SP DISCUSSION PAPER NO. 0923

Pre-Employment Skills Development Strategies in the OECD

Yoo Jeung Joy Nam

November 2009

Social Protection & Labor
THE WORLD BANK

Pre-Employment Skills Development Strategies in the OECD

Yoo Jeung Joy Nam

November 2009

This paper is the result of a joint partnership between the Social Protection Unit of the World Bank and the Korean Ministry of Labor on Skills Development. This partnership was aimed at better understanding the Korean skills development strategy and drawing lessons and best practices for developing countries. This paper benefited from the financial support of the Korean Ministry of Labor and the World Bank. The paper expresses the author's own views on the topic which are not necessarily those endorsed by the World Bank or the Korean Ministry of Labor.

Abstract: Effective pre-employment skills development strategies are critical in preparing individuals with relevant labor market skills and competencies. Within the context of rapidly changing skills demands, this paper documents and examines recent pre-employment skills development trends within OECD countries and reviews its main success factors. Despite the increasing focus on general and higher education, we document that participation in TVET systems at the upper secondary level in OECD countries has remained at approximately 50 percent of total enrollment in recent years. In response to the growing demand for general competencies and higher-level skills, there has also been an increasing trend in OECD countries to defer vocational specialization and more effectively integrate general and vocational education. Furthermore, in an effort to combat the image of TVET as a "dead-end" pathway, OECD countries are undertaking measures to improve permeability between TVET and higher education (e.g. the establishment of national qualifications frameworks). Finally, while traditional apprenticeships are declining in popularity, OECD countries are adopting new approaches of effectively integrating workplace experience in pre-employment TVET systems.

JEL: I21, J24,

Keywords: skills development, pre-employment, labor market outcomes, apprenticeships

Author:

YooJeung Joy Nam, World Bank, 1818 H Street, NW, Washington DC 20433 USA.
Email: ynam1@worldbank.org

Table of Contents

List of Figures

List of Tables

Introduction

The importance of skills development in today's knowledge economy is undeniable. Skills development is a crucial factor and determinant of human capital accumulation, labor productivity, poverty reduction, and growth. It is a comprehensive and cross-sectoral issue that continues to occupy the agendas of both the education and labor market arenas, as well the public and private sectors in both developed and developing nations alike. However, it is this comprehensiveness that lends immense difficulty in conclusively determining how skills development is actually linked to the above-mentioned factors such as, employment and growth.

Skills development can be considered within a three pillar framework: *pre-employment skills development* to prepare future workers, *continuous skills development* to upgrade the skills of the workforce, and *skills development for the unemployed and disadvantaged* as a means of reintegration into the workforce. This paper particularly focuses on pre-employment skills development which serves the purpose of preparing future workers (e.g., youth and new labor market entrants) with relevant competencies and skills. It is often referred to as technical and vocational education (TVE). The 2001 UNESCO and ILO Recommendations characterize TVE as "a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life" (UNESCO and ILO 2002).[1]

Considered within the three pillar framework, pre-employment skills development comprises an integral component of skills development, thus meriting considerable focus and attention. Many studies conclude that the returns to education and training are greater when students are younger and at earlier stages of their schooling than when they have left formal education. For instance, Martin and Grubb (2001) assert that if youth leave the schooling system without adequate skills and competencies, it is extremely difficult to overcome these barriers through future participation in labor market programs. Thus, ensuring effective pre-employment skills development is crucial in

[1] This paper will use the terms pre-employment skills development, TVE (technical and vocational education), and TVET (technical and vocational education and training) interchangeably.

contributing to the effectiveness of continuous skills development that may occur later in an individual's career development.

Striving to contribute to the discussions and debates on pre-employment skills development, this paper serves two large purposes: (a) First, the paper examines the various relevant trends associated with pre-employment skills development in the OECD, especially within the context of changing skills demands. (b) Stemming from this context, the paper reviews the key characteristics and strategies, or the so-called factors for success, with the OECD experience. Even though the transferability of these traits to developing countries is highly contestable, focusing on select, crucial aspects of technical and vocational education of OECD countries would prove valuable as an initial step.

The paper incorporates three main sections. The first section explores the changing economic context for education and skills in the labor market, focusing on the reflection of this context in labor demand and supply. I begin by illustrating the change in the types of skills and competencies demanded, followed by a discussion of the rising returns to higher levels of education and skills. The section then proceeds to show how these changing skill demands resonate in labor supply, namely by highlighting the education trends of the past several years.

The second section introduces pre-employment skills development, or TVET, in OECD countries within this changing economic context. Beginning with a general description of TVET for these countries, the various trends associated with pre-employment skills development are examined. In particular, I focus on trends in enrollment and associated labor market outcomes in terms of employment and earnings, costs, and learning outcomes.

Finally, the third section is a synthesis of three key features of technical and vocational education in the OECD context. The three features highlighted in this paper are as follows: (a) the deferment of vocational specialization, the integration of vocational and general education; (b) permeability of TVET systems, with increased bridges to tertiary education; and (c) the inclusion of workplace experience with education, as in apprenticeships. These key features will be examined in light of their objectives and characteristics, examples, and outcomes or impacts where possible.

I. Changing Economic Context for Education and Skills Demands in the Labor Market and Current Trends

1.1 Reality of the Changing Labor Market Demands

Prior to delving into the key features of TVET systems in OECD countries, it is necessary to examine the changing economic context for education and skills demands in the labor market and the trends that reflect these new demands. The dynamic forces of the knowledge economy, accompanied by changing markets, scientific and technological advances, and increasing globalization and internationalization, call for a new face of skills and competencies. Such skills and competencies are not only highly desired, but also often required in order to meet the demands of this changing economic context and labor market realities.

1.1.1 General Characterization of Types of Skills Demanded

First, there has been a shift from a more narrowly defined vocational training (VT) that is dominated by technical skills to a broadly viewed technical and vocational education and training (TVET) where generic or transferable skills thrive alongside the technical (Leney 2008). The increasing focus on the so-called generic, transferable, core, or key skills lies in the fact that they can be applied across varied organizational and employment contexts (Payne 2004). Reflecting this increased focus and demand, various OECD countries have attempted to define these core skills and competencies often called "skills of the 21st century" or "higher-order skills" (Grubb 2006). While individual countries have their own nomenclature (e.g., "key" and "core" skills in Great Britain; *Schlüsselqualificationem* (key qualifications) in Germany, *qualificaciones quiaves* in Spain), the actual skills are very similar across the countries. Determined from a variety of sources such as, employer surveys and task analysis, the skills typically include problem-framing and -solving, communications skills and teamwork, information analysis, critical thinking and reasoning "skills" (Grubb 2006).

However, the reality of the increasingly global economy and technological advances also continue to accentuate the need for higher level, highly specialized skills and competencies. Countries are striving to embrace the high value-added, high skills areas of production and services that generate sizeable profits in the international market (UNESCO 2006).

In addition to the generic versus specific characterization of skills, there is an increasing focus on hard and soft skills. Employers desire workers that possess soft or life skills in addition to hard skills. Hard skills refer to the technical and analytical competencies and know-how that allow the worker to perform the mechanical aspects of a job (Batlle 2006). In contrast, soft or life skills are those "abilities for adaptive and positive behavior that enable individuals to deal effectively with the demands and challenges of everyday life. In particular, life skills are a group of psychosocial competencies and interpersonal skills that help people make informed decisions, solve problems, think critically and creatively, communicate effectively, build healthy relationships, empathize with others, and cope with and manage their lives in a healthy and productive manner (World Health Organization 2003."

1.1.2 More Specific Characterization of Types of Skills Demanded

According to Levy and Murnane (2005), human skills can be categorized into five major categories:

i. *Expert thinking*: Solving problems for which no rule-based solutions exist; for example, repairing a malfunctioning automobile that the computer diagnostics report to have no problem.

ii. *Complex communication*: Interacting with others to acquire information, explain the information, or persuade others regarding implications for action; for example, a manager motivating the people whose work he/she supervises.

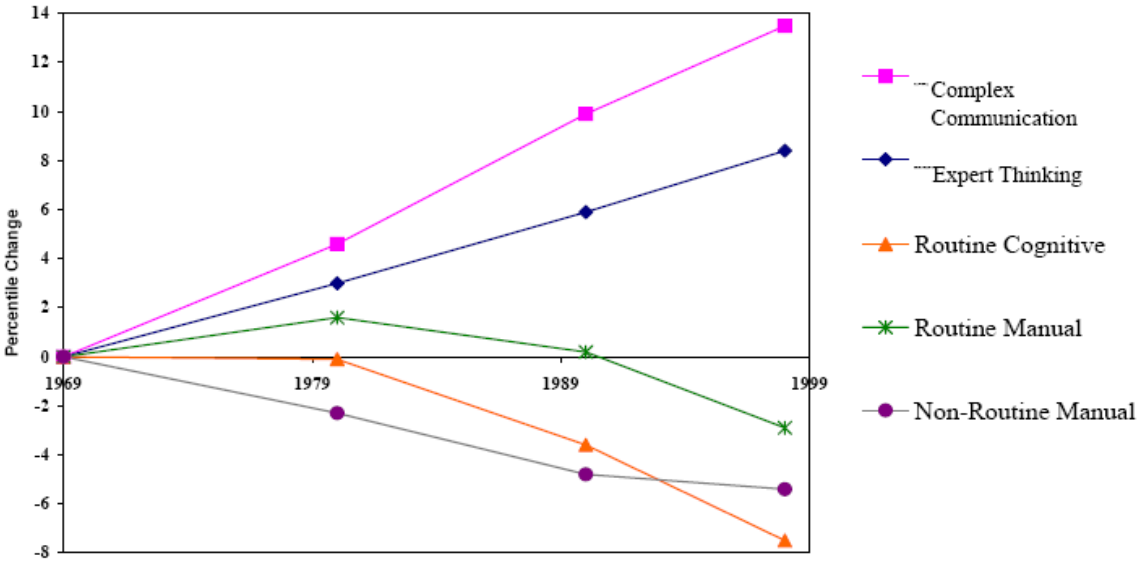
iii. *Routine cognitive tasks*: Mental tasks that can be well described and performed by following a set of rules; for example, maintaining expense reports.

iv. *Routine manual tasks*: Physical tasks that can be well described and performed by following a set of rules; for example, counting and packaging pills in containers in pharmaceutical companies.

v. *Non-routine manual tasks*: Physical tasks that cannot be well described as following a set of "if-then-do" rules as they require optical recognition and fine muscle control; for example, driving a truck.

The figure 1 below displays the changing trends in skills demands in the United States economy from 1969 to 1998. A steady increase occurred in tasks requiring expert thinking and complex communication. And, while jobs demanding routine cognitive or manual skills remained steady in the 1970s, they experienced a decline throughout the next two decades. There was also a decrease in tasks requiring non-routine manual skills throughout the period. In brief, jobs emphasizing expert thinking and complex communication skills continue to rise as technology supplants jobs accomplished by following set rules.

Figure 1. Trends in skills demanded 1969-1998 (1969=0)



Source: Levy and Murnane, 2005.

Autor, Levy, and Murnane (2001) further elaborate on how the recent technological advancements affect the type of skills demanded in the labor market. They show how computerization is associated with decreasing relative labor demand for routine manual, cognitive tasks and increasing relative demand for non-routine cognitive tasks. To elaborate, computers contribute to the increase in the share of human labor input towards non-routine cognitive tasks by overtaking routine manual and cognitive tasks previously performed by professionals. Consequently, this outward shift in the supply of routine informational inputs increases the marginal productivity of non-routine human labor that relies on these inputs. Computerization has contributed importantly to the rise in demand of non-routine cognitive tasks like problem-solving.

1.2 Schemes for Identifying and Categorizing Skills

Various schemes exist in identifying and categorizing this comprehensive set of skills. One leading method of characterizing knowledge and skills is that of Bloom's taxonomy. As shown in Table 1, Bloom's taxonomy is broadly divided into cognitive, affective, and psychomotor skills. Cognitive skills refer to mental skills or knowledge; affective skills refer to attitude and the emotional aspects of learning; and psychomotor skills refer to manual or physical skills (Leney et al., forthcoming).

Table 1. Bloom's Taxonomy

Cognitive Skills	***Affective Skills***	***Psychomotor Skills***
• Synthesis	• Internalizing values	• Adaptation
• Analysis	• Organizing	Complex overt response
• Application	• Prioritizing	• Mechanism
• Comprehension	• Valuing	• Guided response
• Recall	• Active participation	• Set response
	Awareness and attention	• Perception

Source: Adapted from Leney, 2008.

In addition, the OECD's DeSeCo key competency framework, as highlighted in Table 2, provides another method of identifying and classifying the so-called key competencies, by differentiating them into three broad categories: (1) using tools interactively; (2) interacting in heterogeneous groups; and, (3) acting autonomously. First, using tools interactively refers to the ability to use a variety of both physical and socio-cultural tools such as, technology and language respectively, to interact effectively with the environment. The second and third competencies highlight the importance of life or soft skills. One must have the capacity to interact and engage effectively with others in heterogeneous groups, but also be able to take responsibility for one's own life and act autonomously (Leney 2008; OECD 2005).

Table 2. OECD's DeSeCo Key Competency Framework

Competency 1 Using tools interactively
The ability to use language, symbols, and text interactively The ability to use knowledge and information interactively The ability to use technology interactively
Competency 2 Interacting in heterogeneous groups
The ability to relate well to others The ability to cooperate The ability to manage and resolve conflicts
Competence 3 Acting autonomously
The ability to act within the big picture The ability to form and conduct life plans and personal projects The ability to assert rights, interests, limits, and needs

Source: Leney, 2008.

A final way of identifying and classifying core skills and competencies is through qualifications frameworks, as in the European Qualifications Framework (See section 3.2 for a detailed discussion).

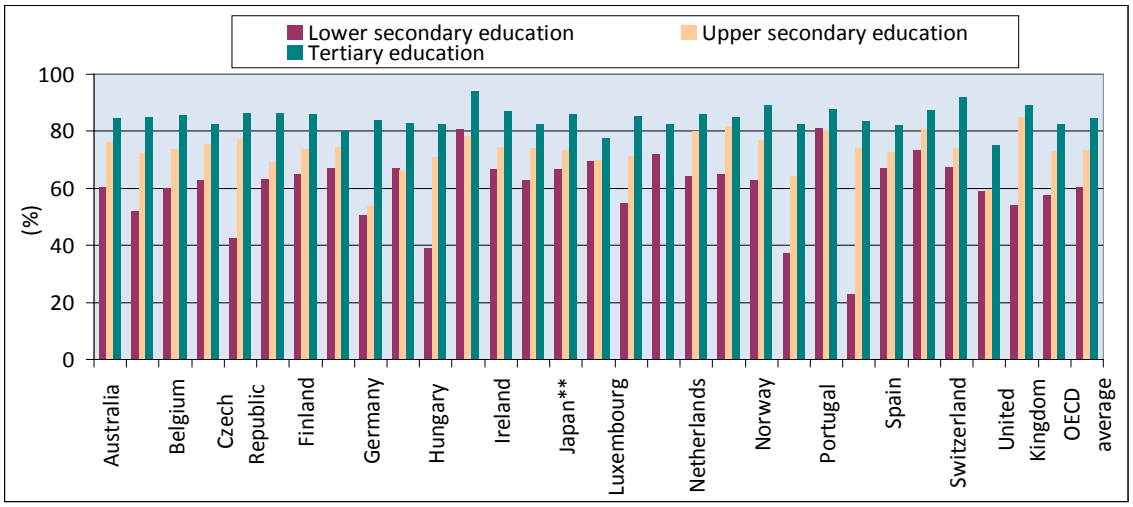
1.3 Rising Returns to Higher Levels of Education and Skills

1.3.1 Correlation between Educational Attainment and Labor Market Outcomes

The changing labor market demands for higher level skills and competencies is reflected in the increased employment prospects associated with higher levels of educational attainment. Indeed, upper-secondary education attainment is considered to be a minimum level requirement in earning a satisfactory position in the labor market for OECD countries. On average, upper secondary

education attainment is associated with a reduction in the unemployment ratio (unemployment among non-students as a percentage of the age cohort) among 20-24 year olds by 7.3 percentage points and that of 25-29 year olds by 7.1 percentage points (OECD 2007). Also, unemployment rates for individuals who have completed upper secondary education is 4 percentage points lower than for those with merely lower secondary education attainment (OECD 2006). Similarly, participation in tertiary education programs is generally associated with improved access to employment, as shown in Figure 2 below. With the exception of a few countries, the employment rate for tertiary education graduates as compared to that for upper secondary graduates is considerably higher at approximately 10 percentage points on average for OECD countries. The difference spans from several percentage points to 14 percentages points and more in Luxembourg, Mexico, Poland, and Turkey (OECD 2006).

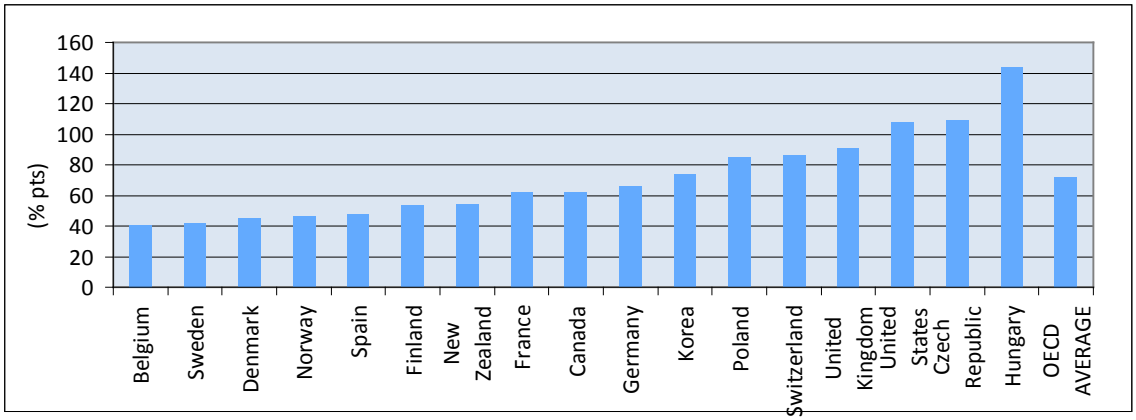
Figure 2. Employment Rates by Educational Attainment (2004)



Note: *Data for general education. ** Japan: Year of reference 2003.
Source: Adapted from OECD, 2006.

Illustrating a strong positive relationship between educational attainment and average pre-tax earnings, Figure 3 illustrates differences in earnings by educational attainment. There appear to be more pronounced earnings differentials between individuals with tertiary education and those with upper secondary education than differentials between upper secondary and lower secondary or below. The earnings premium for 25-64 year olds with tertiary level education, relative to upper secondary education, among those countries that report gross earnings, range from 41 percentage points in Belgium to 144 percentage points in Hungary (OECD 2006).

