International Journal for Research in Vocational Education and Training (IJRVET)
2025, Vol. 12, Issue 3, 316–337
https://doi.org/10.13152/IJRVET.12.3.1

Workplace Learning for Critical Core Skills Development: Empirical Evidence From Singapore

Bi Xiao Fang*[1], Boo Song Hui Lena[2]

[1]*Singapore University of Social Science, Institute for Adult Learning, 463 Clementi Road, 599494 Singapore*
[2]*Nanyang Technological University, National Institute of Education, 50 Nanyang Avenue, 639798 Singapore*

Received: 15 January 2024, Accepted: 29 November 2024

Abstract

Context: Soft skills or critical core skills (CCS), e.g., communication, problem solving, etc, have been recognized by both individuals and organizations as important but at shortage in the labour market. Within this context, the development of CCS for the employees becomes more and more pressing for the organizations in order to cope with the everchanging demand of workforce. By clustering 2000 participants into seven occupation groups in terms of their similar patterns in the use of CCS, this article aims to show how workplace learning initiated by individuals in different occupations can forge a highly similar learning pathway to develop CCS for the purpose of their personal and professional development.

Methods: Drawing on the quantitative results of 2000 participants from Singaporean workforce into seven occupational groups, a qualitative study using semi-structured interview questions that seek to understand how workplace learning attributes to the development of critical core skills. 39 participants were selected to represent the critical core skills profile of the seven occupation groups in Singapore. Unlike earlier research focusing on specific occupation, the present study provides cross-national evidence for the development of critical core skills.

*Corresponding author: bi_xiaofang@ial.edu.sg

ISSN: 2197-8646
https://www.ijrvet.net

Findings: Participants' narratives of their workplace activities are analysed. The empirical study revealed that everyday practices at workplaces facilitate learning pathway more effectively than formal and structured training, for instance, learning from the experience, errors, and also peers within the community of practice.

Conclusions: This paper provides an in-depth qualitative study of workplace activities across the diverse occupational groups in Singapore which is lacking in existing literature, including participation and involvement practices using the lens of situated learning theory to account for the development of critical core skills. As a result, this paper enriches the scarce research base about critical core skills development and participatory practices in the community of practices and its links to organisation-wide performance.

Keywords: Skills Development, Workplace Learning, Situated Learning Theory, Vocational Education and Training, VET

1 Introduction

In recent years, many studies, research reports, surveys, even newspapers articles highlighted a problem of the labour market: They reported a skill shortage among employers. The latest Manpower talent shortage and employment outlook survey (2022) across 7 key industries namely, (1) education, health and government, (2) IT and technology, (3) manufacturing, (4) Banking and Finance, (5) Wholesale and retail trade, (6) Restaurants & hotels, and (7) construction, reported that 75% of the companies had talent shortage, compared to 69% of the companies reported talent shortage in 2021 as depicted in Figure 1. According to the survey, 84% of the companies find it challenging to find the right talent to fill their organisations' roles in 2022 as compared to 56% in 2018. The Manpower Group's Talent Shortage Survey (2015) first accounted that nearly 20% of employers considered the lack of soft skills as one of the key reasons they couldn't hire needed employees. The American survey Career Builder (2014), conducted over a sample of 2,138 human resource managers, indicates that soft skills are just as important as hard skills, ranking at the first position the skill 'work ethic' with 73% of preferences, at the second position 'reliability' again with 73% of answers, and third 'positive attitude' with 72%. LinkedIn's global talent trends (2019) reported that 89% of the recruiters' feedback that the lack of soft skills is the key reason to an unsuccessful hire. These statistics suggest that soft skills development be valued and an effective to be employed and stay employed competitively to face the everchanging demand of the workforce.

Figure 1: Current Status of Talent Shortage

In literature, 'soft skills', 'core competencies' and 'generic competencies' are the terms often used to represent similar skill types. The term, 'soft skills ', is used most often in research and yet the definitions and terminologies are used loosely when studying them (Matteson et al., 2016). To date, there have been no universally agreed upon definition to these skills. Although employers, policymakers, educators, and university students differ on a single definition, each recognizes the importance of soft skills when making contributions to the development of human capital for a competitive society (Cinque, 2016; Low et al., 2019; Majid et al., 2012). Soft skills development researchers posit to legitimize soft skills and retire the term 'soft skills' with the hope of a more appropriate name to frame the skills. Parlamis and Monnot (2019) attempted to reframe soft skills to CORE skills where CORE stands for Competence in Organizational and Relational Effectiveness.

