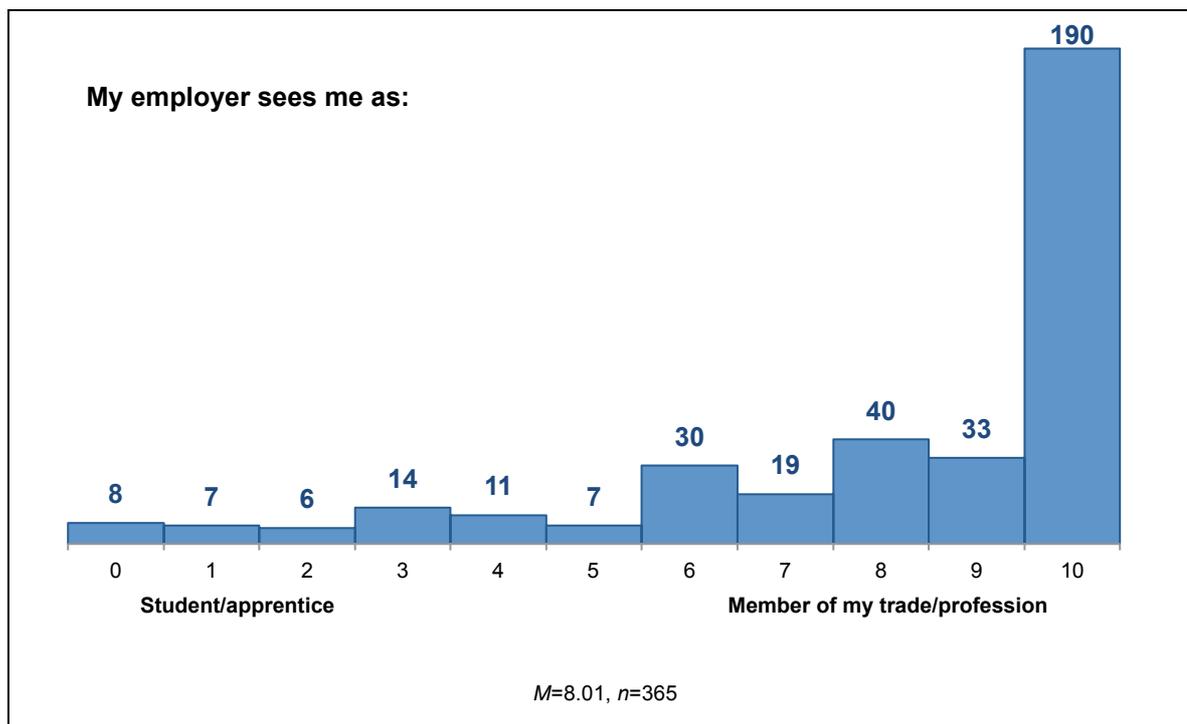


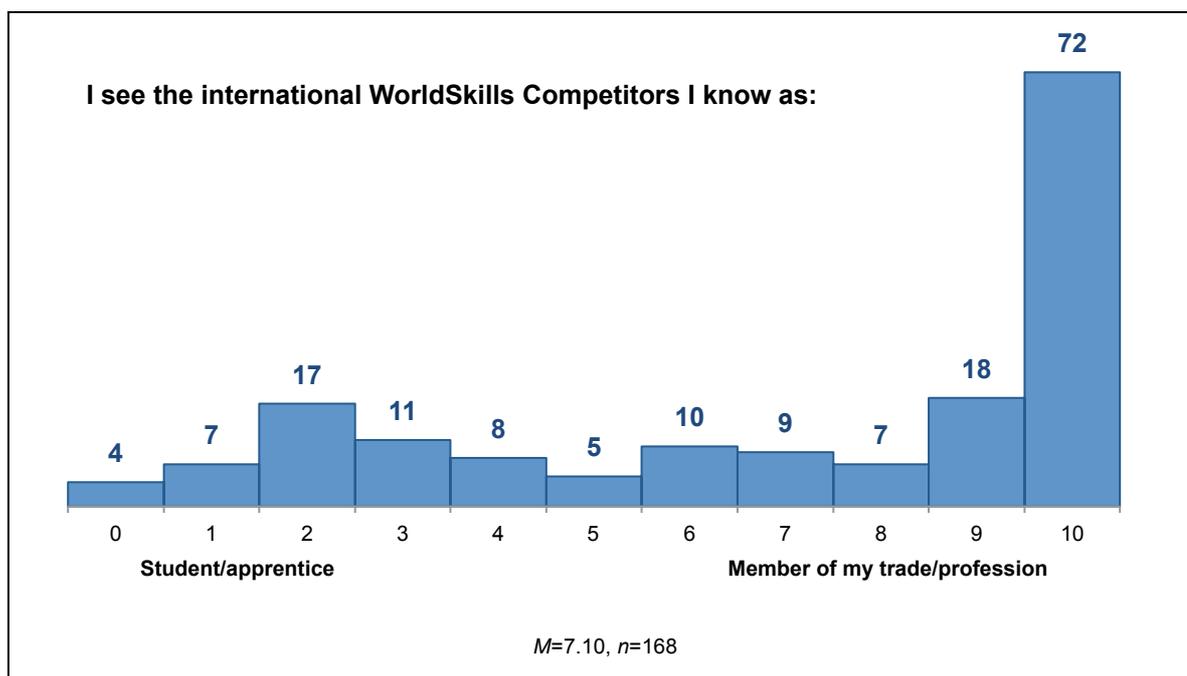
Figure 37c: Competitors' perceptions of employers' perceptions



In each of the three statements, the majority of Competitors selected a point near to, or at the right hand end of, the bar marked 'a member of my trade/profession'. Analysis of these data shows a strong perception on the part of Competitors that they are recognised by others as members of their trade/professional community.