Figure 3. Earnings Differentials between Adults (25-64 years) with Below Upper Secondary Level Attainment and Tertiary Level Attainment (2004)



Note: *Belgium, Sweden, Denmark, Norway, Finland, Canada, and Korea are based on 2003 data.
Source: Adapted from OECD, 2006.

1.3.2 Impact of Technological Change on Skills Demands and Labor Market Outcomes

The recent consensus, adopted by many but not all,[2] is that technological change favors more-skilled workers (skill-biased technical change), replaces tasks previously performed by unskilled workers, and increases earnings inequality (Acemoglu 2002). Regarding this impact on earnings inequality, Acemoglu (2002) argues that the behavior of earnings and returns to schooling indicates that technological change has been skill-biased for the past 60 years. Moreover, he asserts that the recent increase in earnings inequality over the past few decades is due predominantly to the acceleration in skill bias. More pointedly, Autor, Levy, and Murnane (2001) show how recent technological advancements have increased the relative demand for non-routine cognitive tasks. This shift in skills demand has substantially increased the demand for more educated labor in the United States. In particular, computerization and the observed task shifts contributed to increased

[2] For example, Lemieux (2007) emphasizes the concentration of inequality growth in the top end of the distribution since 1990, thus highlighting one major inconsistency with the skills-biased technical change explanation for earnings inequality. Another limitation of the skills-biased technical change explanation is that unlike the United States and Canada, other advanced economies such as France, Japan, or Germany did not experience any significant inequality growth in the 1980s. He points towards other demand-side and institutional explanations, namely de-unionization, the increased prevalence of pay- for- performance, and changes in the relative demand for the types of workers in high-paying occupations for this concentration of earnings inequality in at the top end of the distribution.

growth in college-educated labor employment in the 1970s as compared to the 1960s, with the greatest impacts in the 1980s and 1990s.[3]

1.4 How These Skills Demands Are Reflected in Labor Supply

Within this changing context of skills demands, it is necessary to examine how the labor demands are reflected in labor market supply. Because the focus of this paper lies within pre-employment skills development, or TVE, this section will also examine trends in labor market supply within the context of secondary and tertiary education rather than TVE that occurs within firms or TVE aimed at the unemployed or disadvantaged.

1.4.1 Attainment

Notably, education trends in OECD countries clearly show an increase in secondary and tertiary education attainment over the past several decades. Between 1995 and 2004, education expectancy increased by approximately 13 percent in all OECD countries for which comparable trend data was available (OECD 2006). The Czech Republic, Finland, Greece, Hungary, Iceland, Poland, Turkey, and the United Kingdom have all shown remarkable increases of 16 percent or higher during these recent years. The following chart provides a snapshot of the education expectancy of OECD countries, calculated to show the average number of years a five-year-old can expect to be formally enrolled in education during his or her lifetime (OECD 2006).

[3] The sum of within-industry and within-occupation task changes explains 30- to 40 percent of the observed relative demand shift favoring college-educated over non-college- educated labor from 1970 to 1998. Shifts in task content within nominally identical occupations account for over 50 percent of the overall demand shift caused by computerization (Autor, Levy, and Murnane, 2001).

Figure 4. Education Expectancy (2004): The Average Number of Years a Five-Year-Old Can Expect To Be Formally Enrolled in Education during His/Her Lifetime

Note: * The education expectancy is calculated by adding the net enrollment rates for each single year of age from five onwards. Note that the length of the school year and the quality of education may vary from country to country.

Source: OECD, 2006.

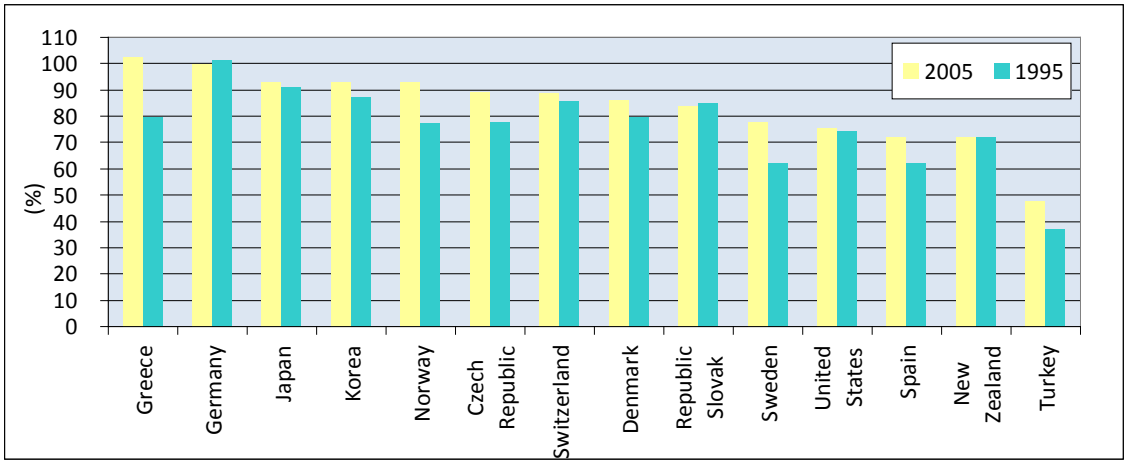
1.4.2 Expected Years in Education

Another way of exhibiting this increase in educational attainment is through the change in expected years of education. On average in OECD countries, students in 2004 could expect to spend approximately two years more in the education system compared to 1995. Of considerable interest are countries such as, Greece, Hungary, Iceland, Turkey, and the United Kingdom that showed an increase of more than three years in expected years of education in the same period of time. The reasons for this increase vary across countries: Greece, Hungary, Iceland, Korea, Poland, and Sweden have predominantly experienced an increase in participation at the tertiary level; the Czech Republic, Finland, Turkey, and the United Kingdom have mostly increased participation in their pre-primary, primary, secondary, and post-secondary non-tertiary education (OECD 2006).

1.4.3 Graduation Rates

Reflecting such reasons and trends, graduation rates for upper secondary as well as tertiary type A and tertiary type B programs have increased in OECD countries in recent years.[4] Figure 5 shows that the proportion of students graduating from upper secondary programs has increased by 7 percentage points on average in the last 10 years for OECD countries with comparable data. Greece, Norway, and Sweden, in addition to the partner economy Chile, have experienced the highest growth. In 21 of 24 OECD countries and 3 partner economies[5] with available data, upper secondary graduation rates surpass 70 percent. Remarkably, graduation rates equal or exceed 90 percent in Finland, Germany, Greece, Ireland, Japan, Korea, and Norway (OECD 2007).

Figure 5. Graduation Rates for Upper Secondary Education (1995, 2005)



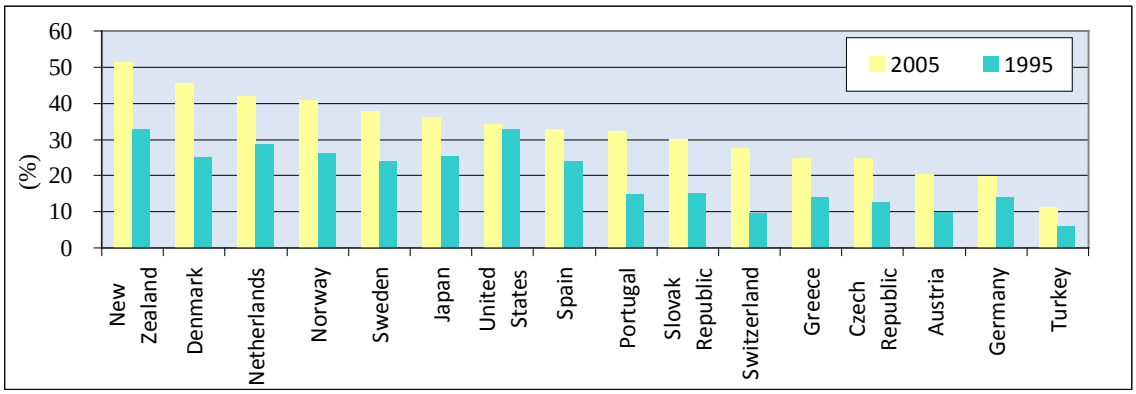
Source: OECD, 2007.

Similarly, graduation rates for tertiary type A programs have increased on average by 12 percentage points from 1995 to 2005 in OECD countries (Figure 6). Graduation rates for tertiary type B programs are more variable, although the OECD average has remained fairly stable. Spain has experienced a sharp increase in type B graduation rates due to the development of new advanced level, vocational training programs, while type B programs in Finland's declining graduation rates reflect the phasing out of these programs (OECD 2007).

[4] Tertiary type A programs (ISCED 5A) are mainly theory-based, designed to prepare students for entry into advanced research programs and professions with high skills requirements. Tertiary type B programs (ISCED 5B) programs focus on technical or occupational skills for direct entry into the labor market, and are usually shorter than tertiary type A programs (OECD, 2002a) (OECD. 2002. Education at a Glance: Glossary. Paris.).

[5] Partner economies are Brazil, Chile, Estonia, Israel, the Russian Federation, and Slovenia.

Figure 6. Graduation Rates for Tertiary Level (1995, 2005)



Source: Leney, 2004.

1.5 Summary

In order to establish the context for discussions on TVET systems in OECD countries, this section explored the changing economic context for education and skills and the trends reflecting these demands. The key points are summarized and highlighted below:

- There is an increasing focus on generic, core, and transferable skills that can be employed in variety of contexts.
- At the same time, however, the reality of the increasingly global economy and technological developments emphasize the need for higher level, often highly specialized and non-routine skills and competencies.
- There are rising returns to higher levels of education and skills, as evidenced by the positive correlations between educational attainment and employment rates as well as earnings.
- The labor demands are also reflected in the labor supply, as witnessed by the increase in expected years in education as well as graduation rates for upper secondary and tertiary education.

II. Vocational Education and Training within This Changing Context

In light of this changing economic environment for higher level skills and competencies, it is necessary to consider the role of technical and vocational education and training (TVET) within an educational as well as a labor market context. This section will begin by highlighting the general characteristics of TVET in OECD countries followed by an examination of the trends in TVET enrollment for lower and upper secondary, as well as tertiary education levels. The next section will examine the labor market outcomes and returns to TVET, namely in terms of employment and earning outcomes, as well as the transition from school to work. Finally, the section will discuss the two main constraints associated with TVET, namely those of costs and learning outcomes.

2.1 General Description and Characteristics of TVET in OECD Countries

First, pre-employment vocational education may take one of two forms in OECD countries (OECD 2007). Pre-vocational programs are predominantly designed to introduce students to the world of work and prepare them for further vocational or technical programs. Vocational programs, on the other hand, prepare students for direct entry into the labor market without further training. Successful completion of vocational programs leads to a labor market-relevant vocational or technical qualification, while pre-vocational programs do not.

Another crucial distinction within pre-employment skills development, or TVET, is the level at which the education and training occurs. This paper will employ the International Standard Classification of Education (ISCED) 1997 classification developed by UNESCO, the most widely used standards for international education classifications, to determine these levels (UNESCO 2006). The levels generally of concern to TVET range from ISCED 2 (lower secondary), ISCED 3 (upper secondary), ISCED 4 (post-secondary non-tertiary), and ISCED 5 (tertiary). Moreover, each of these levels is further subdivided on the basis of the intended program destination.[6] Indeed, the classification of

[6] ISCED Level 2: Level 2A programs are designed to prepare students for entry to Level 3A or 3B programs, which may lead to tertiary education. Level 2B programs are designed to prepare students for 3C programs, which lead to direct entry to the labor market. Level 2C programs are designed mainly to provide direct access to the labor market.
ISCED Level 3: Level 3A programs are designed to provide students direct access to Level 5A programs. Level 3B programs are designed to provide direct access to 5B programs. Level 3C programs are designed to provide direct entry to the labor market, Level 4 programs or other Level 3 programs.

TVET programs by ISCED level proves to be rather complicated and challenging due to their greater heterogeneity, shorter average duration, and higher specificity (UNESCO 2006).

Furthermore, on the basis of the amount of classroom training versus workplace training, these programs can be further divided into school-based and combined school- and work-based programs (OECD 2007). In school-based programs, at least 75 percent of the instruction occurs in the school environment. In combined school- and work-based programs, on the other hand, less than 75 percent of the curriculum is presented in the school environment.

2.2 Trends in TVET Enrollment

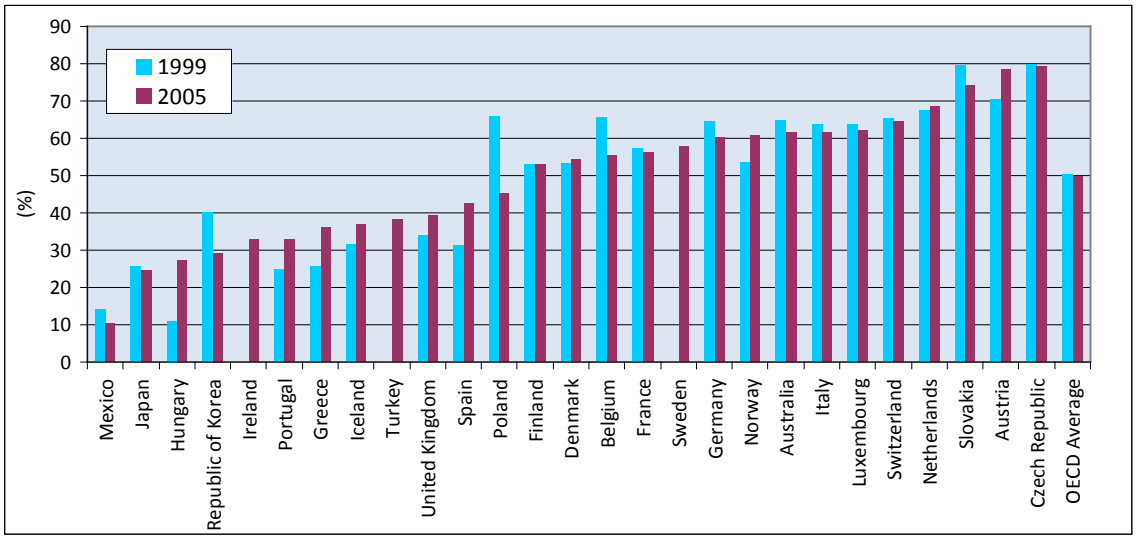
First, upon examining the enrollment trends for TVET at the secondary education level, one is able to realize that TVET continues to be a route taken by a considerable proportion of the population in OECD countries. Although technical and vocational education is often viewed as secondary or supplementary to general education, Figure 7 reveals that the OECD average for the percentage of TVET enrollment at the ISCED 3 or upper secondary level within total enrollment at this level remained at approximately 50 percent between 1999 and 2005. The proportion of TVET enrollment at the ISCED 2 or lower secondary level decreased by several percentage points between 1999 and 2005, but most OECD countries focus their provision of TVET at the upper rather than the lower secondary level. Notably, TVET enrollment at the upper secondary level in Australia, Austria, the Czech Republic, Germany, Italy, Luxembourg, the Netherlands, Norway, Slovakia, and Switzerland exceeds 60 percent of the total enrollment at this level. In Belgium, Poland, and Korea, however, this proportion has declined by at least 10 percentage points.

ISCED Level 4: Level 4 programs are significantly more advanced than Level 3 programs and are generally attended by students who are older than those at Level 3. Level 4A programs are designed to provide direct access to Level 5B programs. Level 4C programs are designed to provide direct entry to the labor market or other Level 4 programs.

ISCED Level 5: Level 5A programs are broadly theoretically-based, involving at least three years of study to provide sufficient qualifications for entry into advanced research programs or professions with high-skill requirements. Level 5B programs are more practically-oriented and occupationally-specific than 5A programs, involving at least two years of study, but do not prepare students for direct access to advanced research programs. (UNESCO, 2006: 18).

When the dual-system apprenticeship programs[7] in Austria, Germany, Luxembourg, the Netherlands, and Switzerland are combined with the programs offered in Australia, Belgium, the Czech Republic, Finland, Italy, Norway, Slovakia, the United Kingdom, and partner economy Slovenia, 60 percent or more of upper secondary students in OECD countries are enrolled in pre-vocational or vocational programs. Exceptions lie in Greece, Hungary, Iceland, Ireland, Japan, Korea, Mexico, and Portugal and partner economies Brazil, Chile, Estonia, and Israel, where 60 percent or more of upper secondary students are enrolled in general education programs even though pre-vocational and/or vocational programs are offered (OECD 2007). Although upper secondary vocational education is school-based, approximately 50 percent of the vocational programs incorporate both school- and work-based elements in Austria, the Czech Republic, Iceland, and Slovakia. Furthermore, approximately 75 percent of those enrolled in vocational programs in Denmark, Germany, Hungary, Ireland, and Switzerland have both school- and work-based components (OECD 2007).

Figure 7. Percent of TVET Enrollment in ISCED 3



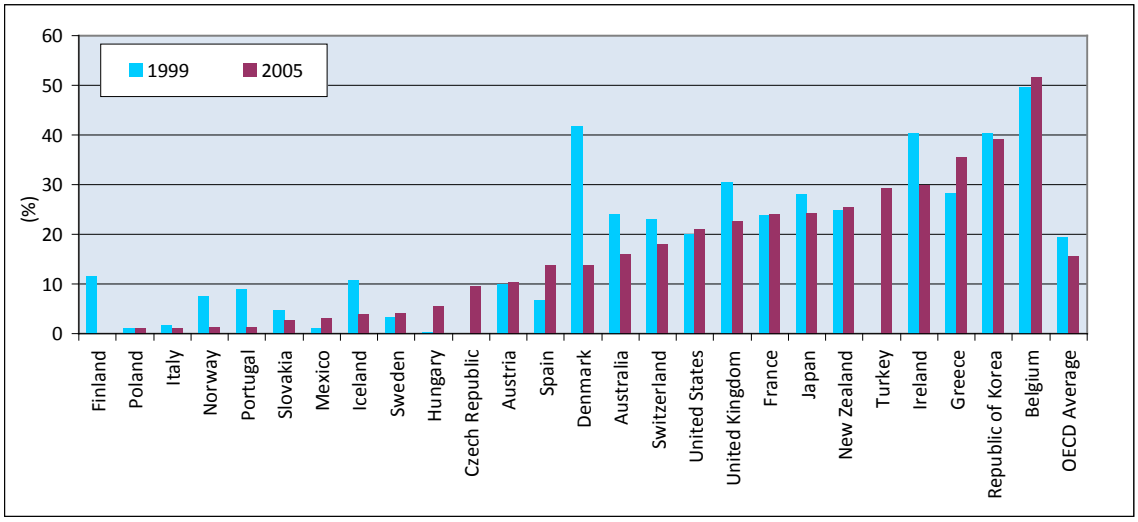
Source: UNESCO Institute for Statistics (UIS) Database.