The skills that contribute to success in modern organizational life comprise those that are both relational and organizational. For example, relational skills include notions such as positive attitude, trustworthiness, effective communication, leadership ability, cooperativeness, responsibility, initiative, ability to manage emotions, team- and self-awareness. Organizational skills encompass ability to influence others, read and manage other's emotions, manage conflict, negotiate, coach and mentor, understand organizational contexts, and develop meaningful networks. Parlamis and Monnot (2019) expressed that the idea of CORE skills better reflects the content of the skills in this domain. Although early researchers ostensibly designated skills as 'soft' if they were difficult to measure, there have been advances in the measurement of effective organizational behaviours in recent decades. Marin-Zapata

et al. (2021) In their systematic review of soft skills identified that soft skills include interpersonal and relational skills but neglected the cognitive dimensions of skills.

In comparison, Critical Core Skills (CCS) Framework in the Singapore Context would be a more comprehensive framework for individuals and organisation to define and measure CORE skills in view of the cognitive dimension that has been identified as a gap by the above researchers. In Singapore, the importance of core skills has been further strengthened by naming it as CCS which play a crucial role for individuals to achieve success at workplaces. Recognizing the increasing importance of CCS at workplaces for both individuals and organizations, Bi et al. (2023) made the first attempt to understand how CCS could be developed drawing on different occupation groups as identified by a CCS profiling tool.

CCS framework is developed by SkillsFurture Singapore (SSG). SSG drives and coordinates the implementation of the national SkillsFuture movement, promotes a culture and holistic system of lifelong learning through the pursuit of skills mastery, and strengthens the ecosystem of quality education and training in Singapore. The framework not only covers the dimensions within the soft skills frameworks in the literature, it also includes the cognitive dimensions that are lacking as outlined by Parlamis and Monnot (2019). Thus, the CCS framework developed by SSG provides a context for the core skills framework as posited by Parlamis and Monnot (2019), which consists of: (1) Thinking skills, such as decision-making and knowing how to learn (in the framework below, it is "thinking critically"); (2) interpersonal skills, such as teamwork skills and customer service skills (in the framework below, it is "interacting with others") ; and (3) intrapersonal skills, such as sociability and self-management (in the framework below, it is "staying relevant") as shown in Figure 2 below.

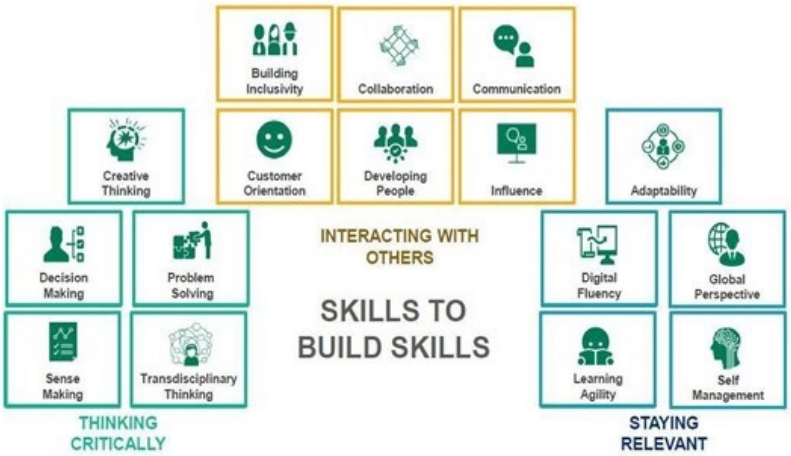


Figure 2: CCS Framework by SSG

In Singapore context, CCS are generally understood as valuable in many work contexts and transferable between those contexts. In this study, CCS are defined as:

