

# The nature of employability skills: empirical evidence from Singapore

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*This paper concerns the changing nature of employability skills, moving from the original life skills or basic skills concepts to the increasingly work-oriented interpretation. The early concept of employability skills linked employability skills to job readiness and holding down employment. However, the work-oriented focus is increasingly linking the impact of employability skills to organizational (or performance) outcomes, which in turn are linked to workers' career mobility and wage gains. This paper makes use of recent skills utilization data in Singapore to map out the relationship between employability skills and mobility. It shows that employability skills in Singapore are increasingly job context related, going beyond just holding down a job. As such, mobility is likely to be influenced by the extent to which employability skills are shared between industries. Recognition of the context-related nature of employability skills has led to the modification of workforce development training in Singapore in order to meet the needs for greater employability skills effectiveness through 'contextualized' training provision.*

## Introduction

Employability skills is one of those policy areas that it is often presented as if it were 'unproblematic' – we all know what 'employability skills' are and the more, the better. However, as a recent employability skills evaluation exercise in Singapore found, the

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major obstacle to evaluating employability skills appeared to be the difficulty of defining employability (Willmott *et al.*, 2011). Not only do we lack a common agreement on definition but also the meaning and nature of employability skills appear to differ depending on the target audience to whom employability skills are applied, suggesting they are less transferable than rhetoric suggests.

For example, the policy purpose in promoting employability skills is often not clear and may also change over time, if indeed it is defined in the first instance. Over the years, countries such as the UK, Australia, Canada, United States, New Zealand, France, Germany and Denmark have attempted to define employability skills as part of their workforce policies. The National Centre for Vocational Education Research (NCVER) (2003, p. 1) has noted that, irrespective of either the policy or the approach taken, these 'country lists' can be summed up as covering six skill domains: basic/fundamental skills, people-related skills, conceptual/thinking skills, personal attributes, knowledge of the business world, and skills related to the community. The purpose in identifying employability skills appears to fundamentally affect the nature of employability skill: for example, they have been variously treated as a commodity, a performance indicator, a survival kit, a means to supporting employers or meeting individual needs. Each has very different implications for the definition of employability skills, how we can support them and how to evaluate any policy effort.

In Singapore, the origin of the interest in the employability skills approach as a policy tool is not entirely clear. Nevertheless, employability skills have been formally promoted as the main tools for up-skilling workers for improving job performance and income mobility since the establishment of the Singapore Workforce Development Agency (WDA) in 2003. A speech by the Minister for Education and Manpower in 2006 included the following statement:

The ESS [Employability Skills System] is a rigorous and developed platform to help our workers upgrade their skills to stay employable or get better paying jobs. . . . The ESS comprises ten employability skills, ranging from numeracy, literacy and infocomm technologies, to teamwork and personal effectiveness. These are generic skills applicable across all industries. Our workers would have developed some of these skills during their formal schooling, but we need to make a conscious effort to teach, reinforce and enhance these skills amongst adult workers too. (Gan Kim Yong, 2006)

The Minister's statement went on to outline the benefits that Singaporean workers might expect to gain from enhancing their employability skills: by upgrading their skills, they will 'stay employable or get better paying jobs'. Employability skills are seen as one of the policy tools to improve mobility and earnings. Therefore, it would appear that, in Singapore, employability skills are construed as a way of solving the politically challenging issue of low pay, by enabling individuals to improve their job mobility and attain improved wages.<sup>1</sup>

The purpose of this paper is therefore to explore two key questions. The first is the nature of employability skills and how that may be linked to mobility issues. Our discussion here will focus on the shift towards contextualization. The rationale is that for employability skills to be a mobility enhancer, employability skills have to be understood as a demand concept. In other words, employers must value these skills.

The second question examines the empirical evidence for the impact of employability skills on mobility in Singapore. In the absence of direct measures of mobility in relation to employability skills, we examine the extent to which overlapping patterns of utilization of employability skills are found across industries. These data are then used to deduce the extent to which employability skills are linked to mobility. We then use these findings as a vehicle for exploring the rationale and implications of recent employability skills policy reform in Singapore.

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<sup>1</sup> It should be noted that, in the last 10 years, income inequality widened, with the bottom 10 per cent of earners seeing almost no improvements to pay (see Dhamani, 2008).

## The nature of employability skills

We assess the nature of employability skills in three parts. The first examines the 'skills transfer perspective'. Skills and education policies single out employability skills as a separate area of policy attention. Some of the justification comes from the belief that most of these skills are generic in nature and are therefore good for labour market and income mobility. A few early assessments have been undertaken by labour economists of mobility studies and some of these have provided empirical estimates on skills transfer, and therefore a certain amount of indirect quantitative evidence for our understanding of the nature of employability skills.

The second part concerns the 'skills policy perspective' focusing on how skills formation policy and systems impact on the nature of employability skills. We will also look at how definitions of employability skills reflect the changing emphasis of employability skills policy. This body of knowledge provides a qualitative assessment of the nature of employability skills.

The third part examines employability skills in the contemporary context of an increasingly demand-led system. This perspective comes from more recent 'skills studies' that derive skills measures through job activities. This new form of job-skills data provides the basis for mapping of skills overlap across industries or occupations, and therefore we argue that this form of data provides the greatest detail about the nature of employability skills because both employers and policymakers are focusing on job performance. The results enable us to assess the extent to which employability skills may facilitate mobility. What emerges from this discussion – as seen from the Singapore data in the later sections – is that as employability skills become more oriented towards job performance, they are increasingly seen as job specific too.