Figure 8 below shows that the proportion of students enrolled in ISCED 5B or TVET at the tertiary level is not as high, with the average declining from 19.4 percent to 15.7 percent between 1999 and 2005. Within those countries with available data, Australia, Denmark, Finland, and Ireland show the largest declines, with the greatest decline in Denmark from 41.7 percent to 13.8 percent. In

[7] Apprenticeship systems will be further discussed in the Section 3.3.

contrast, enrollment in TVET at the tertiary level in Belgium, Greece, and Korea exceeds 35 percent of the total enrollment at this level.

Figure 8. Percent of TVET Enrollment in ISCED 5



Source: UNESCO Institute for Statistics (UIS) Database.

2.3Effectiveness of TVET

2.3.1 Quantitative Assessment of Labor Market Outcomes and Returns to TVET

Employment and Earnings

When considering the labor market outcomes and returns to TVET, it is necessary to compare employment and earnings with those of general education. Although mere correlations between TVET participation and labor market outcomes, they are helpful in shedding initial light on this complex, multi-faceted issue.

Employment

First, as highlighted in Figure 9 and Figure 10 below, the average employment rates of upper secondary TVET graduates and upper secondary general education graduates in 2005 appear to be considerably similar, with the rates of TVET graduates often being slightly higher. Across countries, nevertheless, clear differences exist. For male graduates, the OECD average for ISCED 3C long/3B is

84 percent while that for ISCED 3A[8] is two points lower at 82 percent.[9] For female graduates, the average for ISCED 3C long/3B is 64 percent, while the average for ISCED is two percentage points higher at 66 percent. The difference in employment rates of graduates between the two education streams at the upper secondary level hovers around a few percentage points, with the higher rate often occupied by the TVET graduates.

Figure 9. Difference in Employment Rates between Graduates of General and Vocational Education at the Upper Secondary Level – Males

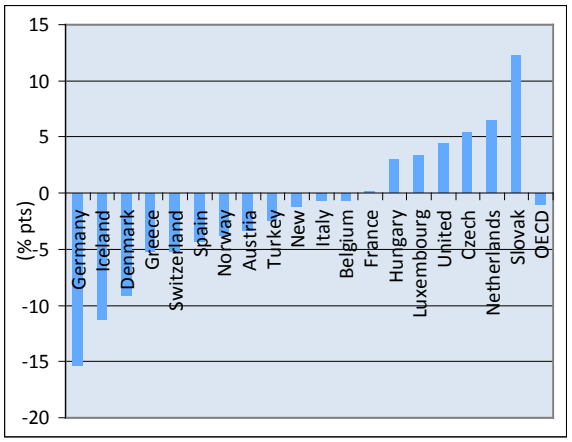
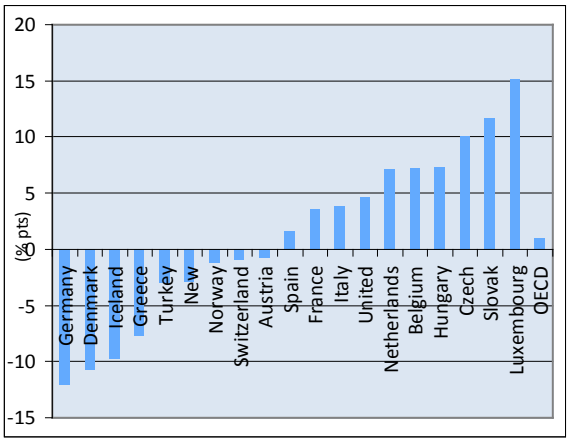


Figure 10. Difference in Employment Rates between Graduates of General and Vocational Education at the Upper Secondary Level – Females



Source: Adapted from OECD, 2007.

At the tertiary level, the average employment rates of TVET and tertiary general education graduates also appear to be fairly similar, and again with considerable differences across countries. However, at this level, the employment rates for general education graduates appear to be a few percentage points higher than TVET graduates in many countries. For male graduates, the OECD average for ISCED tertiary type B is 88 percent while the average for ISCED tertiary type A is 89 percent. The average employment rate for female graduates in both streams is 79 percent.

[8] Refer to the explanation of the ISCED levels on p. 16-17.

[9] Although pre-vocational and vocational education and training can also occur at the ISCED 2A and ISCED 3A level, for purposes of simplicity, this paper will focus TVET enrollment trends at the ISCED 3B, 3C, and 5B level in examining the correlation with employment and earnings.

Figure 11. Difference in Employment Rates between Graduates of General and Vocational Education at the Tertiary Level – Males

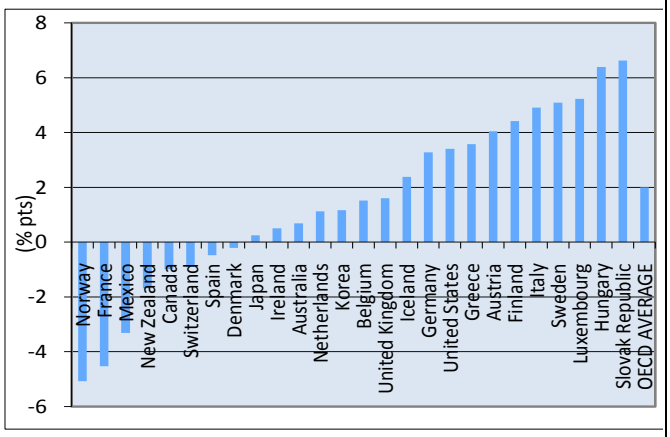
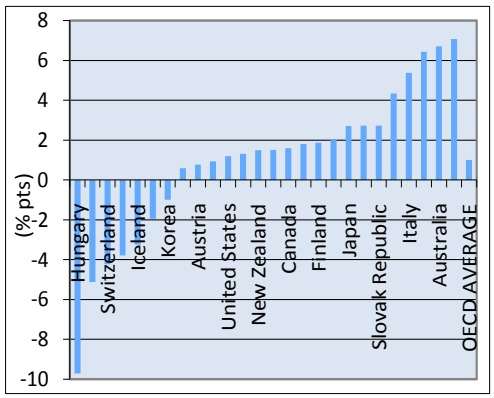


Figure 12. Difference in Employment Rates Between Graduates of General and Vocational Education at the Tertiary Level – Females



Source: OECD, 2007.

Unemployment rates complement employment rates to provide greater insight into the outcomes associated pre-employment skills development. The difference in average unemployment rates between ISCED 3C long/3B male graduates and ISCED 3A male graduates in 2005 is very small, at 5.5 percent and 5.2 percent respectively. However, for females, the difference is considerably greater at 8.8 percent and 6.9 for the former and latter, respectively. Considerable concern lies in countries like Greece and Slovakia where the unemployment rate for female TVET graduates at the upper secondary level is almost 10 percentage points greater than that of female general education graduates at the same level.

At the tertiary level, the difference in average unemployment rates for graduates of the vocational and general tracks in 2005 is 0.5 for males (4.1 and 3.6 respectively) and 0.5 for females (4.8 and 4.3 respectively). While Australia, Canada, Finland, Germany, Italy, Japan, Korea, and the United States show greater unemployment rates for TVET graduates at the tertiary level, Belgium, France, Mexico, and the United Kingdom exhibit greater unemployment rates for TVET graduates. Notably, in Denmark, Greece, and Spain, the unemployment rate for male tertiary type B graduates is lower than that of male tertiary type A graduates, while it is just the opposite for female graduates.

Earnings

Another crucial point of comparison between the two streams of education (general versus vocational) lies in the earnings of their graduates. Figure 13 shows that in 2005, or the latest available year, the earnings differential for 25-64 year olds with tertiary type A level or general education relative to tertiary type B level or vocational education ranges from negative nineteen percentage points in Norway to 85 percentage points in Hungary, with an average of 39 percentage points. The earnings differential for the majority of OECD countries hovers around 30 to 50 points, but is considerably higher on average (greater than 60 percentage points) in the Czech Republic, the United States, Ireland, and Hungry.

Furthermore, Figure 14 examines specifically the earnings differential of 30-44 year olds with tertiary level general and vocational education. The range spans from negative 13 percentage points in Norway to 92 points in Hungary, with an average of 37 percentage points. Approximately half of the countries with available data have an earnings differential that falls between 20 and 40 percentage points. Similar to the trends for 25-64 year olds, the earnings differential for 30-44 year olds with tertiary type A level education in the Czech Republic, Ireland, the United States, and Hungary are greater on average than that of the rest of OECD countries.

Figure 13. Earnings Differentials between Tertiary Types A and B Level Education for 25-64 Year Olds (2005)

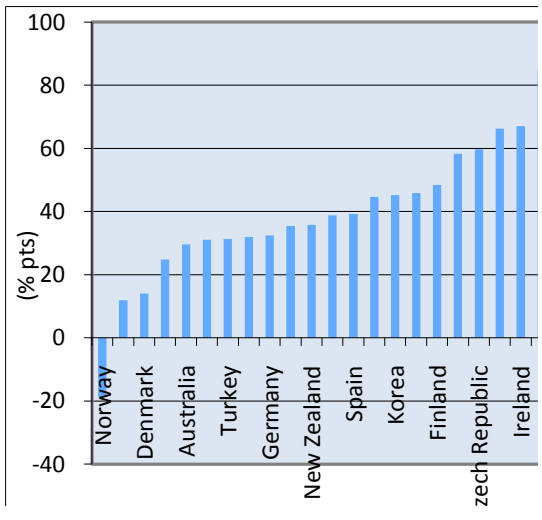
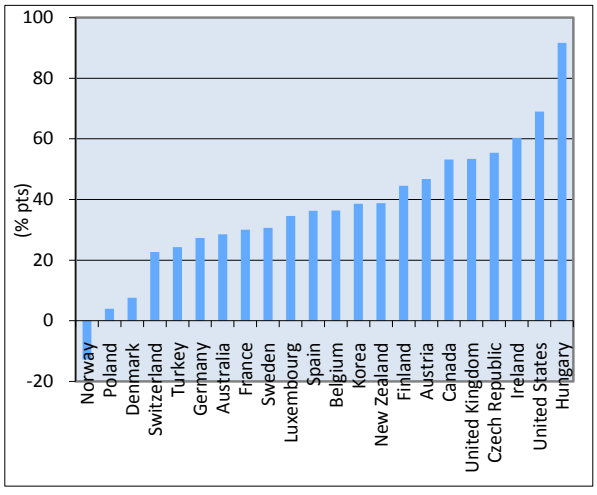


Figure 14. Earnings Differentials between Tertiary Types A and B Level Education for 30-44 Year Olds



Source: OECD, 2007.

2.3.2 A Specific Glance of TVET Assessment in Europe: Evidence from the Maastricht Study

The Maastricht Study (Leney 2004), previously entitled "Achieving the Lisbon Goal: The Contribution of VET," was produced for the European Commission's Directorate-General for Education and Culture to assess the contribution of TVET in striving towards the goals established by the Lisbon Conference in 2000. Indeed, the Lisbon strategy aims to create a highly competitive and dynamic knowledge-based economy in Europe, characterized by sustainable growth, more and better jobs, and greater social cohesion by 2010. The findings were presented at the Maastricht Conference in 2004; this section highlights a few relevant and insightful results from this comprehensive study. And, although this paper focuses on OECD countries, this section will portray Europe in a general light as the findings from this study are based on results from both the OECD as well as the non-OECD European countries.

Comparison of Levels of Participation in Pre-Employment TVET and Continuous TVET for European Countries

First, Table 3 below shows levels of participation in pre-employment TVET against participation in continuous TVET for the European countries. Of particular interest is the prevalence of OECD countries that have greater than 50 percent of youth in a vocational stream of education at the upper secondary level, compared to those in a general education stream.

Table 3. Levels of Participation in Pre-Employment TVET and Continuous TVET for European Countries

Students in Vocational and Pre-vocational Education as a share of all students in Isced 3, 2002.		LOW (0% < 5%)	MEDIUM (5% < 12,5%)	HIGH (>=12,%)
	HIGH (>=50 %)	Italy Poland Romania	Austria Belgium Czech Republic France* Germany Slovakia** Slovenia Luxembourg	Denmark Finland Netherlands Norway UK
	MEDIUM (30<50%)	Bulgaria Greece Hungary Malta	Spain Latvia Estonia	Iceland Sweden
	LOW (<30%)	Cyprus Lithuania Portugal	Ireland	
Life-long Learning (adult participation in education and training), 2002				

Notes: * 2003 value for France (adjustment of reference period). ** 2003 value for Slovakia due to restriction in self-learning activities (harmonization of definition of education and training).

Source: Leney, 2004.

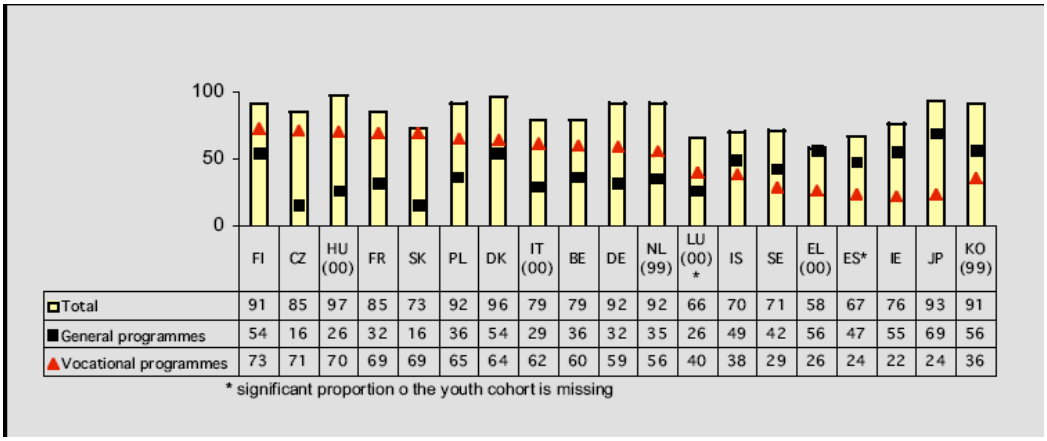
While some countries (Germany and the United Kingdom) are based predominately on an apprenticeship or dual systems, the majority of the European countries (most EU10 and Finland) employ a mainly school-based system of pre-employment TVET (specifically Ireland and Italy).

TVET Participation and Upper Secondary Graduation Rates

Notably, the study suggests that in the European countries, participation in TVET programs is closely correlated to graduation from upper secondary programs. Figure 15 depicts the upper secondary graduation rates of the population at the typical age of the European countries in descending order, in addition to Korea and Japan. In the majority of the highlighted countries, graduation rates from vocational programs are higher than those from general programs. Moreover,

countries with high total upper secondary graduation rates have high graduation rates from TVET programs, whereas no such patterns appear for graduation from general programs. Countries with lower total upper secondary graduation rates mostly have above average graduation rates from general programs. Furthermore, for those countries with available data, in recent years, the correlation between total upper secondary graduation rates and graduation from TVET programs has strengthened, while the correlation between total graduation rates and graduation from general education programs has weakened.[10] Thus, the study asserts that ensuring a supply of high quality TVET at the upper secondary or ISCED level is one effective contributory measure in promoting higher levels of upper secondary level graduation (Leney 2004).

Figure 15. Upper Secondary Graduation Rates (2001)
(% of Total Population at Typical Age)



	FI	CZ	HU (00)	FR	SK	PL	DK	IT (00)	BE	DE	NL (99)	LU (00) *	IS	SE	EL (00)	ES*	IE	JP	KO (99)
Total	91	85	97	85	73	92	96	79	79	92	92	66	70	71	58	67	76	93	91
General programmes	54	16	26	32	16	36	54	29	36	32	35	26	49	42	56	47	55	69	56
Vocational programmes	73	71	70	69	69	65	64	62	60	59	56	40	38	29	26	24	22	24	36

* significant proportion o the youth cohort is missing

Source: Leney, 2004.

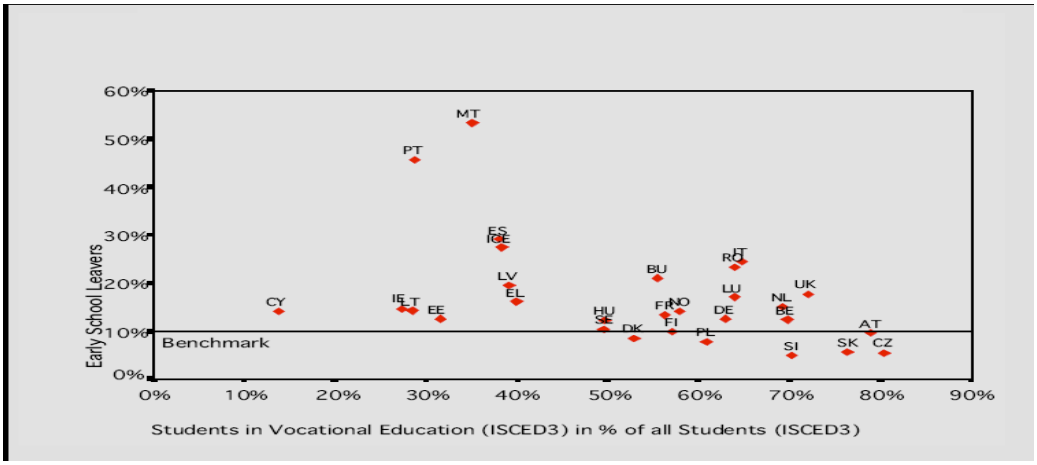
TVET Participation and School Dropout

In addition to the positive correlation with upper secondary level graduation rates, study results show that most European countries with low levels of early school dropout also have high levels of participation in TVET (Figure 16). More specifically, 16 out of the 19 countries with 50 percent or more students participating in vocational programs (both school- and apprenticeship-based systems) at the upper secondary or ISCED 3 levels show low levels of early school leavers. Exceptions lie with Italy, Bulgaria, and Romania, with high levels of upper secondary students in TVET and high levels of early school leavers (20 percent or more). Regarding dropouts, more variation exists among countries with less than 40 percent of upper secondary students in vocational

[10] For more information, refer to Leney, 2004: Section 5.3.1.

programs. Certain countries, namely, Iceland, Malta, Portugal, and Spain, have low participation rates in TVET and high levels of early school leavers. Others such as, the Baltic States, Cyprus, Greece, and Ireland are characterized by low levels of TVET and low levels of early school leavers. Moreover, for those countries with available data for several years (EU15 with the exception of the United Kingdom and Ireland), the study suggests that the correlation between participation in TVET and not dropping out before upper secondary education graduation has strengthened.[11]

Figure 16. Students in Vocational and Pre-Vocational Education and Training (Upper Secondary) and Early School Leavers (2002)



Source: Leney, 2004.

2.3.3 Qualitative Assessment of Attitudes and Perceptions of TVET

In addition to the quantitative assessment of the relationship between TVET and employment and earnings, it is necessary to discuss the qualitative evaluations of the effectiveness of TVET. This section draws upon an international research project that was commissioned by the City and Guilds Institute in 2007 on the attitudes and perceptions of skills development. The research incorporated the responses from 2,000 employers and practitioners across OECD countries of Australia, Canada, Denmark, Germany, Hungary, and the United Kingdom in addition to the non-OECD countries of India, Malaysia, and South Africa. Employers varied by both size and sector; practitioners were from a mix of publicly- and privately-funded institutions (City and Guilds Center for Skills Development, 2008).