> *Common, transferable skills that enable individuals to be employable and employed, facilitate their career mobility, and enable the acquisition of Technical Skills and Competencies relevant for specific job roles in the sector. (Skillsfuture Singapore, 2023)*

2 Understanding Workplace Learning

In recent years, workplace learning research has produced a vibrant body of studies on learning at and in the workplace (Billiet & Choy, 2013; Eraut, 2007; Melacarne & Nicolaides, 2019; Wang et al., 2022). The nature of learning at work is gaining popularity, as it enables the difficulties of assessing learning in this context to be acknowledged while drawing attention to the diverse activities and processes which characterize and distinguish workplace learning. Lave and Wenger's (1991) insight that the community of practice (rather than the individual) should form the basis of an analysis of learning, has highlighted the social and collective nature of learning, which is missed in analyses of (individual) attainment. Hence, social relations and belonging are central to Lave and Wenger's (1991) situated learning theory (SLT). As Lave and Wenger (1991) describe:

> *A community of practice is a set of relations among persons, activity and world, overtime and in relation to other tangential and overlapping communities of practice. A community of practice is an intrinsic condition for existence of knowledge, not least because it provides the interpretive support necessary for making sense of its heritage. (p. 98)*

SLT has been challenged on its overemphasis on the social dimension of learning but the marginalisation of individual learners within the learning situation. That is, "the individual learners seem to be submerged with the learning context" (Goh, 2013, p. 368). For example, learners' dispositions and biographies may also play a significant role in workplace learning. In responding to such limitation, Hodkinson et al.'s (2008) cultural theory of learning was developed to argue for the reciprocal relationship between learners and cultural context.

Marin-Zapata et al. (2021) carried out a systematic review of 82 articles studying soft skills and found that that there are four major groups of theories that seek to understand the development of soft skills. The first group of theories are those related to the resource-based view, expressed those competencies and soft skills as resources that impact organizational performance. In this regard, they tend to understand the contribution of employees' competencies and soft skills to firm-level performance, but do not focus on individual antecedents and outcomes. This theory is usually used to study technical skills. The second group of theories focuses on leadership theories, used in the study of competencies and soft skills composing leadership theories. Traditionally, these theories focus on the traits of leaders and how those

traits affect performance at various levels. Nevertheless, soft skills are individual traits and are present in individuals across all organizational levels and their effect on work settings goes beyond leadership and managerial positions. Third group of theories is capital-related, identified as contributing to the study of competencies and soft skills including human and social capital theories. They are useful to understand how a firm's investment in such capital may influence organisational level outcomes. The final group conceptualising the development of soft skills focuses on social learning theories.

They concluded that the last group of theories are the best fit to explain soft skills' antecedents and consequences that are peripheral to the task embedded in everyday practice at work. For instance, these theories can help understand how context in the form of organizational practices and educational programs interact where individuals develop core skills and eventually affect their job performance.

The above empirical research identified the importance to understand social practices that are peripheral to contextual-related tasks in the development of CCS. Therefore, this article mainly draws upon the significant body of work labelled situated learning theory, which has emerged from the works of Lave and Wenger (1991), with some emphasis on learners' dispositions and biography as acknowledged by Hokinson et al. (2008). Wenger (1999, p. 5) details four "interconnected and mutually defining" components of a situated theory of learning. Learning involves experiencing, belonging, doing and becoming, and this conceptualisation structures the following discussions of the findings of the study for different vignettes. This body of theory encourages a focus not just upon cultural and organisational artefacts, but upon the embeddedness of practices of CCS in their contextual settings. In the meantime, learners' dispositions and biography were also noted in their pathway of development of CCS. The reciprocal relationship between learners and the working contexts were also identified in the analysis the vignettes below.

These social cultural practices are built upon the concept of peripheral participation, members gaining skills by working and progressing from basic tasks to full participation (advance tasks). Novices can progress in a linear and sequential manner as they inculcate themselves in the practice of more experienced 'old-timers'. Peripheral participation acts as a bridge to develop skills, experience and approbation by interacting and learning from peers and mentors, and learning occurs via "centripetal participation in the learning curriculum of the ambient community" (Lave & Wenger, 1991, p. 100). SLT emphasises that learning is a process of identity formation or re-formation in relation to the community sustaining forms of practice. Lave and Wenger (1991, p. 115) thus note that "learning and a sense of identity are inseparable: They are aspects of the same phenomenon". As learners develop the identity for their core skills in the same community, others can observe and 'attend to' in particular situations, identify is shaped (Billett et al., 2005, p. 223).