### The economic approach to assessing skills transferability

There appears to be no reports of the direct assessment of the nature and impact of employability skills within the available economic literature. However, a well-established group of studies on mobility, skills transfer and wage differentials provides some indirect evidence. Transferability of skills has attracted considerable attention in the last 40 years among labour economists who conduct research on immigrants' assimilation patterns in destination countries' labour markets and those who are concerned with the 'less-than-perfect' international transferability of immigrants' pre-immigration skills. They hypothesize that the decline in immigrants' earnings is due to a change in the degree to which immigrant skills are transferable to the destination countries, the so-called 'skill-transferability model' (Duleep & Regets, 1997). Other researchers (Borjas, 1992; Chiswick & Miller, 2009; Mincer & Ofek, 1982) have hypothesized that, in cross-country cases, skill transferability is higher among economically developed countries because of the similarity in their industrial structures.

Because of this, the evidence from cross-country immigrant assimilation studies is viewed by some as less than convincing as different countries are at different stages of economic development. Therefore, simple analysis of wage convergence between immigrants and natives ignores economic structure differentials. In addition, conventional economic researchers studying skills transferability problems tend to use wages as an 'all-in-one' proxy variable to estimate skill set similarities, without clearly classifying different skill sets that are likely to distort transferability estimates. A preferable analytical approach is to utilize the job as the unit of analysis and differentiate employability skills types so that different degrees of employability skills utilization can be directly estimated for various kinds of jobs. Unfortunately, this form of data was not available to the early labour market economists.

A more recent study by Chiswick and Miller (2009) employed the US census for 2000 to analyse the extent of matching of educational qualification to occupational attainment among native and foreign adult men. They found that employers could not tell how relevant the prior skills of migrants might be. To compensate that uncertainty, employers tended to select immigrant workers with 'over-education', which is a 'screening' (or

signalling) behaviour. We can infer from the Chiswick and Miller study that the greater the uncertainty involved, the more likely the employer is to rely on signalling or other simple means of identifying transferable skills. The main point to note is that the employability skills transfer debate so far has overlooked one key issue, which is the way that employers recruit new employees and what informs their perception of the transferability of prior skills. This is a central factor affecting the mobility of workers.

Silfvast and Quagliari (1994) studied the transferability of management skills between the public and private sectors, involving a sample of managers who have worked in both sectors prior to the survey. They identified nine skills that were necessary for accomplishing managerial tasks, namely, communication skills, interpersonal skills, adaptive-like skills, negotiation skills, planning skills, conceptual skills, group skills, decision-making skills and organizational skills. However, the results also showed that both private and public sector managers rated the utilization of negotiation, decision-making and organization skills higher in their own sector, compared with the same three skills in their 'host' sector. In other words, each group believes that particular skills are used more within its own sector than in the opposite sector. As with the Chiswick and Miller study, employability skills appeared to be derived on the basis of perceptions and interpretation rather than anything more tangible or, indeed, any issues to do with the methodology used for elicitation. For our purposes, the most interesting implication is that if managers perceive the utilization of skills is lower for workers outside their own sectors, this will affect the mobility of those workers. In other words, context is an important factor that affects the mobility of skills.

As highlighted, much of the economic literature does not deal with employability skills explicitly. Although we can make some inferences from the general literature on the transferability of migrant worker skills, the more useful contribution seems to be the identification of how employers may deal with skills when they recruit new employees. However, as we have noted, much of the literature simply regards employability skills as a universal 'supply' issue, ignoring the behaviour of employers.

### Skills policy and employability skills

Some of the earliest policy debates can be traced back to the rise of vocationalism in the 1970s. This is reflected in the famous Ruskin College speech by the then Labour Party Prime Minister James Callaghan in 1976 in which he complained (*Guardian*, 2001):

But I am concerned on my journeys to find complaints from industry that new recruits from the schools sometimes do not have the basic tools to do the job that is required. [...] The balance was wrong in the past. We have a responsibility now to see that we do not get it wrong again in the other direction. There is no virtue in producing socially well-adjusted members of society who are unemployed because they do not have the skills. Nor at the other extreme must they be technically efficient robots. Both of the basic purposes of education require the same essential tools. These are basic literacy, basic numeracy, the understanding of how to live and work together, respect for others, respect for the individual.

In the skills policy discourse, this speech was the first time a set of common skills (albeit variously defined) had been pushed to the centre stage as a solution to the employability problem. Not only were 'employability skills' seen as key to bridging the gap between school and work, they were also deemed to be equally important to any employment opportunities (Bates *et al.*, 1984; Holt, 1987).

Three trends began to develop from this supply perspective, which are relevant to our understanding of the nature of employability skills. The first was that employability skills in the 1980s moved from the simple literacy and numeracy types of basic skills (focusing mainly on communication) to enterprise skills in the 1990s. This was followed by another change of emphasis focusing on work-related soft skills, e.g. teamwork, planning and problem solving. More recent development seems to link employability skills more to employment issues and collective efforts amongst stakeholders – employers, workers and the state – to tackle issues such as lifelong learning and lifelong employability (Martin *et al.*, 2009). Changes like these reflect changing social, political and economic priorities. However, more importantly, Canning (2007) argues

that the sequence of changes has made employability skills increasingly 'collective' as opposed to being 'individually oriented' (p. 19):

This is not to deny the "agency" of the individual in the learning process, but to acknowledge the subject's often complex interchange with the collective. Increasingly, the literature is thus foregrounding the importance of the situatedness of practice and the dialogical interface between agency and structure.