[11] For more information, refer to Leney, 2004: Section 5.3.2.

Workplace Readiness

Employers were asked whether they believed vocational education and training prepared employees to be "workplace ready." A majority of 79.6 percent replied *yes*, while a mere 14.7 percent responded *no*, and 5.7 percent stated that they *don't know*.[12]

Within OECD countries, German employers are the most inclined to believe that vocational education and training prepares employees to become workplace ready (93.0 percent), while employers in the United Kingdom (66.0 percent) are the least inclined to believe (Annex, Figure 1 for more details).

Does Supply Meet Demand?

Regarding how well supply met demand, practitioners were asked whether the number of trainees in their subject areas met employer needs. Employers were asked whether supply met demand, considering the availability of appropriate training within their industry.

Table 4. Does the Number of People Trained in Their Subject Areas Meet the Needs of Employers (All Practitioners)? Considering the Availability of Training within Their Industry, Does Supply Meet Demand (All Employers)?

	Yes, fully	Yes, for most but not all skills levels	Yes, for some skills levels but not for others	No, there is a shortfall
Practitioners	43.0%	28.8%	14.1%	14.0%
Employers	38.5%	30.2%	15.2%	16.1%

Note: The results from this survey include all nine countries (OECD + non-OECD countries).
Source: City and Guilds Center for Skills Development, 2008.

Of practitioners, slightly over 40 percent believe that the number of trainees in their subject areas fully meets employer needs. Of employers, slightly less than 40 percent believe that supply meets the demand of their industry. Amongst OECD countries, practitioners in Denmark are more positive that the number of people trained in their subject areas meets the needs of employers. On the other hand, practitioners in Australia particularly lack confidence regarding the numbers trained meeting employer needs (See Annex, Figure 2 for more details).

[12] The results from this survey include all nine countries (OECD + non-OECD countries).

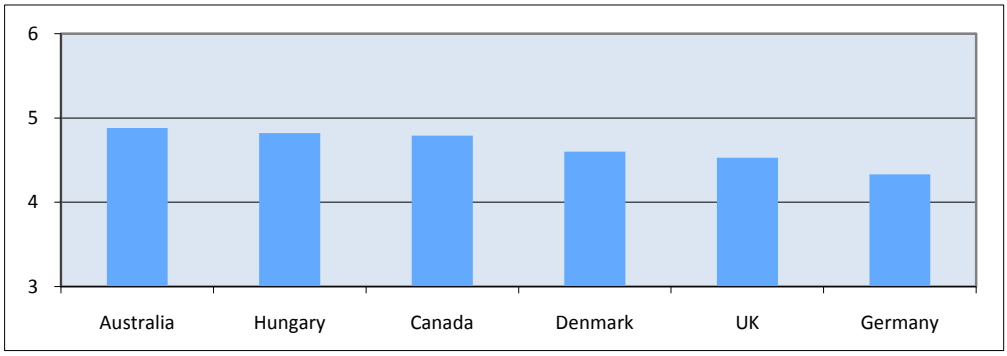
Results for employer opinions show that amongst OECD countries, employers in Hungary and Germany are the most satisfied and those in Australia and Canada are the least satisfied, with supply meeting demand (See Annex, Figure 3 for more details).

Is There a Shortfall in Supply?

Respondents were further asked regarding the extent to which they believed there was a shortfall in supply in: (1) soft skills; (2) basic skills like numeracy and literacy; (3) generic skills transferable across industries such as, management and leaderships; and, (4) job-specific technical skills. Responses ranged on a scale of 1 to 10 with 1 corresponding to "no shortfall at all" and 10 to "great shortfall."

Regarding overall shortfall, Figure 17 below shows that Germany has the lowest average mean (4.33), though not differing significantly from the United Kingdom (4.38), Denmark (4.57), and Canada (4.71). Within OECD countries, Australians (4.88) feel that they have the highest overall shortfall of skills. For *soft skills*, Germany (4.33) again shows the lowest shortfall, while not differing significantly from the United Kingdom (4.38), Denmark (4.57), or Australia (4.71). Canada has the highest average of 5.22 for shortages in soft skills amongst OECD countries. Regarding shortfalls in *basic skills*, Germany (4.20) has the lowest mean, but does not differ significantly from Hungary (4.70) with the highest mean amongst OECD countries. For *generic skills*, Denmark shows the lowest shortfall with an average of 4.26, which differs significantly from Germany which has the highest shortfall with an average of 4.89. For *job-specific skills*, however, Germany again has the lowest shortfall (3.76). Australia (5.49) has the highest shortfall within this category of skills amongst OECD countries.

Figure 17. Overall Shortfall



Source: City and Guilds Center for Skills Development, 2008.

The results show the differences that exist across countries as well as the within-country differences of perceived shortages of various skills (See Annex, Figures 4-8 for more details). For example, in Germany, the greatest perceived shortage occurs in generic skills (4.89) and the least perceived shortage in job-specific technical skills (3.76). In contrast, Canadians feel that their greatest shortage lies in soft skills (5.22), and the least shortage in basic skills (4.34).

Figure 18. Perceived Skills Shortage in Germany

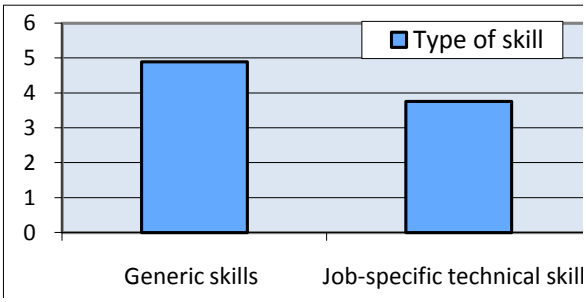
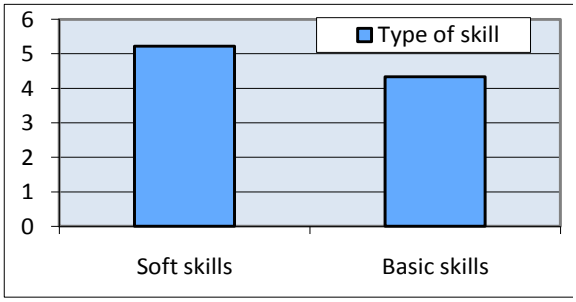


Figure 19. Perceived Skills Shortage in Canada



Source: Adapted from City and Guilds Center for Skills Development, 2008.

Predicting and Responding to Future Training Needs

Another important measure is that of how well practitioners and institutions involved in vocational education and training are able to predict and respond to future training needs. Practitioners themselves responded on a scale of difficulty with 1 corresponding to "not at all difficult" to 10 being "very difficult." Employers were also asked to respond on a scale of 1 to 10, 1 equated to "not well at all" and 10 to "very well." There is a generally high evaluation of the ability of practitioners and institutions to predict and respond to future training requirements within OECD

countries (See Annex, Figure 9 for more details). However, as perhaps expected, practitioners rank themselves as being better able to predict and respond to future training requirements than employers. The only exception lies in Hungary, where employers are more positive than practitioners.

Esteem of Vocational Education and Training

The final and undoubtedly critical issue of consideration is that of the esteem of vocational education and training. Respondents were asked to rate on a scale of 1 to 10, with 1 being low and 10 being high, of how vocational education and training is regarded in their respective countries. The average rating of for OECD countries is rather moderate, hovering around 6.5. Notably, Germany holds vocational education and training in the highest esteem at 7.85 and Hungary the lowest at 5.15. The United Kingdom holds vocational education and training in second lowest esteem amongst OECD countries at 5.90 (See Annex, Figure 10 for more details).

Has Esteem Improved or Deteriorated?

As it is necessary to examine if and how the esteem of vocational education and training has changed over time, respondents were asked whether esteem has: (1) improved; (2) deteriorated; or, (3) stayed the same over the past 10 years. An overall depiction reveals that 61.9 percent believe that it has improved, while 21.9 percent believe that it has deteriorated, and 16.5 percent believe that it has remained the same.[13]

Upon differentiating by country, Australia has the largest proportion of respondents who feel that the esteem of vocational education and training has improved, with 69.6 percent believing that it has improved and 9.8 percent believing that it has deteriorated. Denmark comes in second with 69.1 percent who feel that esteem has improved, with 16.5 percent believing that it has worsened. Hungary and Germany are the only two countries where less than half the respondents feel that esteem has improved: surprisingly, a mere 30.3 percent of Germans believe that esteem has improved while 32.3 percent believe that esteem has deteriorated. Hungarians comprise the largest proportion of respondents who believe that esteem has deteriorated (56.1 percent) (See Annex, figure 11 for more details).

[13] The results from this survey include all nine countries (OECD + non-OECD countries).

2.3.4 Further Studies Comparing General and Vocational Education in Light of Labor Market Outcomes

Although the above correlations and discussions regarding TVET participation and labor market outcomes provide initial insight, the following studies allow for further understanding regarding TVET and labor market outcomes. In particular, these studies compare TVET programs to general education programs in a variety of contexts. One key feature of education programs and the types of skills taught is their ability to adapt to and implement new technology, especially within this rapidly changing economic context. For example, Krueger and Kumar (2002) point to differences between the education policies of Europe and the United States in explaining their growth gap during the past few decades. They argue that the European education policies that focused on skill-specific vocational education may have been optimal, both in terms of growth rate and welfare, during the 60s and 70s. However, during the 80s and 90s of new and more rapid technological advancements, this vocational focus may have suboptimally contributed to the slowdown in growth and the increased growth gap relative to the United States, which focused on more concept-based, general education. Highlighting the occupational advantage of general over vocational education, they show that the difference in the growth rate between an economy that focuses on vocational, skill-specific education and one that focuses on general education increases with the rate of available technology. The economy with stronger general education will be better equipped to exploit the rapidly-changing, new technologies; the optimal subsidy for general education increases with the growth rate of available technology.

Another critical aspect of education programs is that of early versus late specialization on labor market outcomes. Although within the context of higher education, Malamud (2005) examines this tradeoff: the acquisition of specific skills early in one's college education versus broader training and learning about match quality in different fields but with less time to acquire specific skills once a field is chosen. He finds that students in the Scottish systems, where specialization occurs relatively late, are less likely to switch to an occupation unrelated to their field of study than students within the English system who specialize earlier. Thus, it may be beneficial to specialize later rather than earlier as this study suggests high returns to field-specific match quality relative to specific skills. The study further shows that individuals who switch to occupations unrelated to their field of study earn lower wages on average, arguably due to reasons such as the loss of firm-specific skills and lower levels of match quality in the alternative fields.

Finally, the selectivity of students participating in general and vocational education continues to be another major area of discussion and concern. Most studies that compare the effect of vocational and general education on labor market outcomes suffer from selection bias, as less competent students are more likely to participate in vocational programs. Utilizing a 1973 education reform in Romania that shifted a large proportion of students from vocational education programs to general education programs, Malamud and Pop-Eleches (2005) were able to avoid this non-random selection bias. Contrary to cross-sectional evidence that graduates of TVET programs are more likely to be unemployed and have lower wages, the study reveals that students affected by the policy showed no difference in unemployment, non-employment, family income, and wages than their counterparts who were not affected by the policy. The only difference between the two cohorts was that those affected by the policy were significantly less likely to work in manual or craft-related occupations than those not affected.

2.3.5 Two Striking Constraints Associated with Vocational Education and Training Programs

Vocational education and training has the potential to contribute greatly to today's knowledge economy, which demands various high level skills and competencies. Nevertheless, two particular characteristics of these programs may deter governments, international organizations, and individuals themselves from investing in and/or improving upon VET or pre-employment skills development programs.

Costs Associated with TVET

First, in those OECD countries with available data, educational expenditure per student in upper secondary vocational programs in 2004 was, on average, USD 854 higher than in general programs (OECD 2007). The difference in expenditure per student between the two programs appears greater in those countries with large dual-system apprenticeship programs, such as Austria, Germany, Luxembourg, the Netherlands, and Switzerland. To illustrate, in 2004, Germany and Switzerland spent USD 6,748 and USD 5,338 more per student in vocational programs than in general programs, respectively, with significant contributions from employers.

Learning Outcomes Associated with TVET

In addition to the costliness associated with vocational education programs in comparison to general education programs, vocational programs are often compared with general education programs in regards to the learning outcomes of the students. PISA[14] 2003 results for math performance show that for OECD countries on average, students in pre-vocational and vocational programs score 45 points lower than students in general education programs before socio-economic factors are taken into account (OECD 2007).[15] In the Netherlands, Belgium, Hungary, and Korea, the performance of students in general education programs is significantly higher than the overall OECD average, whereas the performance of students in vocational programs is lower than the overall OECD average. In Luxembourg, however, students enrolled in pre-vocational and vocational programs exhibit a statistically significant performance advantage of 23 score points over those in general education programs. Upon adjusting for socio-economic factors, students in pre-vocational and vocational education program still score 27 points on average lower than those in general education programs across OECD countries. Nine of the 14 OECD countries with comparable data show that students enrolled in pre-vocational and vocational programs have a performance disadvantage ranging from 18 score points (Slovakia) to 109 score points (the Netherlands). In Luxembourg, Mexico, and Portugal, on the other hand, students enrolled in vocationally-oriented programs show a statistically significant performance advantage.

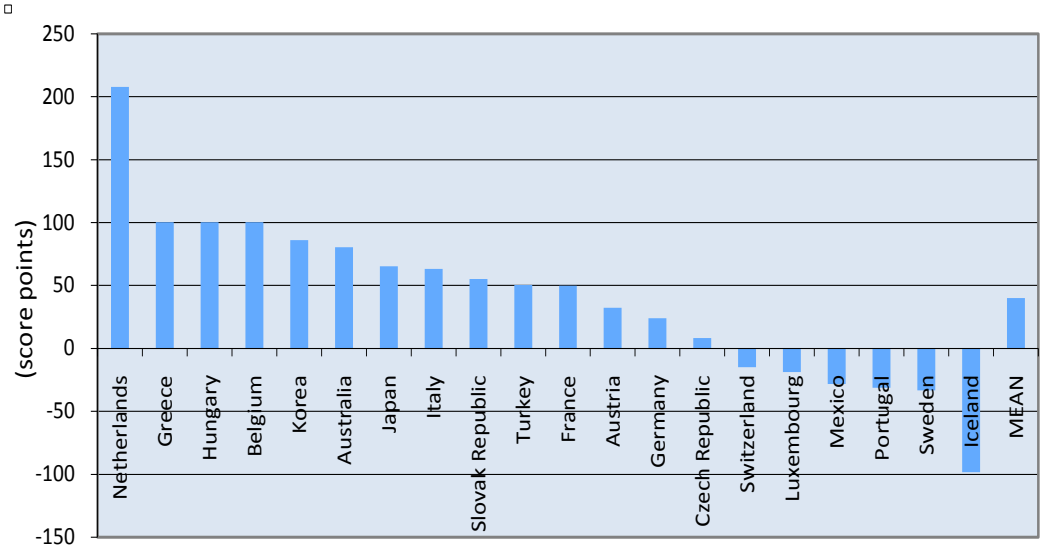
The recent 2006 PISA results show a similar trend for general versus vocational[16] students at age 15 (Figure 20). The 2006 scores for science performance show that in OECD countries on average, students in vocational programs score 40 percentage points lower than students in general programs. The difference ranges from negative 98 percentage points in Iceland to 208 percentage points in the Netherlands. Notably, in several OECD countries with available comparable data (Iceland, Sweden, Portugal, Mexico, Luxembourg, and Switzerland), students enrolled in vocational programs have a performance advantage over general education students ranging from 15 to 98 percentage points.

[14] PISA, or the Programme for International Student Assessment, is an internationally standardized assessment developed by the OECD and participating countries. It is administered to 15 year olds in schools and assesses their reading, mathematical, and scientific literacy, not merely in terms of mastery of the school curriculum, but in terms of important knowledge and skills needed in adult life (http://www.pisa.oecd.org/).

[15] Similar patterns occur with PISA 2003 performance in reading and science.

[16] Vocational programs prepare students for direct entry into the labor market without further training.

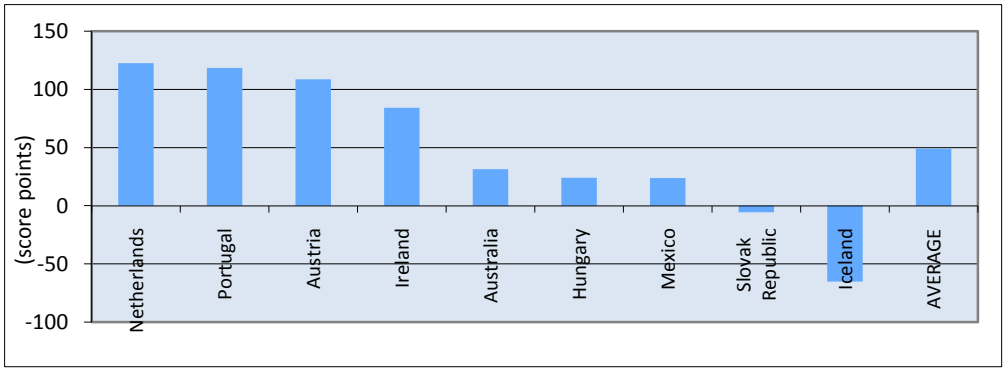
Figure 20. Difference in 2006 PISA Scores between Students in General and Vocational Education



Source: Education Database (World Bank, mimeo).

Comparing the learning outcomes of students in general versus pre-vocational programs,[17] PISA 2006 science scores reveal that on average, students in pre-vocational programs score 49 points lower than students in general education programs (Figure 21). This difference ranges from negative 65 percentage points in Iceland to 123 percentage points in the Netherlands. Notably, students enrolled in pre-vocational programs in Slovakia and Iceland show a performance advantage of 6 and 65 percentage points respectively.

Figure 21. Difference in 2006 PISA Scores between Students in General and Pre-Vocational Education



Source: Education Database (World Bank, mimeo).

[17] Pre-vocational programs are predominantly designed to introduce students to the world of work and prepare them for further vocational or technical programs.

Furthermore, although merely a duration of three years, perhaps the change in differences between the PISA science scores of general versus vocational students from 2003 to 2006 provides another glimpse at the learning outcomes associated with the different streams of education. Approximately half of the OECD countries with available data show an increase in difference while half show a decrease. Notably, within those countries that experienced an increase in the difference, the Netherlands show an increase in change of 40 percentage points, with general education programs having a performance advantage, while Portugal shows an increase in change of 28 percentage points with vocational education programs having a performance advantage.