Experts were also asked to give their perceptions of Competitors' status by completing the statement 'I see the international WorldSkills Competitors I know as ...'. Experts placed a mark on the bar between 'A student/ apprentice' and 'A member of their trade/profession'. Results for the Experts are shown in Figure 37d.

Figure 37d: Experts' perceptions of Competitors' status as student or professional



The Experts' perceptions of the Competitors' as members of their professions was less strong, with lower mean and median responses. Compared to Competitors' responses, a larger number of Experts placed Competitors nearer the status of student. Nevertheless, Experts' perceptions follow the same broad trend in relation to professional identity as do those of Competitors. The perceptions of Experts about Competitors are illustrated in the following narratives.

An exciting and meaningful skill Olympia for future young tradesman

WorldSkills is undoubtedly a platform for young tradesman and their trainers to showcase, compete and learn from all the best in their trades from all over the world ... The benefits of participating come in many forms and dimensions, including elevating their skills level and definitely helping their countries' future and economy.

- Expert, Singapore.

Upgrading and professional experience

It is one of the outstanding competitions. A Competitor involved in WorldSkills would receive experience in his skill area and be able to expand his view of other countries' skills. It is also upgrading skilled labour in the profession and trade.

- Expert, Thailand.

Buried treasure

I would tell them about the difference it makes to everyone involved – Competitors, supporters, Experts; the opportunities for personal and professional growth, for learning more about other cultures and skill areas, to experience what it is like to be part of a team and to bear the responsibility of expectations.

- Expert, Australia.

6.2 Exploring Experts' self-perceptions of professional identity

The potential relationship between participation in WorldSkills and the growth and consolidation of professional identity was explored through an analysis of four question types:

- multiple choice questions about the experience told in their story
- triad questions about the experience told in their story
- Likert scaled questions about aspects of professional skill
- Likert scale questions about dimensions of professional identity.

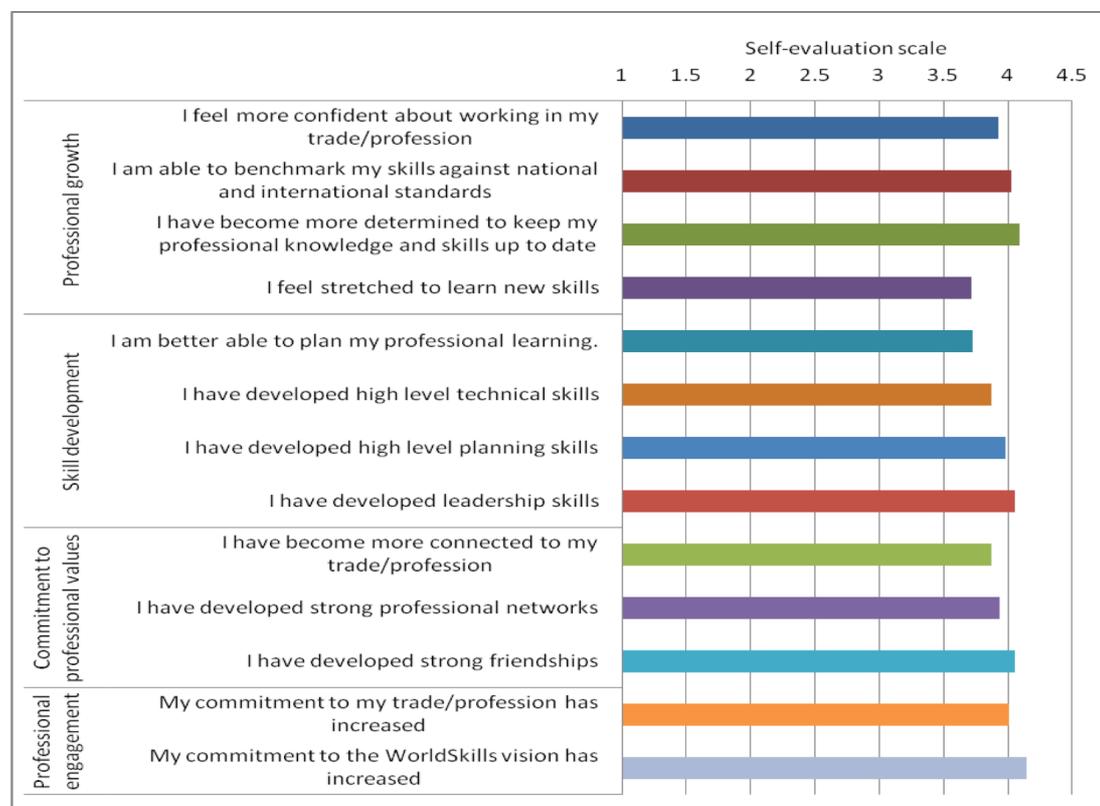
Because of the low Expert response rate, it has not been possible to analyse the statistical data provided in Likert scale questions about the dimensions of professional skill and identity. However, the descriptive data from these questions provides some interesting data that are confirmed by responses to the multiple choice and triad questions. Together the responses provide a profile of the 168 Experts who responded to the survey, and can be used to formulate propositions for further study. These responses are discussed below.