This is an important attempt to theorize the nature of employability skills in its evolving and increasingly work-related formation. The 'collective shift' meant that those emerging employability skills were increasingly bound up by the work context. To use those employability skills effectively, you need an occupational or work environment to provide the necessary conditions to perform the employability skills. This is an area that we will return to in the later sections of this paper in which we will examine the new development of 'contextualization' in the Singaporean Employability Skills System. However, labour market research before the 2000s provided very little empirical evidence to test the mobility of employability skills. Canning (2007, p. 18) added:

The idea that skills are not easily transferred across contexts may seem, at first glance, to be somewhat counter-intuitive. However, it is difficult to identify even basic replicative knowledge that is 'transportable' in this manner.

This leads to the suggestion that the problem with employability skills is that too many detailed assumptions are made about the nature of employability skills. They might be better understood as a metaphor or a heuristic concept rather than an empirical artefact (Canning, 2007, 2011; Edwards *et al.*, 2004).

The second trend was the enlargement of the meaning of employability skills that gradually absorbed personal characteristics, such as attitudes and drive, as well as technology-related skills such as IT and behaviour such as 'learning to learn' (Hayward & Fernandez, 2004). The US O\*NET occupational classification is a good example of this employability skills expansion. O\*NET contains 239 descriptors (which are commonly regarded as 'skills' measures by users of O\*NET) for every job title. The 239 measures fall into seven categories, two of which – abilities and 'work styles' – contain mostly personal characteristics and attitude-related traits (Dickerson & Wilson, 2012; Tippins & Hilton, 2010). Many of these descriptors overlap with the expanded meanings of employability skills.

Employability skills, conceptualized within this complex framework, become tightly wedded into the work context. However, in practice, the nature of employability skills can still be interpreted in two opposing ways. For example, if we were to take the 'supply' (e.g. education) perspective, there would be no reason to assume that communication skills could not be taught in a standard manner and be applied equally effectively across a range of occupations. Thus, many of the 239 skill measures for any occupation could be taught via standard courses. On the other hand, if we were to train communication skills that would allow for information coming from 238 other skill measures, we might arrive at a different conclusion. Take for example communication skills training for sales staff working in a gambling (or book-making) high street outlet, communication skills would be highly integrated into the requirements of other skills, e.g. knowledge of regulatory matters, ethics (gambling addiction), use of specific information technology (IT) equipment and cultural issues. In the case of Singapore, cultural consideration means that it is not advisable to say 'Good luck!' as part of the conversation with customers because of the prevailing local superstition. This leads to a view of communication skills as being situated within a raft of other skills and therefore necessarily highly contextualized.

The third trend has been the increasing use of national qualification frameworks to promote the training of employability skills and to assess the levels of capability of the individual learner who embarks upon such training (Curtis & Denton, 2003; Willmott *et al.*, 2011). For example, in the UK, employability skills, under 'Core' and later 'Key' skills (with their varying emphases) became part of the education curriculum, with 'Core Skills' becoming an important part of Further Education college provision under

the Youth Training Schemes in the 1980s and later as part of the National Vocational Qualifications (NVQs). In 1997, the New Labour government made 'Key Skills' compulsory for school leavers and A-level students. Under the Qualifications and Curriculum Authority in the mid-2000s, Key Skills stood as a separate qualification for all 16- to 19-year-old students. For those in apprenticeships, the focus seems to be moving back to core skills, though the content of core skills varies according to the occupation and are not identical across sectors.

In Australia, the Finn Report initially identified six competencies – covering language and communication, mathematics, scientific and technological understanding, problem solving and interpersonal skills – as employability skills for young people entering employment. These skills were targeted at school curricula. However, the implementation of such skills was the task of the subsequent Mayer Committee, which introduced employability skills to all levels of the education sector (including universities) as well as being part of the Training Packages for workers. In order for these skills to be taught in the classroom setting and the need for formal assessment, the Mayer implementation actually omitted some of the competencies (e.g. personal attributes) that were thought to be 'hard to teach' and assess (Curtis & McKenzie, 2001). This of course narrowed down the content of employability skills and often simplified them to become relatively context free, so that they could be taught and assessed.

Common to both the UK and Australian cases was an attempt to mass-produce employability skills, with the assumption that these skills were highly transferable and equally applicable for young entrants to a wide range of jobs. An important point to note is that subsequent research examining the development of these two systems has shown that this sort of blanket expectation of employability skills is somewhat naive. Firstly, the educationalist approach to employability skills meant that those skills or competencies were identified through desk research and industry consultation in general terms (i.e. the 'metaphoric' nature of employability skills, as argued by Edwards *et al.*, 2004). This is quite different from deriving employability skills from examining the skills content of jobs. The question is therefore 'To what extent are those skills actually used in a variety of jobs, and in what order of importance?'

Secondly, the move to incorporate employability skills into the formal educational curricula had an unintended consequence. Both systems made employability skills more suitable for classroom teaching than necessarily meeting the needs at work. Also, under both NVQ or Training Packages, the assessment requirements led to heavy reliance on detailed descriptions about assessment objectives and criteria that made employability skills taught in these systems highly generalized or decontextualized. The end result was that training providers and employers began to lose confidence in employability skills that were delivered via qualifications (Turner, 2002). The learning point here is that in pursuit of general transferability, employability skills become less effective because they were not developed within the context of work.

### The skills surveys approach

With public policy continuing to focus on the general utility of employability skills for individuals and the supply of such skills, significant progress has been made in the analysis of the demand for skills for specific jobs. There are two sources of new data that are particularly relevant here, though the second is more important than the first.

The first is the Employers Skills Survey (ESS). The survey involves large-scale telephone interviews with employers in the UK<sup>2</sup> and in addition to seeking information on various training-related issues, also reports on skills shortages and skills gap. Davies *et al.* (2012), reporting on the findings of the ESS, found that skills gaps were more likely to be reported by employers in generic skills such as planning and organization (39 per cent), customer handling (38 per cent), team working (38 per cent), problem

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<sup>2</sup> Before UKCES started coordinating this exercise, ESS was carried out separately by the individual nations within the UK.

solving (35 per cent) and oral communication skills (34 per cent). Those generic skills that are less commonly reported include computer literacy (17 per cent), literacy (19 per cent) and numeracy skills (15 per cent).