2.4 Summary and Motivation

Upon examining the various facets and trends associated with pre-employment skills development especially within the changing economic context of higher level skills and competencies, one is able to arrive at a few crucial points. These points are summarized and highlighted below:

- Pre-employment TVET in OECD countries occurs in various forms, such as: (i) pre-vocational versus vocational programs; (ii) the level of the TVET program; and (iii) school-based versus work- or apprenticeship-based programs.
- TVET participation in OECD countries is not low; it has remained at approximately 50 percent in recent years.
- TVET programs relative to general programs are associated with several constraints, such as: (i) future earnings prospects; (ii) costs; and (iii) learning outcomes.
- Two striking points were revealed by a comprehensive study of the European TVET systems: (i) a strong positive correlation between TVET participation and graduation from upper secondary programs; and (ii) low levels of early school dropout in European countries with more than 50 percent of their upper secondary students in TVET programs.
- Qualitative assessments in addition to quantitative assessments of employers and practitioners provide a more holistic view of the issues surrounding TVET.

- Incredible variability lies even within OECD countries in terms of these related outcomes.

In fact, a multitude of factors (e.g., a country's initial labor market conditions) contribute to the outcomes related to TVET programs. While such often-uncontrollable factors should be taken into consideration, there is a necessity and urgency to examine those characteristics and features of TVET programs that contribute to positive outcomes. Applying a similar standard of *quality and access* employed by general education systems, students should arguably have the *access* to *quality* technical and vocational education and training as well. One crucial distinction that must be made in the context of TVET systems is that the criterion of *access* embraces a seemingly double-sided meaning. To elaborate, it is crucial for students to not merely have *access to* TVET programs, but to have *access from* TVET programs *to* higher education programs to ensure their competitiveness rather than merely serving as a dead-end route. Recognizing the significance of both quality and access in the context of TVET, this paper focuses on three key features of the TVET systems in OECD countries: (a) deferment of vocational specialization, integration of vocational and general education; (b) permeability of TVE systems, with increased bridges to tertiary education; and, (c) the inclusion of workplace experience with education, such as apprenticeships. The following section attempts to discuss the importance of and trends associated with these features in OECD countries.

III. Three Key Features of Pre-Employment Skills Development in OECD Countries

The three features highlighted in this section are as follows: (a) deferment of vocational specialization, integration of vocational and general education; (b) permeability of TVET systems, with increased bridges to tertiary education; and (c) the inclusion of workplace experience with education, such as apprenticeships. These key features will be examined in light of their rationale and characteristics, as well as outcomes or impacts where possible. Because these features often lie within the policies of a country, rather than being programmatic interventions, it is often very difficult to realize their associated outcomes and impact. Nevertheless, the significance of these features cannot be undermined.

3.1 Deferment of Vocational Specialization, Integration of Vocational and General Education

3.1.1 General Discussion

Reflecting the higher level skills and competencies demanded in the labor market, completion of upper secondary education is increasingly seen as a minimum requirement for favorable labor market prospects in OECD countries. Consequently, lower secondary level VET is becoming less common, as a solid comprehensive general education is desired at least until the end of compulsory schooling (UNESCO 2006; Adams 2007). Some OECD countries actually delay vocational training until after graduation from upper secondary education. Countries such as Australia, Hungary, and Spain offer vocational education and training as advanced upper secondary programs, while others such as Canada and the United States offer them as post-secondary programs, often called post-secondary non-tertiary education (OECD 2007). Several OECD countries have embraced reform policies to broaden their vocational programs and qualifications to more effectively prepare youth for changing work structures, technologies, and multiple skill needs. Policies refer to both the integration of a greater element of general education in TVE, as well as the development of TVE programs with enhanced general education content (UNESCO 2006).

In line with such arguments, there has been a tendency towards reducing the number of specific entry points to TVET routes, and creating fewer and more comprehensively-defined entry points

focusing on industries rather than single occupations. Between the mid-1980s and the mid-1990s, Finland, Norway, and Sweden drastically reduced the number of vocational programs. In Finland, there was a reduction from 650 vocational programs to 25 basic study lines in the first year of post-compulsory education, followed by 250 fields of specialization. Norway experienced a reduction from 109 to 13 foundation level courses, allowing for specialization in the later years. And, Sweden reorganized its upper secondary TVET into 14 programs corresponding to broad areas of economic activity in addition to two general education programs (OECD 2000).

Recognizing the importance of integrating general and vocational curricula, countries have also increased the general or theoretical content of TVE. Sweden and Norway have increased the proportion of general education that is included in TVE pathways, and Australia has expanded the opportunities for general education students to take TVE courses (OECD 2000). Austria and Switzerland enacted similar reductions in the number of initial programs at the entry point to TVE, while developing common foundation programs during the 1980s and 1990s. Countries with well-established apprenticeship systems, such as Germany and Austria, have also expanded general education content and broadened their vocational programs, while maintaining strong occupational training. The *baccalaureat professionnel* in France has also enhanced its general education content, with the vocational tracks now falling under the same overarching qualification system as the general tracks (UNESCO, 2006).

Proponents of such developments argue that the initial preparation in broader fields of study and the postponement of specialization allow youth to be better informed and equipped to choose their future study and occupations, as well as becoming multi-skilled workers. It is uncertain, however, whether employers would be willing to invest in the training of youth for more specific jobs upon completing a broader vocational education program. Successful entry into changing labor markets and skills demand is contingent upon the possession of solid generic skills, such as reasoning and problem-solving, in addition to solid qualifications and expertise in broad occupational fields. Such demands highlight the necessity of strong school-based vocational education and apprenticeship that provides youth with generic skills, followed by additional job-specific skills training (OECD 2000).

It is crucial to examine the effectiveness of these so-called “parallel” approaches incorporating general education into TVET programs by simply requiring students to take general courses from academic instructors. In certain OECD countries such as Finland, France, the Netherlands, Norway,

and Sweden, students have the opportunity to obtain both a general diploma in addition to vocational qualifications independent of the other. However, such policies and practices do not place adequate emphasis on ensuring that the academic content actually covers the particular qualifications necessary for specific occupations. Even with the well-established dual system in Germany, there lacks a necessary coordination between the school-based elements directed by the *Länder* and the work-based components directed at the national level through tripartite decisions. Further highlighting the inconsistencies between conventional school learning and occupational demands, "school" writing, for example, often focuses on narrative writing while the writing required in the workplace usually requires various types of memos and record-keeping. Realizing the gaps within the "parallel" approaches, various OECD countries have experimented with more "integrated" approaches. While attempts in Germany, Finland, and Australia in the 1990s were not sustained, the United States and Canada made greater efforts at integration. For instance, in both secondary schools and community colleges, collaboration between general and vocational instructors results in specialized courses such as "Math for Nursing" or "Business English." Such approaches have yet to be better established and developed (Grubb 2006.

3.1.2 Structure of Institutions Providing TVET

Various measures have been embraced by OECD countries to defer vocational specialization and integrate the vocational and general paths of education. One crucial element to consider is the varying structure of institutions that provide TVET. While the previous section focused substantially on the secondary education level, this section revolves mainly around institutions providing TVET at the post-secondary education level, broadly differentiated into two major categories. Countries may provide TVET in specialized institutions solely focusing on TVET such as the *Fachhochschule* in Germany, the *Brevet de technicien supérieur* (BTS) and the *Instituts universitaires de technologie* (IUTs, Technology Colleges) in France, the polytechnics in Finland, TAFE colleges in Australia, and technical institutes in Canada and several American states. However, countries may also provide TVET within comprehensive institutions such as the Further Education colleges in the United Kingdom, state colleges in Norway, and community colleges in the United States and Canada. Specified institutions are more likely to ensure the development of high-quality TVET as well as more effective transparency of a TVET system. TVET programs housed within comprehensive programs, on the other hand, are more likely to be associated with lower status, funding, and

institutional visibility. One such example can be seen in community colleges in the United States: TVET programs in such comprehensive institutions are not very well defined or easily understood (Grubb 2006).

While arguably providing high quality TVET, specialized institutions allow for significantly less flexibility in changing fields of study, especially in regards to transferring from the vocational to the general tracks. The issue of permeability between the two streams will be discussed in the following section. In the United States, specialized institutions are perceived to be less equitable than comprehensive institutions as they may be leading students into a dead-end path. Furthermore, it is also more difficult to incorporate academic or general subjects in specialized institutions. The TAFE colleges in Australia, for example, focus on TVET only and thus those that have weak general skills must acquire the skills elsewhere. However, comprehensive institutions in the United States and Canada allow students to enroll in TVET as well as general education courses in varying forms and levels (Grubb 2006).

Two major initiatives have been occurring in OECD countries pertaining to specialization. The first is that of a process known as “status creep” or “institutional drift”: institutions attempt to move up in the hierarchy of institutions and provide higher level qualifications. Examples include Fachhochschule in Germany attempting to be recognized as full universities, some Norwegian state colleges successfully petitioning to offer baccalaureate degrees and be known as university colleges, and technical institutes in the United States and Canada transforming into comprehensive community colleges. Community colleges have also tried to offer baccalaureate degrees, and the Further Education colleges in the United Kingdom are offering more university level courses. It is necessary to examine the effect of specialized institutions becoming more comprehensive on the quality and strength of TVET provision. As discussed above, some may assert that TVET provision is strengthened due to the incorporation of general education and increased flexibility, but others may point to the weakening of TVET provision by its falling into a second-tier status within comprehensive institutions (Grubb, 2006).

Another institutional measure that mimics the initiatives occurring at the secondary level is that of incorporating many smaller programs into larger institutions. Norwegian state colleges and polytechnics in Finland were established by combining many smaller, more-specialized vocational institutions. Other countries such as Denmark still house many smaller specialized institutions, but continue to contemplate consolidation. Proponents of such efforts make the case for increased

visibility and political power, benefits of economies of scale, flexibility in changing subjects, and greater connections with other educational institutions (Grubb 2007).

3.1.3 Impact and Evidence

The deferment of vocational specialization and integrating vocational and general education contents are undoubtedly crucial elements of TVET in OECD countries. Yet, the difficulty that lies in measuring such policies and practices explains the lack of impact evaluations that exist on this critical aspect of TVET. The lack of substantial evidence results in discussions merely revolving around the arguments delineated above. This paper highlights one impact study that sheds limited but nevertheless valuable light on the impact of integrating vocational and general education (Box 3.1). While not focusing specifically on the issues discussed in this section, the study examines the impact of incorporating TVET in general secondary education in the United States.

Box 3.1 The Impact of Integrating Vocational and General Education: An Example of U.S. High Schools

According to OECD evidence highlighted by Bishop and Mane (2005), allowing students the option of preparing for their careers during upper secondary school tends to increase school attendance of 15-19 year olds and improves labor market outcomes of high school graduates. A 10 percentage point increase in the share of upper secondary students enrolled in TVET courses is associated with a 2.6 percentage point increase in the high school graduation rate and a 1.9 percentage point increase in the proportion of 15-19 year olds in school. Significantly, such emphasis on TVET in upper secondary education does not reduce test scores at 15 years of age nor college attendance rates in their twenties.

Upon analysis of longitudinal data on U.S. high school students between 1988 and 1992, Bishop and Mane (2005) also found economic benefits for advanced level vocational courses. While there were no benefits for introductory level vocational courses, students enrolled in advanced, specific TVE courses experienced more successful labor market outcomes that those that only took general, academic courses or a combination of academic and personal interest courses. Advanced TVET course participants spent more time in employment both immediately upon high school graduation as well as eight years later, obtained better jobs, and had significantly higher earnings than those students not taking advanced TVET courses. The estimated high benefit-cost ratios of such courses can be explained by the increased needs of higher skills as well as improved effectiveness in TVET provision and operation. The rates of return are also considerably higher than those calculated for government training programs targeting high school dropouts.

Source: Bishop and Mane, 2005.

3.2 Improved Mobility and Permeability to Higher Education

Greater mobility from secondary TVE to higher education is a crucial factor for improved skills development. It is also necessary in combating the still-existing image of TVE as a dead-end pathway, a "second-tier" education lending to its low popularity. Various OECD countries have undertaken initiatives to improve linkages between TVE and higher education.

3.2.1 Modularization

Modularization, supplemented by sound qualification frameworks, allows students to take modules from both the general and vocational streams of education. The United Kingdom and Finland are two such countries that have embraced such measures to explicitly better-integrate the two streams of education. More specifically, Finland, for example, has undergone large-scale experimentation in the form of their Upper Secondary Education Experiment to allow youth to take both general as well as vocational courses from different schools. Modularization indeed provides students with the freedom and flexibility to create their own skill profiles rather than following a prescribed set of courses (OECD 2000).

While modularization allows for an individualization of pathways through TVET, it is necessary to realize that modularization can also have a negative impact by lending a fragmentation of the curriculum. If improperly designed, students may face difficulty in understanding the coherence and meaning of the modules within their overall curriculum. Even so, modularization is an existing or emerging feature in most OECD countries' TVET systems. Differences undoubtedly exist in the extent to which modularization has been realized, as well as in issues concerning the aim and scope of modularization across various countries. One issue addressed in countries such as, Denmark, Finland, Italy, the Netherlands, and Norway, is that of the aim of modularization being the optimization of choice and the realization of individual pathways. Another issue that is of particular concern to Denmark, Finland, Norway, Sweden but is also raised in the Netherlands pertains to the "breadth" of the modules. There is an effort to develop broad and relatively larger modules in order to ensure the comprehensiveness and transparency of modular qualifications systems (Leney 2004).

3.2.2 Double Qualifying Pathways

Double-qualifying pathways provide graduates of TVE the freedom and flexibility to pursue further studies. Such OECD countries as Austria, the Czech Republic, and Hungary have implemented these programs and in so doing, are preparing youth both for labor market entry with technician level qualifications as well as for tertiary education. Approximately 20 percent of an age cohort in Austria takes this route, and almost 40 percent in the Czech Republic and Hungary (OECD 2000). In other countries, for example, the United States, Canada, and Japan, integrated pathways that include both academic content and work-based learning components prepare students for both four-year colleges as well as the labor market (Adams 2007).

3.2.3 National Qualifications Frameworks

National qualifications frameworks (NQFs) are another crucial mechanism in enabling greater flexibility between pathways, including improving progression to higher education (Leney 2004). An NQF is defined as a single, coherent, and comprehensive instrument for the classification of qualifications according to a set of criteria for specified levels of learning achieved. It aims to integrate and coordinate national qualifications subsystems and improve the transparency, access, progression, and quality of qualifications in relation to the labor market and civil society (Coles 2008b). The key features that distinguish an NQF from other qualifications systems are that the qualifications are (Young 2005):

- Described in terms of a single set of criteria
- Ranked on a single hierarchy of levels
- Classified in terms of a comprehensive set of occupational fields
- Described in terms of learning outcomes that are independent of the site, the form of provision, and the type of pedagogy or curriculum
- Defined in terms of elements, and ascribed a volume in terms of notional learning hours expressed as quantifiable credit.

In principle, qualifications as part of an NQF are designed to be (Young 2005):

- Achieved by accumulation over time (credit accumulation and transfer)
- Transportable as units of one qualification can be used for other qualifications
- Transparent as learners know precisely what learning outcomes they are required to demonstrate to achieve a qualification
- Independent of any specific prior learning program requirements.

While Australia, France, Ireland, New Zealand, Scotland, and the United Kingdom (with Ireland, New Zealand, and Scotland known as the "success stories" in NQF implementation) already have existing NQFs in place, many (Austria, Belgium, Bulgaria, the Czech Republic, Germany, Hungary, Italy, Portugal, Slovakia, Spain, and Turkey) are still in the commitment and preparation phase. Those countries to be considering though not yet having established an NQF are Denmark, Luxembourg, the Netherlands, Norway, Poland, and Sweden. In the last subset of countries (Finland, Greece, and Iceland) National Qualifications Frameworks have not even been considered (Coles 2008a).

Recognizing differences across countries, the Swedish and Scottish upper secondary qualifications are probably the most integrated or unified between vocational and academic learning, while qualifications in France and England can be seen as linked, as vocational qualifications can be the basis for progression to higher education (Young 2005). At the European policy level, the development of the European qualifications framework provides evidence for emerging conceptions of and efforts to link TVET with higher education. The EQF serves the purpose of acting as a reference point across different education and training systems within one common qualifications framework (European Commission 2006, as cited in Dunkel et al. Mimeo). Another feature complimentary and parallel to qualifications frameworks is that of methods to recognize and validate prior learning and experience, as can be seen in Belgium (Flanders), Bulgaria, Denmark, Finland, France, the Netherlands, Norway, and the United Kingdom. Such mechanisms undoubtedly aid in improving the permeability between TVET and higher education (European Comission 2005, as cited in Dunkel et al. Mimeo).

However, as evidenced by countries with established NQFs, the implementation of NQFs is associated with various difficulties. These problems are highlighted below (Young 2005):

- Political difficulties are inevitable, stemming from the fact that the responsibility for an NQF is never housed within one government department, leading to interdepartmental tensions. In the case of New Zealand, there was tension between the Qualifications Authority and the Department of Education regarding power over the school curriculum. New Zealand recognized that some differentiation was necessary, because the principle of similarity could not encompass all types of learning. The New Zealand example reveals a broader political lesson that the more an NQF seeks to be comprehensive, the more it can pose a threat to the very government departments that established it.

- Administrative difficulties also arise from the uncertainties faced by new agencies and committees concerned with quality assurance, standard-setting, and assessment. There is an uncertainty regarding responsibilities as well as the difficulty in recruiting personnel with appropriate expertise. Such lack of skills and knowledge can lead to a slowing down of the entire process, as well as a decrease in confidence in the new qualifications.

- Technical and professional problems of assessment result from differences in the language of standards, units, and levels to define criteria that apply to very different qualifications, as well as difficulties in value judgments regarding learning and knowledge. These problems can be lessened by recognizing that language differences and assessment approaches are inevitable, and that common approaches can only be developed over periods of time from shared experience and use, not of tightly specified definitions.

A general underlying difficulty in implementing NQFs is that in an outcomes-based framework, a disconnect often occurs between the processes involved (e.g., standard-setting and assessment) and the practices of those teaching, training, selecting, and assessing. There needs to be a new basis of trust that relates to outcomes and standards through new forms of partnerships between institutions.

3.2.4 Other Bridges from TVE to Tertiary Education

Other mechanisms to improve access to tertiary education from TVE include credit transfers and open non-university level further education institutions. In Australia, there have been stronger efforts to increase credit transfers between their TAFE (Technical and Further Education) qualifications and university level tertiary programs. Austria began administering a new tertiary

education entrance examination for skilled workers like former apprentices in 1996. Norway allows mobility into tertiary education for TVE students and apprentices through an additional general education program of six months following completion of their vocational studies. Switzerland's *maturité professionnelle* is an apprenticeship certificate that also allows access to tertiary studies. Preparation for this examination can occur during apprenticeship by taking additional, more challenging courses, or upon completion of the apprenticeship in a one-year program. Graduates of general upper secondary school who have completed one year of enterprise training are also eligible to take the examination, allowing general education graduates access to labor market qualifications.