Individuals experiencing "consonance" between their identity and the affordances for learning available in their community are likely to be receptive to those affordances. Identity and the other elements of the situated understanding of social learning are now used to structure the following empirical findings. In another words, situations allow each employee to have at least one, or preferably multiple experiences of work practices, even vicariously, and then having the opportunity to share, compare and contrast these experiences with peers. Such processes can extend manifestations of practice to foundations of practice, and in doing so can generate adaptations of practice. Given the difficulties of accessing workplaces and practice settings, and for optimum periods of time, not all the experiences will be direct. Thus, the paper aims to fill the knowledge gap by investigating what drives each employee to engage in their tasks to develop their core skills and connects us to unveil how each individual use CCS in their work settings.

Bolli and Renold (2017) investigated how important skills are; what specific skills are best learnt at school and what specific skills are best learnt at the workplace. With a sample size of 760 participants from 14 participating colleges exploiting data from a survey among professional tertiary education and training business administration students and their employers in Switzerland, the study found whilst the school provides optimal learning for only analytical skills and joy of learning, the workplace provides significant comparative advantage for soft skills; motivation, negotiation, teamwork, reliability, creative thinking, communication, and assertiveness.

Thus, we can observe that empirical studies underscore that workplace learning is multifaceted and deeply contextualised, e.g., influenced by the political, social and cultural environment. Workplace learning is also recognised as informal learning because these are learnings that arise from situational activities and practices as compared to formal learning that is represented by traditionally "educational events" in the classroom

However, there is a nuanced empirical work into the "interdependent micro-processes" such as the industry type, size, profession, forms of organisation, job design and experiences in specific work situation, even personal experiences (Billet, 2004; Goh, 2013; Melacarne & Nicolaides, 2019) that individuals can have access in their environments that requires deeper investigation of those elements in the community of practice that are most difficult to pin point with our fingers. In this respect, we endeavour to understand the learning strategies of each individual instead of human resources policies at the workplace. That would then suggest our final research question, how do individuals develop CCS in their workplace?

The existing empirical studies investigating critical core skills are profession-specific because of the situativity nature of critical core skills but may lack transferability, in another word, the credibility to transfer a set of findings to other groups of people, settings and times to the extent they are similar to the various groups. These studies lacked "goodness of fit" to some extent. To fill this gap, the present study aims to understand the development of critical

core skills across diverse groups of professions which cover a representative sample of Singaporean workforce and add value to the development of critical core skills which in turn provides career development for the workforce. By doing so, we have enhanced the transferability of the findings to include cross case comparison with many different occupations where other researchers can use them for reference. Specifically, this study seeks to address three research questions as elucidated above:

1. What drives individuals to engage in tasks to develop CCS?
2. How do the individuals use CCS in their different work settings?
3. How do the individuals develop CCS in their workplace?

3 Method

The study employs a qualitative approach with semi-structured interview questions to understand the development of critical core skills at the workplace. The data is then coded and interpreted to identify and understand the patterns of development.

3.1 Research Design

This qualitative study derives from a national study (Bi et al., 2023) that seeks to understand the importance and relevance of critical core skills in the Singapore Context. The national study comprises of two phases. In Phase One, a measuring instrument based on the CCS framework (Figure 1) developed by SSG was designed to investigate the importance and self-efficacy of CCS in the Singapore population (2008 participants) via a quantitative study.

With the instrument, the study managed to profile the 2008 participants into seven occupation groups in terms of their similar patterns in CCS importance and self-efficacy using the cluster analysis (Bi et al., 2023). Cluster analysis refers to a family of procedures (algorithms) for systematically classifying objects such that objects that differ in insignificant detail are given the same name. This implies that if some objects in a cluster have a certain property, other objects in the cluster will be expected to have the same property (Hartigan, 1975, p. 6-7).