The skills gaps identified by ESS do not give a direct measure for examining the nature of employability skills or how employability skills are related to the effective delivery of a job. What it does give us is a picture of the kinds of generic skills that are lacking within industry and are in demand, although the reasons behind such gaps are not clear.

The second data source has greater potential to inform our understanding of the nature of employability skills. This is the UK Skills Surveys (Ashton *et al.*, 1999; Felstead *et al.*, 2002, 2007). The Skills Surveys interview thousands of workers and poll a wide range of activities within their jobs. These activities (the job-task approach) are designed to reflect the skills that are required. Around 40 common activities – ranging from reading short documents, planning your own activities through to making presentations – form the basis of a factor analysis that is used to identify 10 dimensions of employability skills. Using the 2001 Skills Survey, for example, Dickerson and Green (2004) found that all employability skills used in UK jobs, except physical skills, grew significantly between 1997 and 2001. This increasing importance of various employability skills parallels the earlier point that employers increasingly view employability skills as key to improving job performance. In addition, Dickerson and Green (2004) found significant differences in the importance of employability skills – as measured by the extent of utilization in jobs – across industries and occupations. For example, they found that some employability skills, such as ‘high level communication’, ‘planning’ and ‘client communication’, are of much greater importance to professional and managerial workers than in other occupations.

The use of the Skills Survey data represents a significant step forward in assessing the nature of employability skills. Prior to the Skills Surveys, we might have suspected that employability skills might differ from job to job, but we did not know the extent to which they differ from each other or the order of importance of such differentials. The Skills Surveys give us the first-ever empirical evidence of how employability skills are related to British jobs; they also confirm Canning’s (2007) argument that the utility of employability skills is context bound. As the Skills Surveys also collect data on pay, we are also able to examine whether or not employers value employability skills. Green (1999) examined the links between pay and employability skills utilization and found that IT skills are highly valued, compared with other employability skills. Green also found no numerical skills link with pay; Ramos *et al.* (2013) also confirm a similar result with the Singaporean Skills Utilisation study: communication and problem-solving skills remain valued primarily in professional jobs.

These data therefore provide great insights into the nature of employability skills. After years of debates about how useful employability skills are, we are only now in a position to begin to understand the details. However, there are other areas that the Skills Surveys have not been able to tackle. For example, we still do not know whether or not employability skills are useful in enhancing job mobility within the same organization, helping workers to move to better jobs or moving into other industries.

In the next section, we will examine the nature of employability skills in Singapore. The results of a recent Skills Utilisation study will be used to help explain the reasons for recent employability skills policy reform in Singapore.

## Employability skills in Singapore

In Singapore, as in most other countries, employability skills are often seen as generally transferable. As well as accepting this general view, most people would also expect that it is not realistic to expect employability skills to be highly transferable across all sectors, although much of the policy rhetoric might lead one to such a conclusion. Here, Lance *et al.* (1995) provide a useful way forward. They defined skills transferability as the ease with which individuals trained to proficiency in one job can apply acquired

knowledge and skills in learning another job. In other words, within-country skills transferability can be summarized as the degree to which a job requires similar skills sets to another; if the job skills sets are highly similar, that implies high skills transferability. This is of course difficult to test, as economists tend to work with macro data. However, it is an approach that has influenced our own approach to the analysis with the Singapore Skills Utilisation data, reported in this next section.

In policy terms, employability skills in Singapore are formally promoted as part of the national qualifications system, known as the Workers' Skills Qualifications (WSQs). The WSQ evolved from the UK NVQs and the Australian Qualifications Framework. There are therefore great similarities with the UK and Australian models in terms of the qualifications structure and its emphasis on 'standards' and outcome assessment. Most of the differences between WSQ and its 'parent' systems come from the institutional support, its role within the wider policy strategy and its funding mechanism (Sung, 2011).

In terms of the wider policy strategy, Singapore has been described as a developmental state; there is dominant state involvement in the shaping of socioeconomic systems that focuses on economic progress over time (Sung & Raddon, 2013). As such, the national skills system is frequently fine-tuned to support the use of industrial policy that aims at achieving long-term developmental goals, with these goals being defined by the state. Although the most important strategic issue for the developmental state concerns the needs for constant up-skilling and the needs for industries to move up the global value-chain, the national skills system is also tasked with supporting the emergence of a flexible workforce, lifelong learning and with tackling income inequality. Within this context, employability skills are expected to enhance mobility.

Figure 1 shows that there are two main components within the Singapore continuing education and training system – the Singapore WDA and a system of 49 Continuing Education and Training (CET) centres and over 400 Approved Training Organisations. CET centres are 'sector-specific' training delivery bodies. These training providers are deliberately set up to compete among themselves. They can set their own prices for training courses, including both WSQ and other training courses (e.g. employer requested training). However, WSQ and non-WSQ courses are all incentivized through heavy government subsidies (up to 90 per cent of course fees). The WDA plays a key role in managing the qualifications system, coordinating the providers as well as administrating the training fund.