Permeability between upper secondary TVE and tertiary studies is made feasible through credit transfer and articulation arrangements, as well as the provision of various open non-university level further education institutions. Further Education colleges in the United Kingdom, TAFE colleges in Australia, and Community Colleges in the United States and Canada are all examples of such institutions. Community Colleges in the U.S. with a strong TVE focus act as a bridge to both the labor market and further baccalaureate degrees (Adams 2007). With programs like the Tech-Prep in the United States, students may receive credit for courses taken in the last two years of high school to count towards a two-year associate's degree of two-year certificate in a Community College. In Australia, students are able to complete and receive credit for national vocational qualifications during upper secondary school towards TAFE courses (OECD 2000).

3.2.5 Impact and Evidence

Extent and Nature of Mobility between TVET and Higher Education

Various measures to improve the mobility between TVET and higher education have been employed by OECD countries, although assessing their impact is undoubtedly challenging, and explains the lack of impact evaluations on the topic. There also lies considerable difficulty in determining flows among various educational streams and institutions, including those between TVET and higher education. In his recommendations for a thematic review of TVET in OECD countries, Grubb (2007) emphasizes the need to focus on understanding not only the institutions in a country's TVET system, but also the sizes of and flows among institutions. Highlighting the case of Finland, while there is potential movement from secondary vocational schools into universities, the probability of doing so is merely 2-3 percent compared to 15 percent entering polytechnics.

Australia serves as an example where the government, through the Department of Education, Science, and Training, has pushed for the strengthening of intersectoral links between TVET and higher education. Harris et al. (2005) examines the extent and nature of this two-way traffic between the years of 1997 and 2002. The results from the study on mobility patterns are summarized and highlighted below.[18]

Between 1997 and 2002 in Australia, there has been substantial growth in movement from the higher education sector to the TVET sector, but a decline in movement in the opposite direction. In both directions, females constituted the greater proportion of mobile students, and business-related fields dominated as destinations.

There exist several key differences between the higher education and TVET commencers. The pathway from higher education to TVET is largely crossed by females and mature-aged students in part-time study in the TVET sector, where the move is often to a different field of education. The pathway from TVET to higher education, however, is traveled by younger students studying full-time, where the move is often to the same or a similar field of education. Students moving from TVET to higher education generally experience less delay before the transition as compared to those moving in the reverse direction. 60 percent of those moving from university to TVET reported that they had completed their higher education course, while 80 percent of those moving from TVET to university reported they had completed their TVET course. Also, the TVET to higher education commencers tended to be studying full-time, whereas the higher education to TVET commencers tended to be studying part-time.

Delving further into reasons for undertaking their studies, results show statistically significant differences between the two groups of students on 13 of the 19 reasons. The major motivation for both groups in pursuing further study was to improve employment prospects. As mentioned above, in general, the majority of those students crossing from TVET to higher education stayed in the same

[18] The study utilized three major sources of information: (1) a comprehensive literature review that identified previous research and highlighted the key issues; (2) detailed analyses of existing data from the National Centre for Vocational Education Research (NCVER) and the Department of Education, Science, and Training on students with higher education achievement who had moved to the TVET sector and students with TVET experience starting in the higher education sector over the years of 1997 to 2002 (in both cases, excluding fee-paying overseas students); and, (3) a questionnaire survey administered to all undergraduate students who began study in 2003 at all technical and further education (TAFE) institutes, the three universities, and a sample of private TVET providers in South Australia, in order to obtain samples of commencing students who had experience in the other sector (Harris et al. 2005).

or similar field of education to retrain for a different career. The students moving from higher education to TVET, in contrast, often pursued a different field of education to improve prospects in their present career. There is evidence that career planning by both groups of students was independent and calculated. TVET commencers are often older and more financially secure, with employment-driven motivations for further study. The transition process for higher education commencers, however, tends to be more planned, without a substantial time delay compared with those moving in the reverse direction. While approximately 75 percent of the students in both sectors reported feeling relatively comfortable moving between the two sectors, those students transitioning from the TVET to higher education sector experience a greater degree of discomfort than those making the reverse transition.

Three main messages appear to have materialized through the study. First, mobility between and within the TVET and higher education sectors is increasing and complex. The flow from higher education to TVET is estimated to be three times greater, nationally and in South Australia, than the reverse flow, which has actually been decreasing over time. Student motivation for further study is similar for both sectors, namely improved employment prospects and personal development. Finally, the transition from higher education to the TVET sector is often smoother than the reverse (especially regarding financial issues), as TVET commencers tend to be older, more financially secure, more experienced in the workplace, and more confident. Although merely one example, this study highlights the need for improved links between TVET and higher education: two different but increasingly complementary sectors (Harris et al. 2005).

3.3 Effective Opportunities to Combine Workplace Experience with Education

The OECD experience in combining workplace experience with education within pre-employment skills development is undoubtedly complex and varied. The importance of integrating education and workplace experience cannot be underestimated. Such programs allow youth to acquire general as well as technical skills, and improve relations with employers, aiding in both the youth's job search and the employers' recruitment. It is therefore necessary to delve further into the various forms of combined education and workplace experience in order to determine their effectiveness and feasibility.

3.3.1 Apprenticeships

Apprenticeships take place through a contractual agreement between an employer and a youth through which the youth acquires the status of an employee. Several highlighted purposes of apprenticeships are as follows: "to develop many of the skills which the [youth] must acquire in order to become a qualified worker; to assist the [youth's] personal and social development as a worker; and to provide productive labor to the employer" (OECD 2000). Apprenticeships constitute a crucial component of the education and training agendas of the OECD countries of Australia, Austria, Norway, the United Kingdom, and the United States. Even so, the archetypal model to be followed is still that of the German apprenticeship system. Unlike other apprenticeship systems that have a stronger tendency to be viewed as "second-tier" pathways by society, the German system enjoys greater esteem as a model that has effectively combined part-time schooling, work, and apprenticeships (Adams 2007; OECD 2001).

Apprenticeship systems, including the German system, have however been facing a decline over the years. Reasons may include difficult transitions into tertiary education, the reluctance of firms to offer apprenticeships, and the realization that systems like the German system cannot so simply be transferred to other countries (OECD 2001). Generally associated with older industries, apprenticeships have been unable to fully realize the rapidly changing technologies and increasing focus on broadly applicable skills. Larger firms may also be more inclined to focus on in-company training over apprenticeships. Unlike apprenticeship systems that strive towards occupational labor markets and inter-firm mobility, in-company training focuses on internal labor markets and core long-term employees, as seen with Japanese firms. There is no fear of a firm's proprietary knowledge leaking to its competitors through apprentices (UNESCO 2006). To combat this declining status of apprenticeships, various mechanisms have been employed. One such example is that of hybrid apprenticeships developed in England (the Modern Apprenticeship) and Denmark (EFG), where public agencies (as opposed to the employers) assume the primary organizing responsibilities (UNESCO 2006). The United Kingdom-based Modern Apprenticeship program launched in 1994 incorporated new apprenticeships, such as information technology and catering, beyond the traditional venues (Adams 2007).

Another notable initiative with the changing apprenticeship system is that of inter-company training cooperation. The Austrian vocational training law, as well as the GOLO project in the German region

of Wilhelmshaven, has established joint training systems aimed at specialized companies desiring to train apprentices but that are unable to offer the complete range of competencies in the training curricula, as well as companies desiring trainees with additional skills to be gained from partner companies. Joint training systems may incorporate various forms: a rotation/exchange of apprentices among companies, skills development in other companies against payment, or participation in courses at training providers against payment. Examples of such initiatives can be seen in Austria, as enabled by the vocational training law, as well as the German region of Wilhelmshaven, in the form of the GOLO project focusing on the needs of specialized Small and Medium Enterprises. Although difficult to establish, joint-training systems allow for more enriched learning experiences and the development of more comprehensive occupational profiles for the apprentices (Gruber et al. 2008).

Another recent reform effort undertaken in a number of OECD countries is that of modularizing the apprenticeship system. In Austria, the intention of modularizing the apprenticeship system was first nationally recognized in early 2003. Since 2006, in related occupations, identical basic modules lasting at least two years to ensure a solid general education are followed by the main training lasting at least one year and specialization modules lasting six months to one year.

In an effort to reform apprenticeship training, the German government and various trade organizations agreed upon a national training pact in 2004. While the government promised a reform of the vocational training law, the associations had to offer the required number of apprenticeship training positions. Effective since 2005, the law amending vocational training includes various components. One critical change is that people are able to be admitted to the final exam of the apprenticeship training without having taken part in the regular training, so long as they are able to prove professional experience in the respective field of at least 1.5 times of the regular training period or provide proof of the necessary skills and knowledge (Gruber et al. 2008).

3.3.2 Other Examples of Programs Combining Education and Workplace Experience

Co-operative education programs are one primary example of school-organized workplace experience. Unlike apprenticeships, such programs are typically organized, designed, and monitored by the educational institutions and implemented through partnerships with individual enterprises. Students are placed in actual jobs with employers as one component of their formal education. In

the United States and Canada, where such programs are most developed, up to 10 percent of high school students in their last two years were participants. Similar programs at the tertiary level are found in Australia, Austria, Finland, Hungary, and the United States. The new Qualified Vocational Education courses in Sweden, established in 1996, require one-third of student time be spent in the workplace. Canada presents a similar case, where co-operative education students generally spend one trimester per year in the workplace.

Box 2. Japan: A Case That Effectively Bridges But Does Not Combine Education and Workplace Experience

Japan exemplifies a case of highly positive transition outcomes for youth, as evident through its low dropout rates, high upper secondary graduation rates, low unemployment to population ratios for youth, and high unemployment rates among young people. One key characteristic of this system is its strong institutional link between schools and firms. Characterized by strong internal labor markets and in-company training, Japanese firms select graduates on the basis of general educational achievement, attitudes, and trainability. The Japanese system of *Jisseki-Kankei*, or semi-formal contracts between schools and firms, developed mostly as a result of the Japanese Employment Security Law and arrangements established in the 1960s that allowed the Public Employment Service Office to delegate some aspects of its duties to schools regarding job placement of students. Taking into account the academic ranking of schools, and the ranking of students within the schools, high schools and firms have established long-term recruiting relationships. Such close contacts are essential in ensuring the success of schools in placing students in jobs as well as employers in recruiting competent, well-matched employees on a regular basis (OECD, 2000). With schools essentially acting as screening mechanisms for employers, students have an incentive to perform well, and employers are confident in their future potential workers (Adams 2007).

One aspect of this highly effective transition system that requires more attention is that of the students' opportunity to combine education and workplace experience. Of upper secondary students, 75 percent are enrolled in general education courses, and general education comprises a significant portion of vocational courses. However, these vocational courses do not incorporate adequate workplace experience and the opportunity to engage in practical work outside of the classroom. Some also argue that the system should emphasize greater qualitative efficiency in the matching of young people to firms, as evident in the increasing quit rates of young workers (OECD 2000). While the system serves well for those students in school, it also needs to be more inclusive of those that require "second-chances" (Adams 2007).

Career Academies in the United States are another example of an initiative striving to create stronger links between high school, further studies, and the workplace. They are organized as small learning communities in large high schools, combining academic and vocational curricula around common work themes such as, health, computer technology, and business. Partnerships are also

established with local employers to provide participants with workplace experience (Kemple and Scott-Clayton 2004).

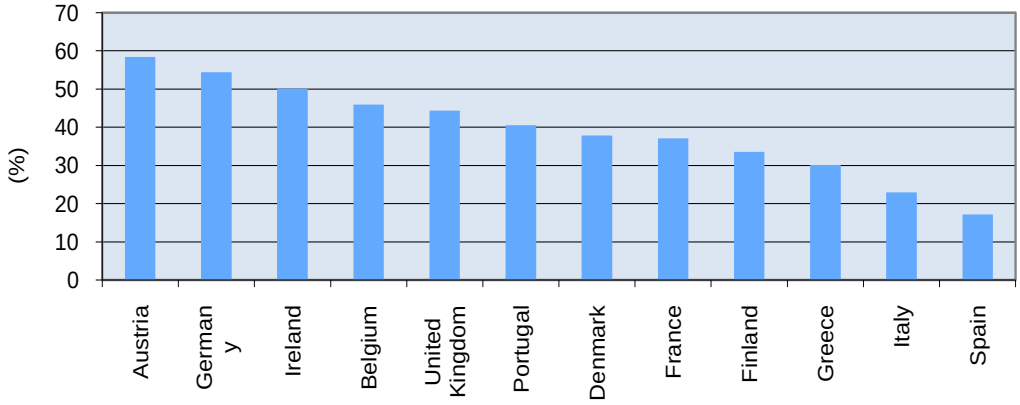
3.3.3 Impact and Evidence

Upon cross-national comparisons of several OECD countries, Ryan (2001) finds that apprenticeships, relative to other forms of TVE, have positive impacts on early labor market experience. The effects on pay are less clear when compared to full-time vocational education, but positive when compared to labor market alternatives like regular employment or job training. In France, apprenticeships are associated with increased employment in the participants' early working lives, but also with lower pay at the end of five years. Apprenticeships in the United Kingdom are also associated with higher employment rates for low and moderate achievers, and higher pay for males. Evidence from the United States shows that relative to full-time tertiary studies, apprenticeships increase pay for participants, who are mostly young adult males. Males benefit more from apprenticeships than females in terms of entry rate, occupational access, and further labor market outcomes. Apprenticeships that 25 percent of university students undertake between full-time secondary and tertiary education in Germany lend modest gains in employment and pay in early working life. Considering its high cost, however, it may only prove financially rational for highly risk-averse youth (Ryan 2001).

Rigorous evaluations employing random assignment reveal that Career Academies (mentioned above) significantly improved the labor market outcomes of young men, but not of young women. The program also increased employment and earnings for students that entered at high or medium risk of dropping out of school. Although it did not have a significant impact on educational attainment, participants' high school completion rates and post-secondary enrollment and attainment rates were higher that national averages (Kemple and Scott-Clayton 2004).

Although not a direct indication of impact, examining the average duration of transitions from school to work for the past several years in those countries that have the most developed apprenticeship systems sheds some light on this feature of TVET. As highlighted by Quintini and Martin (2006), more than half of those students leaving school in Germany and Austria, where the apprenticeship system is most developed, find a job without experiencing any unemployment (Figure 22).

Figure 22. Unemployment Experience of Youth Out-of-School in Europe, 1994-2000: Percentage with No Unemployment Spells



Note: 1995-2000 for Finland.

Source: Quintini and Martin, 2006.

IV. Conclusion

Pre-employment skills development, or TVET, is a topic of considerable focus and attention within the policy arena of both developed and developing countries. Recognizing the potential of pre-employment skills development, countries continuously strive to determine the most effective and efficient methods of implementation. In a context of rapidly changing demand for skills, this paper examines the trends in pre-employment skills development for OECD countries and highlights its main success factors.

We find that despite the increasing focus on general and higher education, participation in TVET systems at the upper secondary level in OECD countries has remained at approximately 50 percent of total enrollment in recent years. Furthermore, a study of the European TVET systems shows positive correlations between TVET participation and graduation from upper secondary programs, as well as TVET participation and low levels of early school dropout. Relative to general education programs, however, TVET programs are associated with several constraints such as lower future earnings prospects, higher costs, and lower learning outcomes. Yet, even within OECD countries, these trends in enrollment and related labor market outcomes evince strong variability. Against this backdrop, this paper highlights three key features of the TVET systems in OECD countries.

First, responding to the growing demand for general or core competency as well as higher level skills, there has been an increasing trend for OECD countries to defer vocational specialization and more effectively integrate general education and TVET. Lower secondary level VET is becoming less common, alongside a focus on fewer and more comprehensively-defined entry points to VET. OECD countries have also increased the proportion of general education that is included in TVET pathways, and expanded the opportunities for general education students to take TVE courses. While undoubtedly difficult to measure such measures, one particular longitudinal study of U.S. high schools finds that students enrolled in advanced TVE courses experienced more successful labor market outcomes that those that only took academic courses or a combination of academic and personal interest courses.

Second, in an effort to combat the image of TVET as a “dead-end” pathway, a “second-tier” education route, OECD countries are undertaking measures to improve mobility between TVET and higher education. Measures such as modularization, double qualifying pathways, and national

qualifications frameworks all contribute to increasing flexibility between the two streams of education. While not an impact evaluation on the topic, one particular study examined the nature of the two-way traffic between TVET and higher education in Australia. The study results reveal that mobility between and within the two sectors is increasing and complex, the flow from higher education to TVET is greater than the reverse, and the reasons for transfer, namely improved employment prospects and personal development, are similar.

Finally, with the rationale of allowing youth to acquire general as well as technical skills on-site and improving relations with future employers, the incorporation of workplace experience remains an area of considerable focus. Apprenticeships, one of the oldest forms of VET, continue to serve as one key form of acquiring workplace experience in OECD countries. While traditional apprenticeships have been declining over the recent years, new approaches to apprenticeships have developed, alongside other measures of school-organized workplace experience opportunities such as co-operative education programs. Evaluations of cross-national comparisons of several OECD countries reveal that apprenticeships, relative to other forms of pre-employment skills development, have positive labor market outcomes, especially in securing employment.

Recognizing the complex nature of TVET programs and policies, it is extremely difficult to garner conclusive evidence in determining the actual impact of the highlighted features of OECD countries. Shifting the focus to less-developed countries, the transferability of such features is even more uncertain and cautionary. Within OECD countries, however, these key features appear to be associated with adequate evidence, albeit not impact, of positive outcomes. It would thus be advisable for developing counties to focus on those features of TVET that will arguably encounter less political and financial obstacles in implementation and execution. As evidenced in OECD countries, the features highlighted in the paper will undeniably assume various forms and dimensions depending on the individual contexts of developing countries. Certain features like the integration of general and vocational content may be more feasible to put forth on the agenda and implement, while others like establishing a national qualifications framework may be met with more resistance. One major reason for such resistance is undoubtedly due to a lack of information and evidence regarding these TVET features. More rigorous impact evaluations are therefore critical in ensuring more knowledge and capacity in improving TVET systems in countries both advanced and developing.

References

Acemoglu, D. 2002. Technical Change, Inequality, and the Labor Market. *Journal of Economic Literature* 40(1): 7-72.

Adams, A.V. 2007. *The Role of Youth Skills Development in the Transition to Work: A Global Review*. Human Development Network, Children and Youth No. 5. Washington DC: World Bank.

Armstrong, R., C. Beduwe, J. Germe, T. Leney, J. Planas, and M. Poumay. Mimeo (Later published in 2009). "New and Emerging Issues in Vocational Education and Training Research Beyond 2010." Modernising Vocational Education and Training. Fourth Report on Vocational Training Research in Europe: Background Report. Vol. 2. Luxembourg: Office for Official Publications of the European Communities.

Autor, D., F. Levy, and R. Murnane. 2001. *The Skill Content of Recent Technological Change: An Empirical Exploration*. National Bureau of Economic Research Working Paper No. 8337. Cambridge: NBER.

Batlle, S. 2006. Analysis of How to Incorporate Life Skills within Employability Training Modules. Washington DC: World Bank.