Four dimensions of professional identity were explored through Experts responses to a set of statements for which they were asked to select from five options (1 = strongly disagree, 5 = strongly agree) to indicate their views. The four dimensions were:

- professional growth
- skill development
- commitment to professional values
- professional engagement.

Experts' responses to statements representing these four dimensions are presented in Figure 38.

Figure 38: Summary of Experts' responses to statements about four dimensions of professional identity



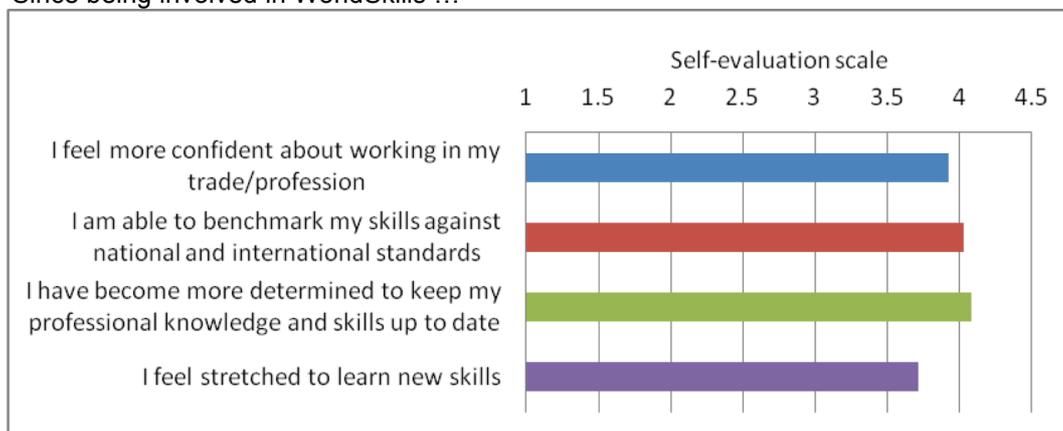
The ratings on all elements of the four dimensions are above 3.5, indicating a high level of agreement with all statements about professional identity.

6.2.1 Professional growth

Experts' views about the extent to which involvement in WorldSkills had contributed to their professional growth were explored through the four Likert scale statements presented in Figure 39.

Figure 39: Experts' ratings of statements about professional growth

'Since being involved in WorldSkills ...'



The element of professional growth which Experts' rated highest is their determination to continue learning as a professional by keeping their knowledge and skills up to date. All other elements rate highly, indicating that for these Experts, WorldSkills is having a positive impact on professional growth.

6.2.2 Skill development

All elements of skill development have rated highly, with the development of leadership skills rating the highest (Figure 40).

Figure 40: Experts' ratings of statements about skills development

'By being involved in WorldSkills ...'

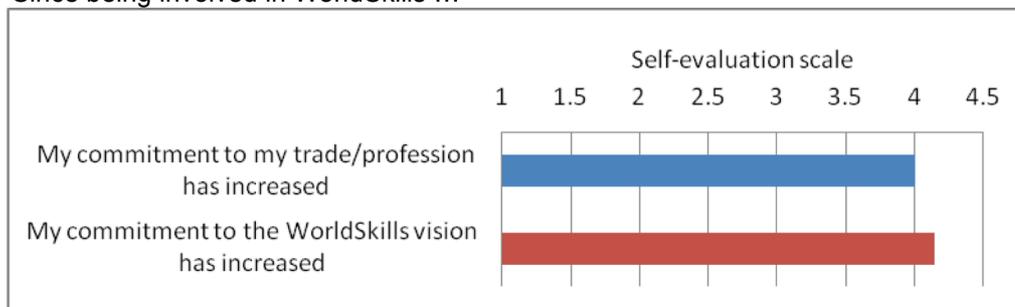


6.2.3 Commitment to professional values

Experts' responses to two statements on commitment to professional values indicate an increase in the level of commitment to professional values. The level of commitment to the WorldSkills vision is rated as increasing slightly more than commitment to their profession, as Figure 41 shows.

Figure 41: Experts' ratings of statements about commitment to professional values

'Since being involved in WorldSkills ...'

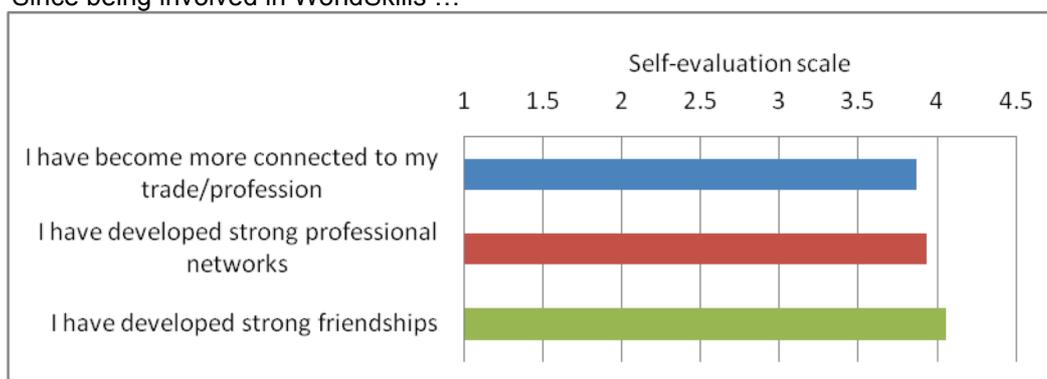


6.2.4 Professional engagement

Again, all elements of professional engagement have been rated highly, with the development of strong friendships rating the highest (see Figure 42).