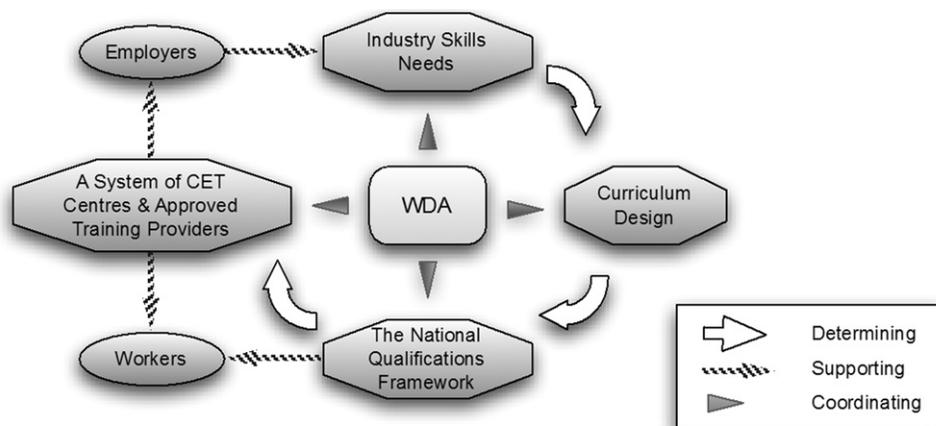


Figure 1: The National Skills System under the Singapore Workforce Development Agency (WDA).

Source: Authors' own.

Employability skills form one of the 31 WSQ frameworks supporting worker training at the 'worker', 'supervisory' and 'managerial' levels. Employability skills, referred to as ES within the WSQ, is the only framework that cuts across all industries; it attracts the largest share of public funding compared with any other frameworks. The original ES design team studied the US Comprehensive Adult Student Assessment System (CASAS) literacy and numeracy assessment system, the Australian Business Council taxonomy of employability skills and the Scottish Key Skills system. However, the eventual content of ES was influenced by a combination of desktop research and the need to tackle local policy concerns, e.g. workplace health and safety and 'global mindset'. ES therefore consists of the following items (see Figure 2).

Figure 2 shows that the different employability skill modules are taught at three levels for operatives, supervisors and managers. Literacy and numeracy are treated separately and their assessments follow the US CASAS system. However, despite the establishment of the ES framework, it is still hard to arrive at a succinct definition of employability skills in the context of Singapore. Willmott *et al.* (2011, p. 2) suggest that the original purpose of ES in Singapore was 'a matter for conjecture'. However, judging from the way in which ES has been promoted and supported, it would seem reasonable to link ES to the general policy objectives, which include tackling low wage problems through enhanced employability and increasing labour market flexibility (Sung, 2011). In a guide to employers, employability skills are '... generic and portable skills that will enable workers to better adapt to new job demands, work challenges and changing work environment. [In the form of a full certification, employability skills training also] ... provide[s] a new pathway to skills upgrading and lifelong learning for

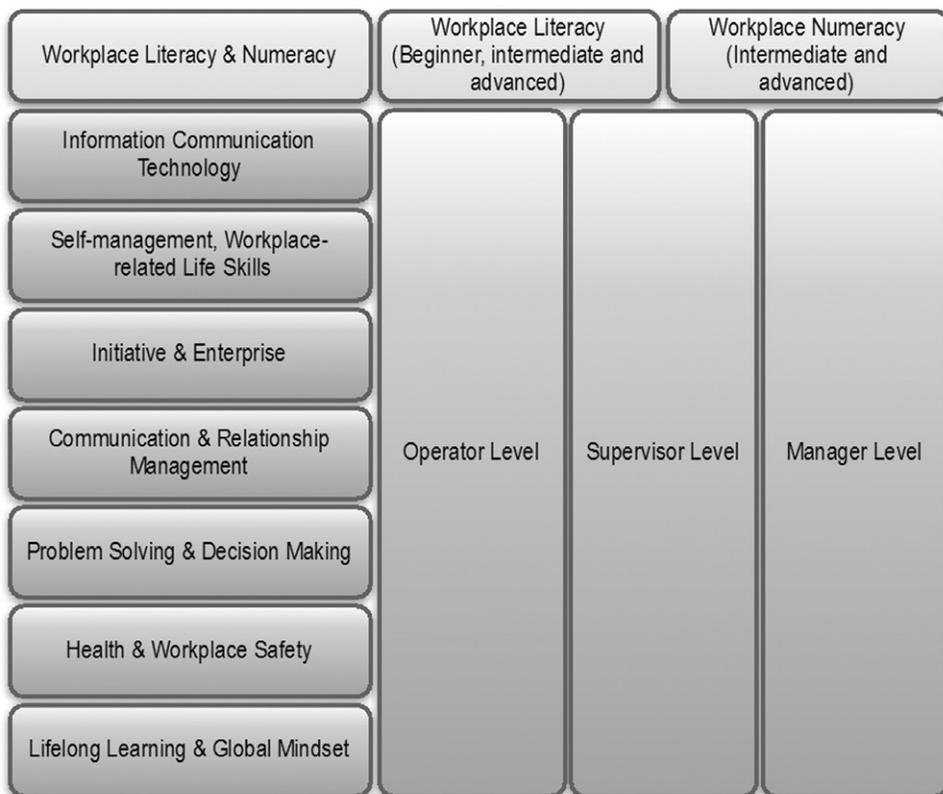


Figure 2: The Employability Skills Framework in Singapore.  
Source: Authors' own.

Singaporeans who have not completed their secondary education' (Singapore Workforce Development Agency, 2006, pp. 3–4).

The above definition clearly reflects that within the Singaporean policy context, employability skills are expected to enhance job mobility and lifelong learning. The mobility emphasis of employability skills is further clarified by the adoption of the '4 Ms' criteria for evaluating employability skills training impact by the WDA. The 4 Ms stand for:

- move into – from unemployment into a job;
- move up – an employed worker moving up to undertake a bigger or higher job;
- move between – an employed worker moving between jobs or companies in the same industry; and
- move across – an employed worker moving across to a new industry to seize growth and career advancement opportunities.