Bishop, J. and F. Mane. 2005. "Economic Return to Vocational Courses in U.S. High Schools." In *Vocationalisation of Secondary Education Revisited*, edited by J. Lauglo and R. Maclean. The Netherlands: Springer.

Blom, A. and C. Hobbs. 2008. *School and Work in the Eastern Caribbean: Does the Education System Adequately Prepare Youth for the Global Economy?* Washington DC: World Bank.

City and Guilds Centre for Skills Development. 2008. Skills Development: Attitudes and Perceptions. Final Report. March 2008.

Coles, M. 2008a. "The European Qualifications Framework." Powerpoint presentation at the World Bank, Washington DC, January 2008.

Coles, M. 2008b. "The Growing Interest in Qualifications Systems," Powerpoint presentation at the World Bank, Washington DC, January 2008.

Dunkel, T. and I. Le Mouillour, in cooperation with U. Teichler. Mimeo (Later published in 2009). "Through the Looking-Glass: Diversification and Differentiation in Vocational Education and Training and Higher Education." Modernising Vocational Education and Training. Fourth Report on Vocational Training Research in Europe: Background Report. Vol. 2. Luxembourg: Office for Official Publications of the European Communities.

Eurostat New Cronos Database, theme3-educ-educat-enrol1a_t-isced3, isced3pv, isced3voc, 30.07.2004.

Eurostat, Structural Indicators, Employment I.5.1, 22.07.2004.

Grubb, N. 2006. “Vocational Education and Training: Issues for a Thematic Review.” Issue Paper Prepared for the OECD Meeting of Experts, Paris, February 5, 2007.

Gruber, E., I. Mandl, and T. Oberholzner. Mimeo (Later published in 2009). “Learning at the workplace.” Modernising Vocational Education and Training. Fourth Report on Vocational Training Research in Europe: Background Report. Vol. 2. Luxembourg: Office for Official Publications of the European Communities.

Harris, R., R. Sumner, and L. Rainey. 2005. Student Traffic: Two-Way Movement between Vocational Education and Training and Higher Education. Adelaide: National Centre for Vocational Education Research.

Kemple, J. and J. Scott-Clayton. 2004. Career Academies: Impacts on Labor Market Outcomes and Educational Attainment. New York: Manpower Development Research Corporation.

Krueger D, and K. Kumar. 2002. *Skill Specific Rather than General Education: A Reason for US-Europe Growth Differences*. National Bureau of Economic Research Working Paper No. 9408. Cambridge: NBER.

Lemieux, T. 2007. *The Changing Nature of Wage Inequality*. National Bureau of Economic Research Working Paper No. 13523. Cambridge: NBER.

Leney, T. 2004. Achieving the Lisbon Goal: The Contribution of VET. London: QCA.

Leney, T. 2008. “Developing Core Competencies and Skills” Powerpoint Presentation at the World Bank, Washington DC, April 2008.

Leney, T., J. Gordon, and S. Adam. Mimeo (Later published in 2009). The Shift to Learning Outcomes: Policies and Practices in Europe. QCA under CEDEFOP European Center for the Development of Vocational Training.

Levy, F. and R. Murnane. 2005. “How Computer Work and Globalization Shape Human Skill Demands.” Paper prepared for Planning Meeting for 21st Century Skills, National Academy of the Sciences, September 18, 2005.

Malamud, O. 2005. *Breadth vs. Depth: The Effect of Academic Specialization on Labor Market Outcomes*. Harris School Working Paper Series 05.17. Chicago: University of Chicago.

Malamud, O. and C. Pop-Eleches. 2005. *Vocational Training versus General Education: Evidence from an Educational Reform in Romania*. Harris Paper Working Paper Series 05.16. Chicago: University of Chicago.

Martin, J. and D. Grubb. 2001. *What Works and for Whom: A Review of OECD Countries' Experiences with Active Labour Market Policies*. Working Paper Series 2001:14. Uppsala: IFAU - Institute for Labour Market Policy Evaluation, revised.

Organization for Economic Cooperation and Development. 2000. From Initial Education to Working Life: Making Transitions Work. Paris: OECD.

Organization for Economic Cooperation and Development. 2001. Economics and Finance of Lifelong Learning. Paris: OECD.

Organization for Economic Cooperation and Development. 2001. Education at a Glance. Paris: OECD, p. 146.

Organization for Economic Cooperation and Development. 2002. Education at a Glance. Paris: OECD, p. 36.

Organization for Economic Cooperation and Development. 2002a. Education at a Glance: Glossary. Paris: OECD.

Organization for Economic Cooperation and Development. 2003. Education at a Glance. Paris: OECD, p. 40.

Organization for Economic Cooperation and Development. 2005. The Definition and Selection of Key Competencies: Executive Summary. Paris: OECD. http://www.oecd.org/dataoecd/47/61/35070367.pdf.

Organization for Economic Cooperation and Development 2006. Education at a Glance. Paris: OECD.

Organization for Economic Cooperation and Development. 2007. Education at a Glance. Paris: OECD.

Payne, J. 2004. *The Changing Meaning of Skill*. SKOPE Issues Paper Series No. 1. Oxford and Warwick: Oxford and Warwick Universities.

Quintini, G. and S. Martin. 2006. *Starting Well or Losing their Way? The Position of Youth in the Labour Market in OECD Countries*. OECD Social, Employment and Migration Working Papers. Paris: OECD.

Ryan, P. 2001. The School-to-Work Transition: A Cross-National Perspective. *Journal of Economic Literature* 39(1): 34–92.

United Nations Educational, Scientific, and Cultural Organization and International Labour Organization. 2002. Technical and Vocational Education for the 21st Century: UNESCO and ILO Recommendations. Paris and Geneva: UNESCO and ILO.

United Nations Educational, Scientific, and Cultural Organization Institute for Statistics (UIS) Database. http://stats.uis.unesco.org/unesco

United Nations Educational, Scientific, and Cultural Organization. 2006 (ed.) Participation in Formal Technical and Vocational Education and Training Programmes Worldwide: An Initial Statistical Study. Bonn: UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training.

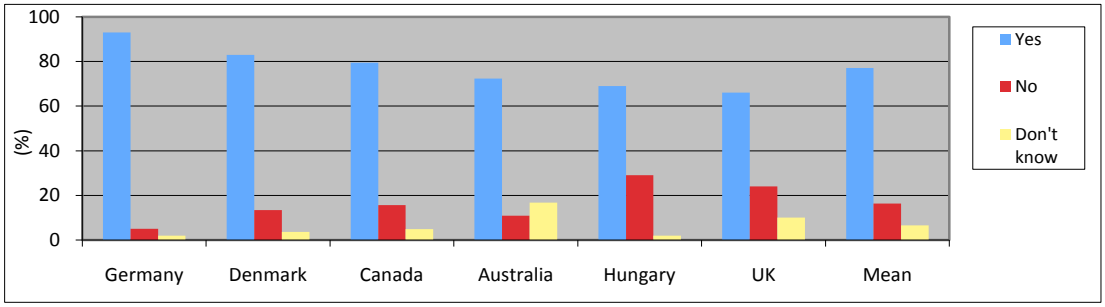
World Bank. Human Development Network Education Data, mimeo.

World Health Organization. 2003. *Skills for Health. Skills-Based Health Education Including Life Skills: An Important Component of a Child-Friendly/Health-Promoting School*. Information Series on School Health, Document 9. Geneva: WHO.
http://www.who.int/school_youth_health/media/en/sch_skills4health_03.pdf.

Young, M. 2005. *National Qualifications Frameworks: Their Feasibility for Effective Implementation in Developing Countries*. Skills Working Paper No. 22. Geneva: International Labor Organization.

Annex

Figure 1. Does TVE Make Employees Workplace–Ready?

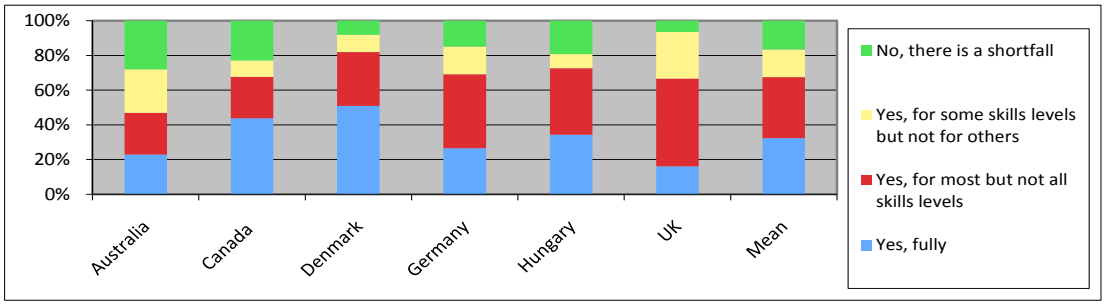


Source: City and Guilds Center for Skills Development, 2008.

Country	Yes	No	Don't Know
Germany	93.0	5.0	2.0
Denmark	82.9	13.4	3.7
Canada	79.4	15.7	4.9
Australia	72.3	10.9	16.8
Hungary	69.0	29.0	2.0
UK	66.0	24.0	10.0
Mean	77.1	16.3	6.6

Source: Adapted from City and Guilds Center for Skills Development, 2008.

Figure 2. Practitioner Opinions on Whether the Number of Trainees in Their Subject Areas Meets Employer Needs

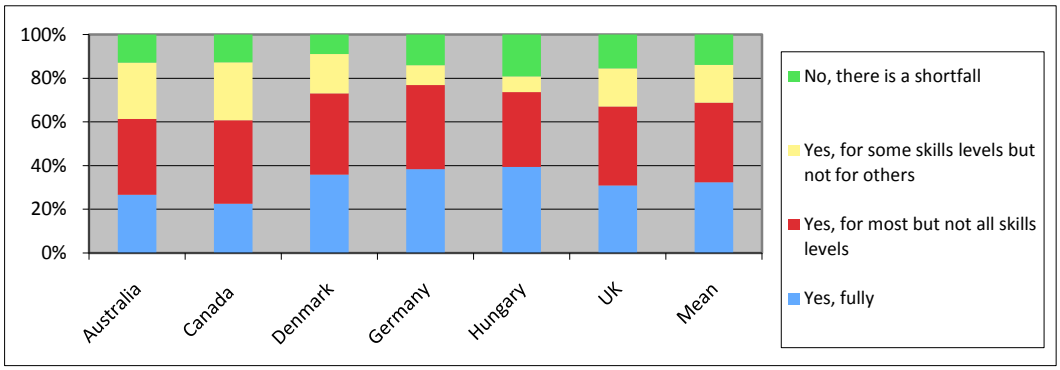


Source: City and Guilds Center for Skills Development, 2008.

Country	Yes, fully	Yes, for most but not all skills levels	Yes, for some skills levels but not for others	No, there is a shortfall
Australia	22.9	24.0	25.0	28.1
Canada	43.8	24.0	9.4	22.9
Denmark	50.8	31.1	9.8	8.2
Germany	26.6	42.6	16.0	14.9
Hungary	34.3	38.4	8.1	19.2
UK	16.1	50.5	26.9	6.5
Mean	32.4	35.1	15.9	16.6

Source: City and Guilds Center for Skills Development, 2008.

Figure 3. Employer Opinions on Whether Supply Meets Demand*



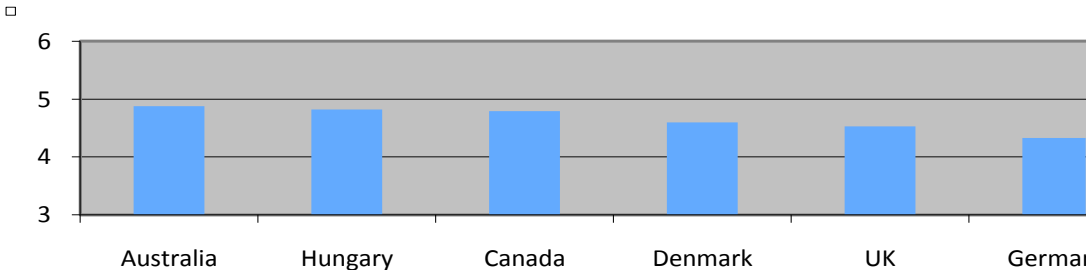
Note: * Considering the Availability of Suitable Training within Their Industry.

Source: City and Guilds Center for Skills Development, 2008.

Country	Yes, fully	Yes, for most but not all skills levels	Yes, for some skills levels but not for others	No, there is a shortfall
Australia	26.7	34.7	25.7	12.9
Canada	22.5	38.2	26.5	12.7
Denmark	35.9	37.2	17.9	9.0
Germany	38.4	38.4	9.1	14.1
Hungary	39.4	34.3	7.1	19.2
UK	30.9	36.1	17.5	15.5
Mean	32.3	36.5	17.3	13.9

Source: City and Guilds Center for Skills Development, 2008.

Figure 4. Overall Shortfall

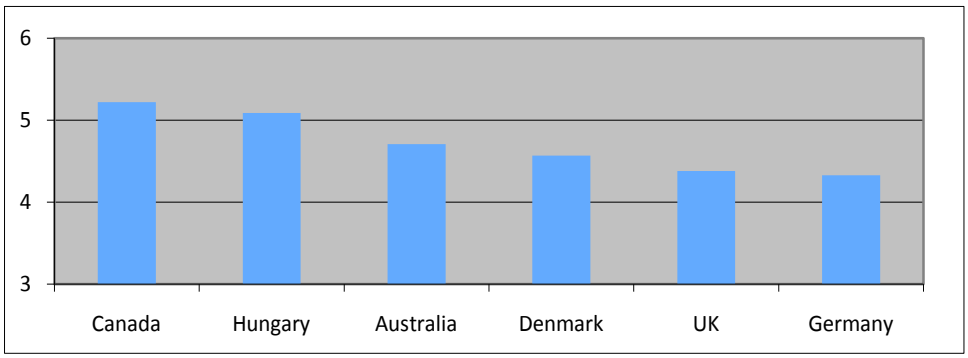


Source: City and Guilds Center for Skills Development, 2008.

Country	Mean
Australia	4.88
Hungary	4.82
Canada	4.79
Denmark	4.60
UK	4.53
Germany	4.33

Source: City and Guilds Center for Skills Development, 2008.

Figure 5. Soft Skills Shortage

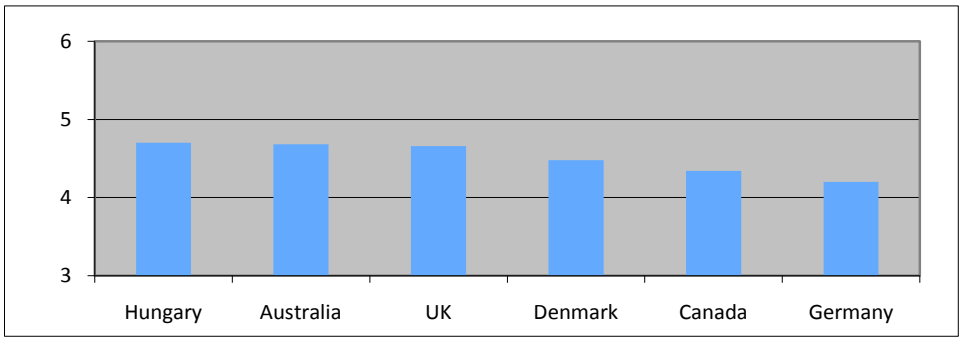


Source: City and Guilds Center for Skills Development, 2008.

Country	Mean
Canada	5.22
Hungary	5.09
Australia	4.71
Denmark	4.57
UK	4.38
Germany	4.33

Source: City and Guilds Center for Skills Development, 2008.

Figure 6. Basic Skills Shortage

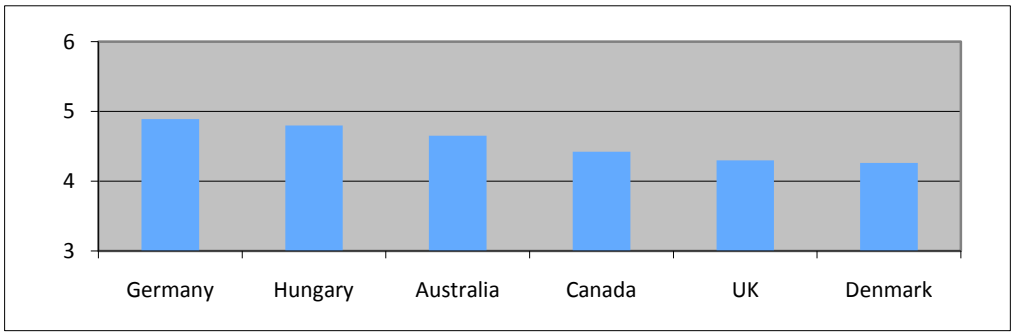


Source: City and Guilds Center for Skills Development, 2008.

Country	Mean
Hungary	4.70
Australia	4.68
UK	4.66
Denmark	4.48
Canada	4.34
Germany	4.20

Source: City and Guilds Center for Skills Development, 2008.

Figure 7. Generic Skills Shortage

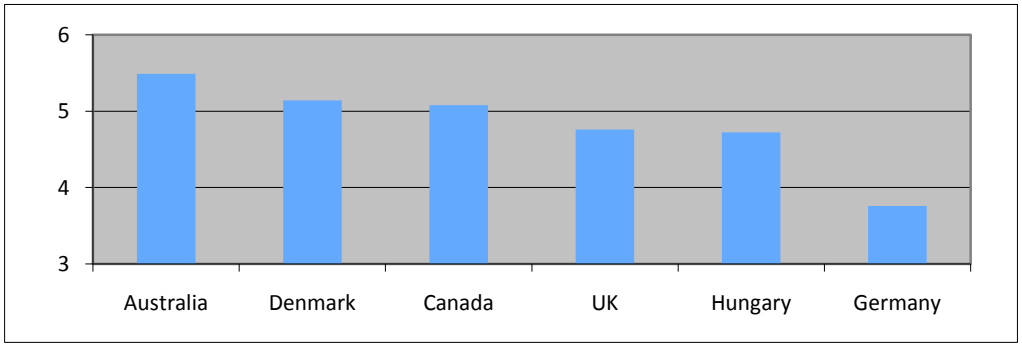


Source: City and Guilds Center for Skills Development, 2008.

Country	Mean
Germany	4.89
Hungary	4.80
Australia	4.65
Canada	4.42
UK	4.30
Denmark	4.26

Source: City and Guilds Center for Skills Development, 2008.