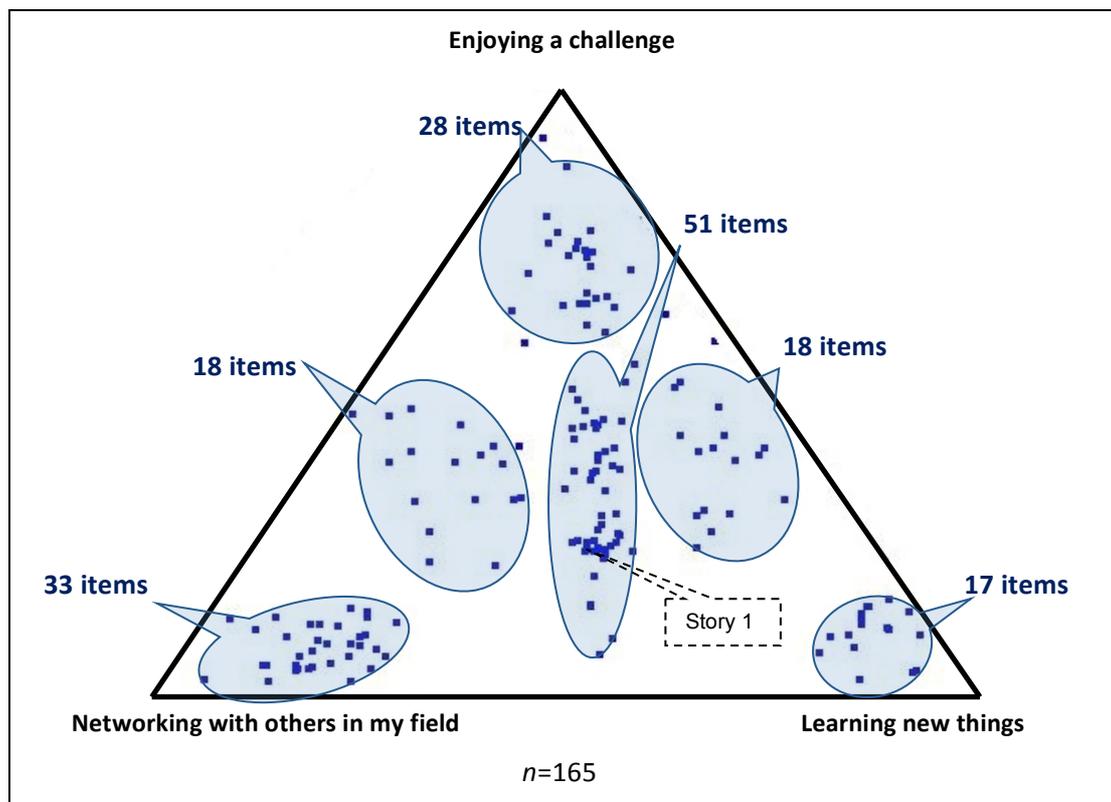
Figure 42: Experts' ratings of statements about professional engagement

'Since being involved in WorldSkills ...'



Two further illustrations of the way that Experts responded to questions about professional identity are provided by analysis of the data from the Experts' triad questions. Experts were asked to describe their stories. Figure 43 presents their responses to the statement about motivation.

Figure 43: Experts' responses to the statement 'In this experience I was motivated by ...'



The responses show a fairly even distribution between the three options, with professional engagement ('networking with others in my field') and a balance of engagement and professional growth ('learning new things') indicated by the cluster in the middle. Story 1 below is drawn from that cluster of responses and illustrates how one Expert saw the various dimensions of professional identity played out in the Expert's role at WorldSkills London 2011.