Any assessment of the 4 Ms outcomes is difficult because of the lack of systematic data collection on such issues. What data are available often include self-report ratings and measures of the perceived performance from employers and trainees (Willmott *et al.*, 2011). Working with perception data, Toh *et al.* (2008; cited by Willmott *et al.*, 2011) produced a rare study on the impact of ES on wage and mobility. They found that the trainees who completed the Workplace ICT Applications module of ES gained a 2.8 per cent change in the mean gross monthly income within 6–12 months after training. Figures for the Communication and Relationship Management and Problem-Solving and Decision Making modules, showed 14.4 per cent and 7.2 per cent gains, respectively. Toh *et al.* (2008) also identified positive mobility results from two of the 4 Ms: 'moving up' (42 per cent) and 'moving between' (55 per cent). The remaining two Ms were not assessed.

Of all the mobility objectives, the 'move across' mobility is probably the most difficult to gauge because of the inherent difficulties in collecting the relevant data. In the following section, we use recent skills utilization data to map the extent to which the various employability skills are used in different industries. Although not a direct measure of any of the 4 Ms, nonetheless this provides a rare opportunity to identify more information to contribute to the mobility discussion and to gauge the impact of employability skills.

## Data sources and statistics

The skills data employed in this article were collected in the Skills Utilisation at Work Survey (SU) in Singapore in 2010, conducted by the Institute for Adult Learning (Sung *et al.*, 2011). The study included a random sample of workers attending publicly funded courses under the 31 industry frameworks. In 2010, over 400,000 workers went through training in various government-funded CET centres (Willmott *et al.*, 2011). Trainees include professional, managerial and executive staff as well as rank-and-file workers.

The unit of analysis in the study is the job rather than the worker. Thus, questions are asked about the skills used in the jobs and not about the competencies of the workers themselves. The SU study is modelled on the UK Skills Surveys. Like the UK Skills Surveys, questions were worded in the following manner to ensure respondents focus on their job requirement:

In your job, how important is [paying attention to details]?

A total of 2293 workers from different sectors were surveyed. Table 1 shows the sample profile, cross-classifying all the jobs in terms of occupation, industry, establishment size, contract type, gender and job income. The last column shows the national profile to enable comparison of the sample data with the broader workforce. It is recognized that there are some discrepancies between the sample and national data in different categories, with an obvious oversample of jobs in the service industry and an under-sample of jobs with incomes of \$3000 (per month) and above.

Table 1: The sample profile of the skills utilization study

Category	Sub-category	%	N	Total	National Profile (2011) (%)
Occupation	Professional, managerial, executive and technical	46.4	1060	2285	52.2
	Service, production workers, operators, labourers	53.6	1225		47.8
Industry	Technical	29.6	642	2166	19.6
	Service	70.4	1524		80.3
Establishment size	49 employees or below	33.5	758	2262	a
	50 or more employees	66.5	1504		a
Contract type	Permanent full time	83.9	1864	2221	88.5
	Others	16.1	357		11.4
Gender	Male	55.5	1208	2175	55.9
	Female	44.5	967		44
Income	Less than \$1200	19.3	427	2213	a
	\$1200–\$2999	54.6	1209		a
	\$3000–\$4999	19.1	423		21.6
	\$5000–\$7999	4.9	109		12.7
	\$8000 or more	2.0	45		10.8

a = official statistics have different cut-off points and hence are unavailable.

## Data analysis and methodology

The SU study collects a wide range of skills data and workplace variables that may influence skills issues within those jobs. For the purposes of this paper, we focus on the 46 generic skills identified within the SU. These 46 generic skills follow those in the UK Skills Surveys. Appendix A contains the full list of these generic skills and the extent to which they are regarded as 'important' or 'very important' to the performance of their jobs. It is difficult to work with 46 generic skills, so a data reduction strategy is adopted to arrive at some larger groupings of what we refer to as employability skills in Singapore, nine in total. These nine broad categories of employability skills are listed in Table 2.

As a second step, we divide each generic skill factor loading by total factor loading in order to obtain the weights for each generic skill. As there are 46 generic skills, each of the nine more broadly defined generic skills has 46 individual weights. The weights reflect the relative importance of each generic skill within the larger employability skills groups.

The third step is to compute a weighted average for each employability skills group utilization. To achieve this, we multiply each generic skill by its corresponding weight, and then sum up the product. Thus, there are nine weighted average formulas as there are nine employability skill groups according to factor analysis results. All the values fall between zero and unity, one represents the highest utilization (importance) of that particular skill among these 16 industries, whereas zero represents the lowest utilization (importance). The last step is to normalize the weighted average results using  $(X - \text{Min}(X)) / (\text{Max}(X) - \text{Min}(X))$ , so that the results are all between zero and unity. That provides a simple and more intuitive interpretation of the results.

Finally, we cross-tabulated the normalized weighted averages by industry. In the SU sample, there are 16 industries in total. After the procedure of normalization and cross-tabulation, we took the absolute difference between the normalized values among industries and obtained the average employability skills differentials.