Figure 8. Job-Specific Technical Skills

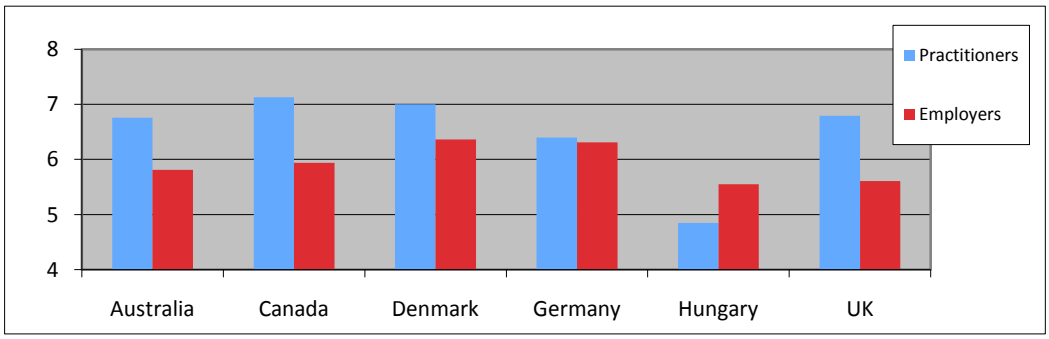


Source: City and Guilds Center for Skills Development, 2008.

Country	Mean
Australia	5.49
Denmark	5.14
Canada	5.08
UK	4.76
Hungary	4.72
Germany	3.76

Source: City and Guilds Center for Skills Development, 2008.

Figure 9. Practitioner Ability to Predict and Respond to Future Training Requirements

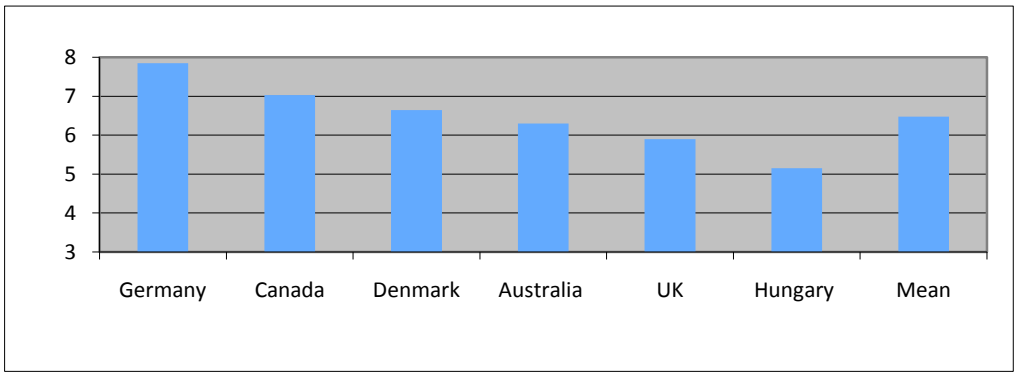


Source: City and Guilds Center for Skills Development, 2008.

Country	Practitioners	Employers
Australia	6.76	5.81
Canada	7.13	5.94
Denmark	7.00	6.36
Germany	6.40	6.31
Hungary	4.85	5.55
UK	6.79	5.61

Source: City and Guilds Center for Skills Development, 2008.

Figure 10. Esteem of TVET

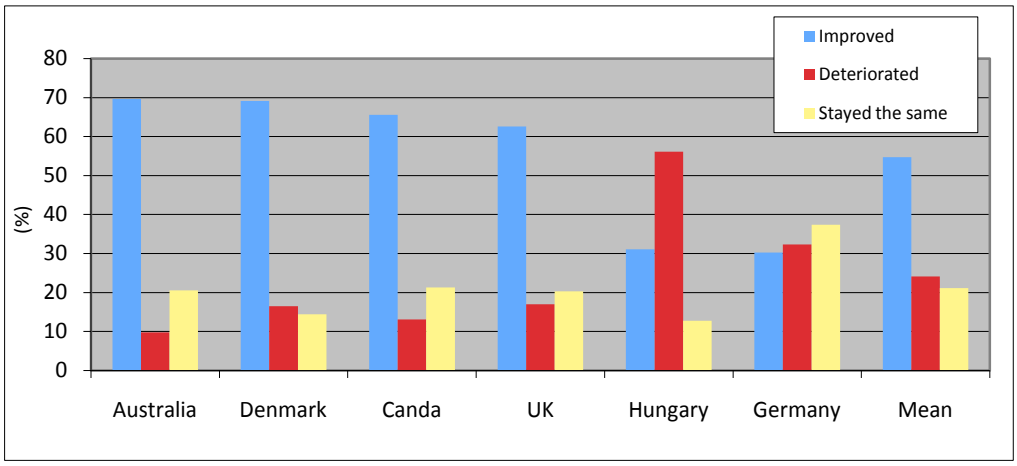


Source: City and Guilds Center for Skills Development, 2008.

Country	**Mean**
Germany	7.85
Canada	7.03
Denmark	6.64
Australia	6.30
UK	5.90
Hungary	5.15
Mean	6.48

Source: City and Guilds Center for Skills Development, 2008.

Figure 11. Status of Esteem of TVET over the Last 10 Years?



Source: City and Guilds Center for Skills Development, 2008.

Country	Improved	Deteriorated	Stayed the same
Australia	69.6	9.8	20.6
Denmark	69.1	16.5	14.4
Canda	65.6	13.1	21.3
UK	62.6	17.0	20.3
Hungary	31.1	56.1	12.8
Germany	30.3	32.3	37.4
Mean	54.7	24.1	21.1

Source: City and Guilds Center for Skills Development, 2008.

Social Protection Discussion Paper Series Titles

No.	Title
0924	Towards Comprehensive Training by Jean Fares and Olga Susana Puerto, November 2009
0923	Pre-Employment Skills Development Strategies in the OECD by Yoo Jeung Joy Nam, November 2009
0922	A Review of National Training Funds by Richard Johanson, November 2009
0921	Pre-Employment Vocational Education and Training in Korea by ChangKyun Chae and Jaeho Chung, November 2009
0920	Labor Laws in Eastern European and Central Asian Countries: Minimum Norms and Practices by Arvo Kuddo, November 2009 (online only)
0919	Openness and Technological Innovation in East Asia: Have They Increased the Demand for Skills? by Rita K. Almeida, October 2009 (online only)
0918	Employment Services and Active Labor Market Programs in Eastern European and Central Asian Countries by Arvo Kuddo, October 2009 (online only)
0917	Productivity Increases in SMEs: With Special Emphasis on In-Service Training of Workers in Korea by Kye Woo Lee, October 2009 (online only)
0916	Firing Cost and Firm Size: A Study of Sri Lanka's Severance Pay System by Babatunde Abidoye, Peter F. Orazem and Milan Vodopivec, September 2009 (online only)
0915	Personal Opinions about the Social Security System and Informal Employment: Evidence from Bulgaria by Valeria Perotti and Maria Laura Sánchez Puerta, September 2009
0914	Building a Targeting System for Bangladesh based on Proxy Means Testing by Iffath A. Sharif, August 2009 (online only)

0913 Savings for Unemployment in Good or Bad Times: Options for Developing Countries
by David Robalino, Milan Vodopivec and András Bodor, August 2009 (online only)

0912 Social Protection for Migrants from the Pacific Islands in Australia and New Zealand
by Geoff Woolford, May 2009 (online only)

0911 Human Trafficking, Modern Day Slavery, and Economic Exploitation
by Johannes Koettl, May 2009

0910 Unemployment Insurance Savings Accounts in Latin America: Overview and Assessment
by Ana M. Ferrer and W. Craig Riddell, June 2009 (online only)

0909 Definitions, Good Practices, and Global Estimates on the Status of Social Protection for International Migrants
by Johanna Avato, Johannes Koettl, and Rachel Sabates-Wheeler, May 2009 (online only)

0908 Regional Overview of Social Protection for Non-Citizens in the Southern African Development Community (SADC)
by Marius Olivier, May 2009 (online only)

0907 Introducing Unemployment Insurance to Developing Countries
by Milan Vodopivec, May 2009 (online only)

0906 Social Protection for Refugees and Asylum Seekers in the Southern Africa Development Community (SADC)
by Mpho Makhema, April 2009 (online only)

0905 How to Make Public Works Work: A Review of the Experiences
by Carlo del Ninno, Kalanidhi Subbarao and Annamaria Milazzo, May 2009 (online only)

0904 Slavery and Human Trafficking: International Law and the Role of the World Bank
by María Fernanda Perez Solla, April 2009 (online only)

0903 Pension Systems for the Informal Sector in Asia
edited by Landis MacKellar, March 2009 (online only)

0902 Structural Educational Reform: Evidence from a Teacher's Displacement Program in Armenia
by Arvo Kuddo, January 2009 (online only)

0901 Non-performance of the Severance Pay Program in Slovenia
by Milan Vodopivec, Lilijana Madzar, Primož Dolenc, January 2009 (online only)

0838 Investing for the Old Age: Pensions, Children and Savings
by Vincenzo Galasso, Roberta Gatti and Paola Profeta, December 2008 (online only)

0837 Can the Introduction of a Minimum Wage in FYR Macedonia Decrease the Gender Wage Gap?
by Diego F. Angel-Urdinola, December 2008 (online only)

0836 Highly Labor-Intensive Public Works in Madagascar: Issues and Policy Options
by Nirina Haja Andrianjaka and Annamaria Milazzo, October 2008 (online only)

0835 Can Conditional Cash Transfer Programs Play a Greater Role in Reducing Child Undernutrition?
by Lucy Bassett, October 2008

0834 The Performance of Social Pensions in India: The Case of Rajasthan
by Puja Vasudeva Dutta, July 2008 (online only)

0833 Labor Regulations in Developing Countries: A Review of the Evidence and Directions for Future Research
by Tito Boeri, Brooke Helppie, Mario Macis, October 2008 (online only)

0832 The Incentives to Invest in Job Training: Do Strict Labor Codes Influence this Decision?
by Rita K. Almeida and Reyes Aterido, October 2008

0831 Reforming the Pension Reforms: The Recent Initiatives and Actions on Pensions in Argentina and Chile
by Rafael Rofman, Eduardo Fajnzylber and German Herrera, May 2008 (online only)

0830 Community-based Risk Management Arrangements: An Overview and Implications for Social Fund Programs
by Ruchira Bhattamishra and Christopher B. Barrett, October 2008

0829 Work History and the Access to Contributory Pensions in Uruguay: Some Facts and Policy Options
by Marisa Bucheli, Alvaro Forteza and Ianina Rossi, May 2008 (online only)

0828 A Theory of Contribution Density and Implications for Pension Design
by Salvador Valdés-Prieto, July 2008 (online only)

0827 On the Financial Sustainability of Earnings-Related Pension Schemes with "Pay-As-You-Go" Financing
by David A. Robalino and András Bodor, July 2008 (online only)

0826 An Ex-Ante Evaluation of the Impact of Social Insurance Policies on Labor Supply in Brazil: The Case for Explicit Over Implicit Redistribution
by David A. Robalino, Eduardo Zylberstajn, Helio Zylberstajn and Luis Eduardo Afonso, July 2008 (online only)

0825 The Portability of Pension Rights: General Principals and the Caribbean Case
by Alvaro Forteza, May 2008 (online only)

0824 Pension Systems and Reform Conceptual Framework
by Robert Holzmann, Richard Paul Hinz and Mark Dorfman, September 2008 (online only)

0823 Mandated Benefits, Employment, and Inequality in a Dual Economy
by Rita Almeida and Pedro Carneiro, August 2008 (online only)

0822 The Return to Firm Investments in Human Capital
by Rita Almeida and Pedro Carneiro, June 2008 (online only)

0821 Population Aging and the Labor Market: The Case of Sri Lanka
by Milan Vodopivec and Nisha Arunatilake, August 2008 (online only)

0820 China: Improving Unemployment Insurance
by Milan Vodopivec and Minna Hahn Tong, July 2008 (online only)

0819 Management Information Systems in Social Safety Net Programs: A Look at Accountability and Control Mechanisms
by Cesar Baldeon and Maria D. Arribas-Baños, August 2008 (online only)

0818 Guidance for Responses from the Human Development Sectors to Rising Food Prices
by Margaret Grosh, Carlo del Ninno and Emil Daniel Tesliuc, June 2008 (revised and published as a non-SP Discussion Paper)

0817 Levels and Patterns of Safety Net Spending in Developing and Transition Countries
by Christine Weigand and Margaret Grosh, June 2008 (online only)

0816 Labor Regulation and Employment in India's Retail Stores
by Mohammad Amin, June 2008 (online only)

0815 Beyond DALYs: Developing Indicators to Assess the Impact of Public Health Interventions on the Lives of People with Disabilities
by Daniel Mont and Mitchell Loeb, May 2008

0814 Enforcement of Labor Regulation and Firm Size
by Rita Almeida and Pedro Carneiro, May 2008 (online only)

0813 Labor Markets Lending and Analytical Work at the World Bank: FY2002-2007
by Milan Vodopivec, Jean Fares and Michael Justesen, May 2008

0812 Risk and Vulnerability Analysis in the World Bank Analytic Work: FY2000-2007
by Valerie Kozel, Pierre Fallavier and Reena Badiani, May 2008

0811 Pension Lending and Analytical Work at the World Bank: FY2002-2007
by Richard Hinz, Melike Egelmelzer and Sergei Biletsky, May 2008 (online only)

0810 Social Safety Nets Lending and Analytical Work at the World Bank: FY2002-2007
by Margaret Grosh and Annamaria Milazzo, May 2008

0809 Social Funds as an Instrument of Social Protection: An Analysis of Lending Trends - FY2000-2007
by Samantha De Silva and June Wei Sum, July 2008

0808 Disability & Development in the World Bank: FY2000-2007
by Jeanine Braithwaite, Richard Carroll, and Karen Peffley, May 2008

0807 Migration, Labor Markets, and Integration of Migrants: An Overview for Europe
by Rainer Münz, April 2008 (online only)

0806 Is the Window of Opportunity Closing for Brazilian Youth? Labor Market Trends and Business Cycle Effects
by Michael Justesen, April 2008

0805 Disability and Poverty: A Survey of World Bank Poverty Assessments and Implications
by Jeanine Braithwaite and Daniel Mont, February 2008

0804 Poverty Traps and Social Protection
by Christopher B. Barrett, Michael R. Carter and Munenobu Ikegami, February 2008

0803 Live Longer, Work Longer: Making It Happen in the Labor Market
by Milan Vodopivec and Primoz Dolenc, February 2008 (online only)

0802 Disability in Kazakhstan: An Evaluation of Official Data
by Ai-Gul S. Seitenova and Charles M. Becker, February 2008 (online only)

0801 Disability Insurance with Pre-funding and Private Participation: The Chilean Model
by Estelle James, Augusto Iglesias and Alejandra Cox Edwards, January 2008

0719 The Life-Course Perspective and Social Policies: An Issues Note
by A.L. Bovenberg, November 2007

0718 Social Safety Nets and Targeted Social Assistance: Lessons from the European Experience
by Chris de Neubourg, Julie Castonguay and Keetie Roelen, November 2007 (online only)

0717 Informality and Social Protection: Preliminary Results from Pilot Surveys in Bulgaria and Colombia
by Franco Peracchi, Valeria Perotti and Stefano Scarpetta, October 2007 (online only)

0716 How Labor Market Policies can Combine Workers' Protection with Job Creation: A Partial Review of Some Key Issues and Policy Options
by Gaëlle Pierre and Stefano Scarpetta, October 2007 (online only)

0715 A Review of Interventions to Support Young Workers: Findings of the Youth Employment Inventory
by Gordon Betcherman, Martin Godfrey, Susana Puerto, Friederike Rother, and Antoneta Stavreska, October 2007

0714 Performance of Social Safety Net Programs in Uttar Pradesh
by Mohamed Ihsan Ajwad, October 2007

0713 Are All Labor Regulations Equal? Assessing the Effects of Job Security, Labor Dispute and Contract Labor Laws in India
by Ahmad Ahsan and Carmen Pagés, June 2007

0712 Convention on the Rights of Persons with Disabilities: Its Implementation and Relevance for the World Bank
by Katherine Guernsey, Marco Nicoli and Alberto Ninio, June 2007

0711 Reaching the Poor and Vulnerable: Targeting Strategies for Social Funds and other Community-Driven Programs
by Julie Van Domelen, May 2007

0710 The Macedonia Community Development Project: Empowerment through Targeting and Institution Building
by Caroline Mascarell, May 2007

0709 The Nuts and Bolts of Brazil's Bolsa Família Program: Implementing Conditional Cash Transfers in a Decentralized Context
by Kathy Lindert, Anja Linder, Jason Hobbs and Bénédicte de la Brière, May 2007 (online only)

0708 Globalization and Employment Conditions Study
by Drusilla K. Brown, April 2007

0707 The Kosovo Pension Reform: Achievements and Lessons
by John Gubbels, David Snelbecker and Lena Zezulin, April 2007 (online only)

0706 Measuring Disability Prevalence
by Daniel Mont, March 2007

0705 Social Safety Nets in World Bank Lending and Analytic Work: FY2002-2006
by Annamaria Milazzo and Margaret Grosh, March 2007 (online only)

0704 Child Labor and Youth Employment: Ethiopia Country Study
by Lorenzo Guarcello and Furio Rosati, March 2007

0703 Aging and Demographic Change in European Societies: Main Trends and Alternative Policy Options
by Rainer Muenz, March 2007 (online only)

0702 Seasonal Migration and Early Childhood Development
by Karen Macours and Renos Vakis, March 2007

0701 The Social Assimilation of Immigrants
by Domenico de Palo, Riccardo Faini and Alessandra Venturini, February 2007 (online only)

To view Social Protection Discussion papers published prior to 2007, please visit www.worldbank.org/sp.

Summary Findings

Effective pre-employment skills development strategies are critical in preparing individuals with relevant labor market skills and competencies. Within the context of rapidly changing skills demands, this paper documents and examines recent pre-employment skills development trends within OECD countries and reviews its main success factors. Despite the increasing focus on general and higher education, we document that participation in TVET systems at the upper secondary level in OECD countries has remained at approximately 50 percent of total enrollment in recent years. In response to the growing demand for general competencies and higher-level skills, there has also been an increasing trend in OECD countries to defer vocational specialization and more effectively integrate general and vocational education. Furthermore, in an effort to combat the image of TVET as a "dead-end" pathway, OECD countries are undertaking measures to improve permeability between TVET and higher education (e.g. the establishment of national qualifications frameworks). Finally, while traditional apprenticeships are declining in popularity, OECD countries are adopting new approaches of effectively integrating workplace experience in pre-employment TVET systems

HUMAN DEVELOPMENT NETWORK

About this series...
Social Protection Discussion Papers are published to communicate the results of The World Bank's work to the development community with the least possible delay. The typescript manuscript of this paper therefore has not been prepared in accordance with the procedures appropriate to formally edited texts. The findings, interpretations, and conclusions expressed herein are those of the author(s), and do not necessarily reflect the views of the International Bank for Reconstruction and Development / The World Bank and its affiliated organizations, or those of the Executive Directors of The World Bank or the governments they represent. The World Bank does not guarantee the accuracy of the data included in this work. For free copies of this paper, please contact the Social Protection Advisory Service, The World Bank, 1818 H Street, N.W., Room G7-703, Washington, D.C. 20433 USA. Telephone: (202) 458-5267, Fax: (202) 614-0471, E-mail: socialprotection@worldbank.org or visit the Social Protection website at www.worldbank.org/sp.