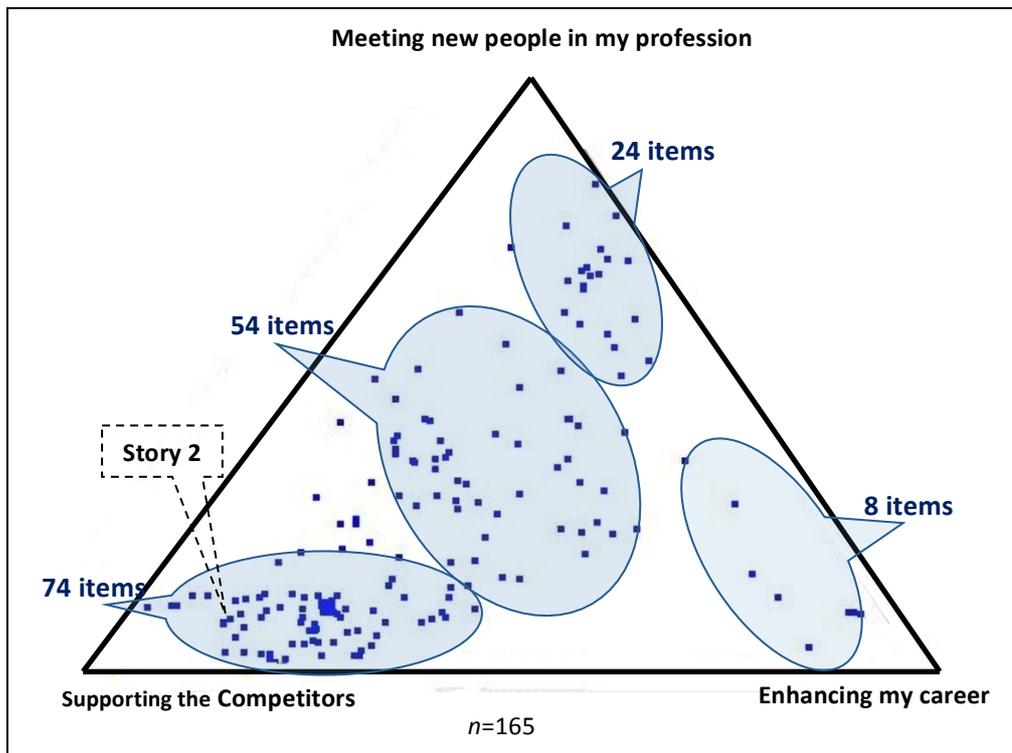
Story 1: A once in a lifetime experience

For all the young professionals, World Skills is a once in a lifetime experience. The Competition will most certainly influence both their professional career and personal future. Our job as an Expert, is to make their experience as good as possible. That is only possible if you have a team of skilled Experts. With skilled I mean not only the outstanding professional knowledge they demonstrate. Just as important is their ability to work together with fellow Experts from different cultures and countries. One of the moments I feel real proud of being part of this team is when I see my fellow Experts put all their effort into making it possible for all Competitors to perform well, not just their own. That's the spirit of World Skills.

- Expert, Norway.

The second example is provided by Experts' responses to a statement about the relative importance of three factors presented in Figure 44.

Figure 44: Experts' responses to the statement 'The most important thing about this experience was ...'



These responses show that Experts regarded supporting Competitors as more important than networking opportunities or career enhancement, and that a number regarded both Competitor support and networking as important. Very few were concerned about enhancing their career through participating in WorldSkills.

The story below, selected from those 73 Experts who responded positively to 'supporting the Competitors', encapsulates the Experts' commitment to professional values.

Story 2: Trades on top of the World

For a trade person, the WorldSkills experience is an opportunity to celebrate the trade and to participate in an extremely high level competition. It celebrates our trade and displays all the good we have to offer. The focus is on youth and this gives us great pleasure to be passing on the trade to a competent next generation. It brings together industry, education and government as we work together in an attempt to fill the need for new workers in our trade. I would encourage any trade person to get involved with this great opportunity.

- Expert, Canada.

7 Observations and recommendations

7.1 Themes and trends in the data

7.1.1 A snapshot of the WorldSkills experience

Competitors

To compete at WorldSkills involves a lot of commitment from Competitors. Their perspectives indicate their experience was dominated by the WorldSkills training and improving their technical skills. Interestingly, the focus of their narratives seemed to be about determination and persistence in developing technical skills, with less emphasis on ability. It is important to note that the Competitors felt that persistence was also the most difficult part of the experience.

Unsurprisingly, Competitors were motivated mostly by wanting to succeed. However, the challenge alone was not enough. Competitors felt that challenge combined with the desire to succeed, and/or the desire to learn, was more motivating than either success or a challenge on their own.

Given the amount of training Competitors undertake, it follows that they felt their skills changed most of all, and consequently many became more confident in their skill.

In line with increased skills and confidence, the participants saw themselves as skilled workers and experts; few saw themselves as just students or apprentices. Competitors who felt like skilled workers saw their experience as changing their communications skills and ability to work in teams, while those who saw themselves as apprentices were more likely to cite changes in their technical skills.

The WorldSkills experience involves both Competitors and their families, and sometimes their employers. Competitors felt that family and employers were more likely to see them as members of professions, while Experts and Competitors themselves were more aware of their apprenticeship status. This result may reflect different perspectives about skilled work. Competitors judge their expertise in relation to the expert practice they see in training and competitions. Family members' views are less sophisticated as they lack experience in the field. Given the work situation and the status of employee, it seems natural that Competitors would think their employers viewed them as members of their trades/professions.

Experts

The smaller sample of Experts who completed the survey ($n=161$) limits the ability to draw firm conclusions. Nonetheless, significant differences between Experts' perceptions and Competitors' perceptions are worth reporting, specifically around what changes occur and what motivates Competitors. Experts clearly saw their main role as supporting Competitors. They also regarded WorldSkills as a highly valued experience that provided a fantastic opportunity for networking and building friendships. In line with Competitors, Experts believed Competitors to be motivated by the challenge and desire to succeed. However, Experts saw Competitors as less experienced than Competitors saw themselves.

7.1.2 A snapshot of the findings about the characteristics of vocational excellence

The survey data on the characteristics of vocational excellence revealed that all Competitors rate themselves relatively highly on questions exploring the nine dimensions of intelligence, ethical sensitivities, goal orientation, and self-regulation. Competitors also rated themselves highly on questions measuring three domains of expertise: social, cognitive, and entrepreneurial expertise.