Table 2: Weighted average level of nine generic skills by industry

Industry	Employability skills categories								
	Literacy skills	Leadership skills	Problem-solving skills	Physical skills	Influencing skills	Teamwork	Planning skills	Numeracy skills	Emotional labour
Aviation maintenance and precision engineering	2.7893	2.6935	3.4416	2.9089	2.7177	3.5604	3.0910	2.6735	2.8862
Logistics and transportation	2.8416	2.7079	3.4803	3.0798	3.1526	3.5508	3.1229	2.2548	3.0667
Pharma and biologics	3.1366	2.5177	3.6094	2.7637	2.7248	3.6146	3.3653	2.8664	2.9382
Construction	3.0561	2.9722	3.4352	2.9932	2.9127	3.3919	3.2054	2.8316	3.1532
Chemicals/petrochemicals	2.9505	2.5835	3.4761	2.8721	2.6215	3.5318	3.2017	2.7288	2.7465
Electronics/electrical engineering	2.9724	2.6217	3.6330	2.7955	2.8935	3.5709	3.2054	2.7614	3.0457
Marine	3.0992	2.9787	3.5722	2.9994	2.8654	3.6255	3.3311	2.8140	3.0749
Retail	3.0498	3.0794	3.4205	3.1445	3.3669	3.6788	3.1858	2.8857	3.2245
Security, estate management and services	3.1096	3.0630	3.4012	2.8922	3.0000	3.5730	3.2327	2.5841	3.1638
Infocomm	2.9525	2.6201	3.5741	2.6883	3.0096	3.6275	3.2787	2.5208	2.8820
Hotels, tourism, events and attractions	3.1837	3.0749	3.6084	2.9204	3.3528	3.7604	3.2239	2.8949	3.2104
Community and social services, healthcare	3.1099	2.7919	3.4260	3.0789	3.3546	3.6746	3.0656	2.8362	3.1136
Food and beverage	3.0929	3.3476	3.5707	3.3413	3.3803	3.7544	3.1613	2.9693	3.3657
Landscape	2.9943	2.9048	3.5177	3.0395	2.9436	3.6487	3.3923	2.5760	3.1572
Government and other public service	3.1065	2.7082	3.4542	2.9413	3.0810	3.6452	3.2050	2.6626	2.9914
Generic manufacturing	2.9138	2.8474	3.5345	3.0139	2.7533	3.5824	3.1847	2.7918	3.0750
Average	3.0224	2.8445	3.5097	2.9671	3.0082	3.6119	3.2158	2.7282	3.0684
Ranking of importance	5	8	2	7	6	1	3	9	4
Standard deviation	0.1114	0.2287	0.0772	0.1582	0.2527	0.0890	0.0906	0.1795	0.1537

Following the approach of Lance *et al.* (1995), the results can be interpreted in such a way that a small difference implies similar employability skill utilization between two industries. This may also suggest higher possibility for mobility between the two industries as the difference in employability skills utilization is small. Conversely, a larger difference in normalized values indicates difference in skill utilization between the two industries and less potential for mobility.

## Statistical results

Table 2 shows the weighted average level of importance of nine employability skills among industries. Overall, teamwork skill is the most important employability skill (3.6119) across all industries, whereas numerical skill is the least important (2.7282). The top three employability skills are teamworking, problem solving and planning skills. Employability skills such as literacy and numeracy rank fifth and ninth, respectively. This seems to suggest that there is an increasing emphasis on work-related generic skills, instead of basic or life skills such as literacy and numeracy.

The distributions of employability skill importance vary across industries. The normalized results allow ready comparison of the relative importance, as the normalized values. Table 3 displays employability skills utilization across industries and shows that the food and beverage industry has the highest utilization of leadership skills, physical skills, influencing skills, numeracy skills and emotional labour skills. Hotels, tourism, events and attractions have the highest utilization of literacy skills and teamwork skills, whereas electronics/electrical engineering and landscape have the highest utilization of problem-solving skills and planning skills, respectively.

The absolute difference (or 'distance') between the normalized values among industries can be interpreted as a proxy for employability skills mobility among industries. We calculated the 15 possible mobility distances from each industry. These are shown in Table 4. Here, we can see that jobs in aerospace (aircraft maintenance in the local context) and precision engineering have very similar employability skills requirements to those in the chemical/petrochemical industry. The next closest is genetic engineering. The industry that is the most distant, or which has the least similar employability skills requirements is food and beverage, indicating barriers to mobility for people from aerospace and precision engineering who might want to move into that sector.<sup>3</sup> Likewise, to use one more example, the closest match of employability skills for retail jobs can be found in the community, social services and healthcare industry, then comes hotels and tourism. Employability skills in the pharmaceutical and biological industry have the least in common with those used in retail work. The implication of the mobility matrix in Table 4 is that employability skills used by a retail worker would be very useful for a job in the healthcare or the hotel industry. However, the same skills are not so relevant in the pharmaceutical and biological industry.

As mentioned earlier, we expected that there would be differences in the extent of employability skills utilization by different jobs. However, the findings of the Singapore SU data show that employability skills used in some jobs are so different from others that we expect very low mobility. For example, the mobility distances between infocomm and many other industries are so large such that we would not expect employability skills to be any significant help to an infocomm worker wishing to move into another industry. The mobility matrix therefore suggests that the 'context' argument of Canning (2007) may be salient.

## Discussion and conclusion

Our results here have some general implications for the employability skills debate, as well as implications for policy development in Singapore. The most important learning point is that the link between job mobility and employability skills depends on the job

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<sup>3</sup> And leaving aside any specific sector-specific vocational skill requirements.