Overall, Competitors who responded to the survey were most highly motivated to train and compete by intrinsic factors related to their skill (domain specific), including their own interest in the skill, followed closely by extrinsic domain specific factors such as the WorldSkills Competition itself. Competitors cited domain specific influences (for example, impressive demonstrations of expertise in the Competitors' own skill) as more important than non-domain specific influential factors such as family and friends.

Analysis of the data revealed small but statistically significant differences in the ratings of medal and non-medal winners. Medal winners (those who achieved at least 500 points at WorldSkills London 2011) reported higher bodily-kinesthetic and interpersonal abilities, greater belief in ability rather than effort, and higher performance-related motivation, performance-related goal orientation, and determination.

The data also revealed statistically significant differences between Competitors in the six sectors. For example, all Competitors reported higher mastery (to learn things as deeply as possible) and performance goal orientations (to be as respected as possible) than performance-avoidance goal orientation (fear of doing things badly in front of the others). Competitors in Social and Personal Services sector (for example, Bakery and Caring) reported the highest mastery and performance goal orientations in this sample, and also the highest performance-avoidance goal orientation.

7.2 Outcomes of the research

The proposal to the WorldSkills Board of Trustees in April 2011 identified three potential outcomes from the MoVE International research:

- a new lens on current vocational practice
- a celebration of vocational excellence at global and national levels
- a framework for international benchmarking and a global discourse on quality and productivity.

We address each of these in turn.

A new lens on current vocational practice

This MoVE International research represents a shift away from the 'deficit' model of research on vocational education. Such research produces outcomes which suggest that vocational education and training (VET) is beset by structural and cultural problems, such as being unable to keep up with changing skill requirements, and unable attract and retain a sufficient number of young people to meet the growing demand for skills. VET is often regarded as inflexible; not sufficiently attuned to industry demands and limiting graduates' transition into higher studies.

Few studies have explored quality vocational learning to uncover the characteristics of high quality learning and excellence in vocational practice. While we are cautious about drawing general conclusions from this pilot study it does nevertheless demonstrate the potential in addressing VET from this new perspective.

A celebration of vocational excellence at global and national levels

This research is the first in which a model of vocational excellence has been tested empirically in an international setting. The data collected from young people and Expert practitioners from more than 35 countries provides an insight into the types of education and training practices which can encourage the formation of expertise and excellence.

A framework for international benchmarking and a global discourse on quality and productivity

Through our analysis of the data on professional identity and in the context of the research literature, a proposition for further exploration has emerged. Previous research on professional identity has concluded that identity is not a fixed quality, but a fluid 'process of becoming' that incorporates both individual and social factors. The workplace, fellow workers, the family, training institutions, and professional associations, all play a role in the formation of professional identity. Indeed, data from WorldSkills Competitors and Experts confirm the importance of all these factors. This study suggests that the WorldSkills experience – being immersed in an event with the spotlight on the pursuit of vocational excellence – is another contributing factor to the formation of professional identity.

International WorldSkills Competitions provide young people and expert practitioners with a unique professional experience in which they engage in high standard vocational practice within three connected communities:

1. their own team of Competitors and Experts, who represent the highest levels of expertise across the skills in each Member organization
2. the Competitors and Experts in their professions across Member organizations, which represent the international standard for each profession
3. all WorldSkills Competitors and Experts, who constitute a global community of expertise and excellence in vocational skill and knowledge.

For the period of training leading up to the Competition, and for the Competition itself, Competitors and Experts are immersed in a highly charged experience within their chosen profession and with matters of professional expertise in general. The data shows us that the impact of this experience on Competitor and Expert self-perceptions is significant; perhaps profound for some individuals. Accordingly we find that the international WorldSkills Competition contributes to the formation and consolidation of professional identity in Competitors and Experts by offering a unique experience of the pursuit of excellence within particular professions and across professions at a global level.

This raises the question of the extent to which international WorldSkills Competitions can contribute to the quality of everyday vocational practice. Participation in an international WorldSkills Competition is clearly an elite experience – related to daily vocational practice in much the same way as the Olympic Games are to local sporting practice. And the role played by the Olympics provides a key to understanding how WorldSkills can influence the everyday world of vocational learning and practice:

- by being a highly visible role model for vocational learners and their teachers – literally modeling vocational excellence
- by ensuring that the essential elements of the international experience are cascaded down into national and regional competitions and promoted widely.

As well as providing a visible role model, the international WorldSkills Competition fosters the development of leadership qualities and capabilities – in each represented trade/profession, and in relation to broader vocational leadership. The young people who compete internationally are potential leaders in their own work and learning communities, and in the global arenas in which questions of vocational quality are debated and standards of practice set. Similarly the Judges, Chief Experts and Experts, who are already leaders within the WorldSkills community, represent a source of advocacy and leadership to promote and enhance quality vocational learning and practice.

The WorldSkills organization is already aware of the leadership potential of their Competitors and skills Experts, and is supporting the development of leadership capabilities through the WorldSkills Youth Forum. However, there is much more that could be done in global and national arenas to utilise the experience and capabilities of WorldSkills champions.

In highlighting the WorldSkills contribution to the formation of professional identity and the development of vocational leadership, the MoVE International research findings recorded here provide the Foundation with support for its focus on strategies to develop and nurture a network of international leaders in vocational practice – as advocates, teachers and mentors.

7.2.1 The research reports

The research proposal to the WSF promised a main report of 12-14 pages, plus three case study reports (Finland, UK, and Australia). In order to do justice to the data, and to give 'voice' to the Competitors and Experts, we completed a lengthy, technical research report, which will be of interest mainly to research and policy audiences. To provide wider access to the study and its findings, a short overview of this report is available. The overview is written to be as accessible as possible for readers in the key audiences where English is not a first language, and also to facilitate translation to other languages.

7.3 Using the findings from the pilot MoVE research project

The proposal aimed to produce research which could be 'applied to a range of different stakeholder purposes including promotion and advocacy; career decision making; informing educational policy making and changes in training practice; and the design of practical tools to support high levels of skill development'. Particular stakeholder groups and possible uses for the data include:

1. WorldSkills member organizations

The results identifying differences in self-perception between medal winners (vocational excellence) and non-medal winners (vocational expertise) may provide insights into aspects of Competitor training. For example, the exploration of characteristics of excellence showed that medal winners:

- evaluated their bodily-kinesthetic (practical) and interpersonal (social) capabilities higher than did other Competitors (section 5.1)
- had higher average self-evaluation scores on all ethical sensitivity dimensions (section 5.1)
- had statistically significant higher self-evaluations on their entrepreneurial abilities (section 5.4)
- had statistically significant higher self-reported mastery goal orientation (section 5.5)
- rated all six self-regulatory dimensions higher than other Competitors did (section 5.6).

These findings suggest the value of training which pays explicit attention to non-technical, as well as technical, aspects of skill development, including team interaction, social skills development, ethical sensitivity and self-regulation.

Further, as noted in the 'snapshot' offered in section 7.1, Competitors identified 'persistence' as a particular challenge in their WorldSkills training and at the Competition. This is an important finding for those helping to prepare Competitors and supporting them during the Competition.

Member organizations may also be able to use the data regarding the WorldSkills contribution to the formation of professional identity to demonstrate the potential value to employers of their employees participating in WorldSkills, and also to demonstrate to education authorities the role WorldSkills plays in skill formation.

The data may also be used in campaigns to raise awareness about opportunities for skill development and career prospects in pursuing vocational education, and thereby help raise the attractiveness of VET.

2. WorldSkills International may wish to use the research for promotional purposes. The narratives provide a rich source of material for a report to the 2011 Competitors and Experts, and to promote WorldSkills to future Competitors.
3. WorldSkills Competitors and other young people involved in WorldSkills worldwide have expressed their 'voice' through the narratives. The narrative data presented in this report may be of value to groups such as the WorldSkills Youth Forum in promoting the Forum, and in support of other strategies to increase the involvement in WorldSkills of former Competitors.
4. The WorldSkills Foundation can use the report as a source of data to underpin its advocacy of vocational education and training, including:
 - motivational stories to put before young people in the process of choosing a career
 - positive messages about the value of vocational careers to be directed to families and careers teachers
 - data to engage and encourage employers to support their employees' participation in skill competitions

- evidence about skill formation for policy makers to inform their understanding about the development of vocational excellence.

7.4 Reflections on project implementation

The MoVE International research project would not have been possible without the expertise, hard work and support of a number of key people:

- the MoVE International project manager, Judy Turnbull, from the Dusseldorf Skills Forum, who coordinated survey development, managed logistics, stakeholder relationships, project promotion and incentives, and carried out day-to-day troubleshooting and problem solving;
- WorldSkills International leaders and Secretariat members
- Member organization Team Leaders who promoted the study to their Experts and Competitors and worked to get both groups to complete the surveys. (A number of team members expressed their personal support for the research and went to extraordinary lengths to ensure that surveys were completed).

There is no doubt that the research survey competed for attention amongst many important aspects of the WorldSkills program, and, naturally, was far from the top of the priority list for Competitors. It was even lower on the Experts' priority list – in addition to mentoring Competitors, they are responsible for Competition standards and outcomes. This dual responsibility no doubt contributed to the low response rate for Experts.

As noted previously, the English language may have caused difficulties for some survey respondents, and from discussions with some Experts and Team Leaders, we understand that language issues may have caused some Competitors and Experts to avoid completing the survey. Team Leaders and Experts also alerted us to the problems with online access outside the competition venue. Many Competitors preferred to complete the survey on their laptops in their own rooms where they had the time and space to reflect on the questions and their answers, but were unwilling or were unable to pay the high access fees demanded by most hotels.

Even with these challenges the MoVE International 2011 research can be considered a successful pilot project. We achieved a statistically reliable number of Competitor surveys, and sufficient data from Experts to enable qualitative analysis which has generated interesting and valuable insights into Expert perceptions of their Competitors' skills and attributes, and their attitudes to WorldSkills. Further, given that most of the submitted surveys were fully or near fully completed with valid data, and that a good number of Competitors and Experts took the time to contribute thoughtful and comprehensive narratives, shows that the survey was taken seriously. Future research of this nature could expect higher response rates with forward planning and continued support from key individuals in member organizations. The best way to ensure that response rates are high would be to incorporate the research into the WorldSkills program so completing the survey is considered just one of the activities that Competitors and Experts do. In the short term, it will be important to renew the support that Team Leaders showed in 2011, and to recognise the significant role they played in the administration of the survey.