Table 3: Normalized value of importance of nine generic skills by industry

Industry	Employability skills categories								
	Literacy skills	Leadership skills	Problem-solving skills	Physical skills	Influencing skills	Teamwork	Planning skills	Numeracy skills	Emotional labour
Aviation maintenance and precision engineering	0.0000	0.2118	0.1740	0.3378	0.1267	0.4574	0.0777	0.5861	0.2256
Logistics and transportation	0.1327	0.2292	0.3414	0.5996	0.6999	0.4312	0.1755	0.0000	0.5170
Pharma and biologics	0.8806	0.0000	0.8983	0.1156	0.1361	0.6044	0.9174	0.8560	0.3095
Construction	0.6765	0.5477	0.1467	0.4669	0.3838	0.0000	0.4280	0.8072	0.6568
Chemicals/petrochemicals	0.4088	0.0793	0.3229	0.2815	0.0000	0.3795	0.4168	0.6634	0.0000
Electronics/electrical engineering	0.4644	0.1253	1.0000	0.1642	0.3584	0.4859	0.4278	0.7090	0.4832
Marine	0.7857	0.5555	0.7376	0.4765	0.3214	0.6340	0.8127	0.7826	0.5302
Retail	0.6606	0.6769	0.0831	0.6986	0.9823	0.7786	0.3681	0.8830	0.7720
Security, estate management and services	0.8121	0.6571	0.0000	0.3123	0.4988	0.4913	0.5116	0.4609	0.6739
Infocomm	0.4137	0.1234	0.7461	0.0000	0.5115	0.6395	0.6524	0.3723	0.2188
Hotels, tourism, events and attractions	1.0000	0.6714	0.8939	0.3554	0.9637	1.0000	0.4846	0.8958	0.7491
Community and social services, healthcare	0.8130	0.3304	0.1070	0.5982	0.9661	0.7671	0.0000	0.8137	0.5928
Food and beverage	0.7698	1.0000	0.7311	1.0000	1.0000	0.9837	0.2929	1.0000	1.0000
Landscape	0.5198	0.4665	0.5024	0.5378	0.4244	0.6970	1.0000	0.4495	0.6632
Government and other public service	0.8044	0.2296	0.2287	0.3874	0.6056	0.6874	0.4269	0.5707	0.3955
Generic manufacturing	0.3156	0.3973	0.5750	0.4986	0.1737	0.5169	0.3646	0.7515	0.5304

Note: Comparing the different levels of generic skills used across industries, an industry with a score of 1 represents the highest utilization while a score of 0 represents the lowest utilization.

Table 4 Matrix of inter-industries mobility for employability skills

	Aerospace and precision engineering	Logistics and transportation	Pharma and biologics	Construction	Chemicals/ petrochemicals	Electronics/ electrical engineering	Marine	Retail
Aerospace and precision engineering	Nil	0.239	0.377	0.321	0.177	0.282	0.382	0.432
Logistics and transportation	0.239	Nil	0.507	0.348	0.326	0.325	0.390	0.366
Pharma and biologics	0.377	0.507	Nil	0.399	0.295	0.205	0.198	0.484
Construction	0.321	0.348	0.399	Nil	0.297	0.286	0.217	0.230
Chemicals/ petrochemicals	0.177	0.326	0.295	0.297	Nil	0.211	0.343	0.436
Electronics/ electrical engineering	0.282	0.325	0.205	0.286	0.211	Nil	0.224	0.404
Marine	0.382	0.390	0.198	0.217	0.343	0.224	Nil	0.302

	Security, estate management and services	Infocomm	Hotels, tourism, events and attractions	Community and social services, healthcare	Food and beverage	Landscape	Government and other public service	Generic manufacturing
Aerospace and precision engineering	0.319	0.308	0.535	0.342	0.620	0.371	0.241	0.214
Logistics and transportation	0.328	0.326	0.486	0.298	0.517	0.312	0.255	0.250
Pharma and biologics	0.385	0.234	0.352	0.434	0.541	0.319	0.296	0.297
Construction	0.178	0.402	0.347	0.264	0.437	0.260	0.224	0.216
Chemicals/ petrochemicals	0.324	0.252	0.496	0.411	0.608	0.348	0.240	0.207
Electronics/ electrical engineering	0.300	0.178	0.334	0.379	0.485	0.284	0.235	0.172
Marine	0.235	0.263	0.253	0.299	0.358	0.163	0.224	0.173

context involved. Rather than the complete transferability of such skills implied by much of the rhetoric, utility is mediated by context.

Our results here give us a handle of how employability skills mobility varies between any two industries, reflecting the impact of the business environment, dominant job design and perhaps specific circumstances relevant to the two industries concerned. This is an important point, given the serious attention given to job context in the recent review on employability skills in Singapore (Willmott *et al.*, 2011). That review concluded that the previous 4 Ms criteria were neither practical nor useful for the evaluation of employability skills training. What is more important to focus on is the actual impact of the *contextualized* content of employability skills training and specific organizational outcomes.

As a result, there are now three versions of publicly funded employability skills training: the generic option (mostly for the unemployed), the sectoral option and the company option. The company option is now the most preferred option because this contextualized employability skills training is seen as more likely to lead to job-related impacts. Such contextualized employability skills training in Singapore is very new, but it contains some significant innovations. Before training, the company has to go through a 'training needs analysis'. This identifies various performance issues or goals that the company wants to achieve. Then the employability skills training content is 'tailor-made' to enhance workers' capability to achieve those goals. For example, a restaurant chain in Singapore wants to enhance its branch managers' ability to manage customer diversity (e.g. age, gender or race). Previously, any queries would be routed to the CEO for advice. One of the new organizational objectives is to empower branch managers to take on these issues themselves. Employability skills training (e.g. modules on problem solving, applying emotional competence, effective communication and so on) will be customized to incorporate the relevant training materials to deal with those very specific organizational goals. In this respect, as employability skills become more context bound, employability skills also become more specific to the organization and its operating environment.

In conclusion, there is emerging evidence that employability skills are progressively orienting towards a work-based concept. Further understanding of the nature of employability skills is unlikely unless future research examines the connection between employability skills utilization and the work context. That will mean a requirement for detailed work-based skills data, especially if employability skills are to remain a central tenet of workforce development policy and planning. And until we pay sufficient attention to the use of this form of new data, employability skills policy will remain largely a desktop exercise that relies on metaphoric assumptions and expectations.

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