Management of a research project of this nature presents many complexities, including the knowledge and skills to manage a research team located in different countries, and to consult with stakeholders from multiple cultural and language backgrounds. Ideally the project manager should be familiar with the WorldSkills culture and operations. If not, it will be essential to allow time and mentoring support for the project manager to facilitate relationship building with key stakeholders, including Team Leaders, Judges, and Chief Experts.

7.5 Opportunities to build on the MoVE International research

The data emerging from the MoVE International 2011 survey points to several opportunities for further research at the international level, and also for projects involving individual WorldSkills Member organizations and groups of organizations (for example, within regions).

The immediate opportunity for building on the 2011 pilot project will be to administer the 2011 surveys (or similar data collection instruments) to the 2013 WorldSkills Competitors and Experts, with the aim of securing responses from the majority of Competitors and Experts. Ideally, any further data collections should include one or more control groups (for example, ordinary graduating apprentices within a sample of WorldSkills member organization regions, young people who participated in training and competitions but who were not included in their international teams). Including comparative groups will better support the aim of the research to identify what factors contribute to vocational excellence and the development of professional identity.

There are also opportunities to carry out longitudinal studies to follow Competitors as they pursue their careers post-Competition, and to assess the longer term impact of WorldSkills on their sense of professional identity, career development and levels of vocational expertise.

The data from the 168 Experts who responded to the 2011 survey suggests further research at both national and international levels to explore the propositions arising from this study about the role of WorldSkills in the consolidation of professional identity, and whether there are benefits for Experts and their employers as a result of Experts' experience. Further research could also be directed at assessing the potential for Experts to play a strategic role in promoting the WorldSkills vision through involvement in Foundation sponsored initiatives.

Support for MOVE International also provides opportunities for the WorldSkills Foundation to work in partnership with WorldSkills Members and vocational research organizations to build a WorldSkills research community and to lead the dissemination of research findings on multiple aspects of vocational quality. The researchers involved in MoVE International have been collaborating at the country level (UK, Finland and Australia) to gather further data on Competitors and to further explore issues around occupational identity and learning environments. Other countries may also wish to join the research effort, especially once the outcomes of this pilot study are known. The WSF might begin to consider the conditions under which other countries can become involved in research related to WorldSkills. The MoVE study team has already outlined some of the issues involved in such collaborations and can contribute to those discussions.

7.6 Recommendations

7.6.1 Recommendations regarding the dissemination of research findings

That the WorldSkills Foundation Board of Trustees endorse the findings in this research report.

That the Board of Trustees provides feedback to the authors and editor regarding any changes needed to finalise the main report for publication on the WSF website.

That the Board of Trustees endorses the overview report for distribution to key stakeholders, including delegates to the WorldSkills General Assembly, and distribution via the WSF website.

That consideration is given to strategies for disseminating the findings to VET researchers and opinion leaders worldwide. This may include dissemination of the overview report and/or the production of reports targeted to different audiences – for example, members of the WorldSkills Youth Forum (and via them to their own stakeholders), and WorldSkills London 2011 Competitors and Experts. There is also scope for presentation of the findings via seminars and workshops associated with WorldSkills events.

That the WSF engages with leaders of the WorldSkills Youth Forum to discuss options for the use of the research data to further the objectives of the Youth Forum.

7.6.2 Recommendations regarding future research

That the WorldSkills Foundation Board of Trustees seeks WorldSkills Leipzig, WSI and Member organizations' support for continuing MoVE International at Leipzig in 2013, and agrees to continue as the primary sponsor of the research.

That Team Leaders are asked for their feedback on MoVE 2011 about the wording of questions in relation to different languages and cultures, the timing of the surveys, and the impact of their presentation in English.

That WorldSkills Team Leaders are provided with a copy of the MoVE 2011 overview and a letter thanking them for their efforts at WorldSkills London. If a decision is made to continue the research at Leipzig, the overview and letter could be accompanied by a draft 2013 implementation plan and timetable for the next research project. Feedback could also be requested on strategies to increase the level of online completion (including making it a designated activity in the program), and how far in advance of the Competition the surveys would need to be available.

That WSF and WSI consider enabling Member organizations to translate the survey, noting the need for translation guidelines and controls to ensure consistency.

That the MoVE research team for 2013 be determined by September 2012 so there is ample time for review and revision of study instruments and procedures, and forward planning for data collection at WorldSkills 2013.

7.6.3 Recommendations regarding the WorldSkills Foundation program

That the WorldSkills Foundation Board of Trustees explores strategies to enhance the role of the WorldSkills Youth Forum to build international leadership and advocacy capabilities.

That consideration is given to ways of involving WorldSkills Experts in advocacy and development projects in developing nations.

That consideration is given to sponsorship for practice-based leadership education and training at diploma, degree and masters level.

References WorldSkills London. If a decision is made to continue the research at Leipzig, the overview and letter could be accompanied by a draft 2013 implementation plan and timetable for the next research project. Feedback could also be requested on strategies to increase the level of online completion (including making it a designated activity in the program), and how far in advance of the Competition the surveys would need to be available.

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