The findings from Phase One were further used to carry out Phase Two, a qualitative study. This study aims to understand the development pathway of CCS within the workforce. van Laar et al. (2020) expressed that contextual factor such as job quality, complexity of job tasks, nature and degree of support, and the degree of motivation, level of autonomy and self-belief and other value-based factors can be considered for the development of core skills. These contextual factors influence the way employees may interact meaningfully with other

individuals in their communal settings, which in turn impacts the way they construct shared conceptualisation for the development of CCS in their lives and their social world. To unpack these contextual factors in the development of CCS, SLT was adopted to craft the interview questions with a focus on the understanding of how situated events trigger the development of CCS to reach the proficiency levels as required by different job roles interwoven with these different contextual factors. The support and challenges in the process of the development of CCS embedded in various situated events were also explored during the interview. For example, if creative thinking as shown in Table 1 is one of the most demanded CCS for an occupation group, we would ask the interviewees "How and why the 'task' was important in his/her daily work?", "Could you cite an example?" and "how do you develop the confidence in performing the task", "what support/challenges do you face in developing your confidence?" This approach allowed the research team to draw out common themes that the participants considered to be relevant and important to the development to CCS (Deeley, 2014). Findings from the data analysis were used to generate a concept map (Hay & Kinchin, 2006) as shown in Figure 3.

Table 1: Task Statements for Creative Thinking

Level of tasks	Task statements
Basic	Noticing areas for improving your own work?
Basic	Finding areas for improving the work of others?
Intermediate	Thinking of new ways to do things?
Advanced	Using specific techniques to generate new ideas?
Advanced	Testing or evaluating the effectiveness of new ways of doing work?

3.2 Data Collection

The interviewees were selected based on the seven groups of working contexts as identified in Phase One using cluster analysis (Bi et al., 2023). These seven unique working contexts were clustered in terms of the most demanded CCS across 2008 participants with a diverse type of profession. Drawing on the similar patten of the use of CCS, the different occupations in the same group are labelled with a common name based on their common job nature, e.g., Frontliners, Administrators, Deal-makers, Nurturers, Managers, Analysers and Wayfinders. The unique seven working contexts, the top three most demanded CCS are presented in Table 2 below.

Table 2: Seven Occupation Groups From Phase 1

Groups	*Description of the group*	*Top three most demanded core skills*
Frontliners	The everyday work of this cluster requires a high level of customer engagement in daily work, managing varied requests from customers where communication is critical, and constant negotiation within tight business	i. Self-Management ii. Customer Orientation iii. Influence
Administrators	The everyday work of these participants involve the creation of better solutions and enhancement of work processes and productivity, demanding orderliness, conscientiousness, and resources management, e.g. accountants, system analysts	i. Self-Management ii. Creative Thinking iii. Problem Solving
Deal-makers	This group of participants have high requirements for CCS. These occupations require synthesis of information and insights across a variety of sources and contexts, managing demands from employers and customers, as well as decision-making and problem-solving capabilities that have a significant impact on business outcomes and productivity	i. Transdisciplinary Thinking ii. Problem Solving iii. Decision Making
Nurturers	This cluster require strong interpersonal and emotional labour, and are dominated by educators, human resource practitioners, and nurses	i. Self-Management ii. Creative Thinking iii. Communication
Managers	This cluster of participants' work involved interaction across multiple stakeholders to coordinate delivery of services and solutions. Information processing and collaboration across stakeholders and use of digital tools are critical for this cluster, e.g., Supervisors and General Foremen (Building and related trades), Business Services and Administration Manager	i. Self-Management ii. Collaboration iii. Digital Fluency
Analysers	The everyday work of this cluster include the typical knowledge worker in the digital economy who require strong cognitive skills to create value. Their decisions have major impact on the organisations, e.g., financial analysts, data scientists, buyers and purchasing agents.	i. Sense-Making ii. Decision Making iii. Problem Solving
Wayfinders	This cluster of participants have skills that are equipped to ensure smooth operation of businesses and organisations. Managing customers' and stakeholders' needs is the core, e.g. management and business consultants, Managing Directors, Chief Executives and General Managers.	i. Customer Orientation ii. Self-Management iii. Communication

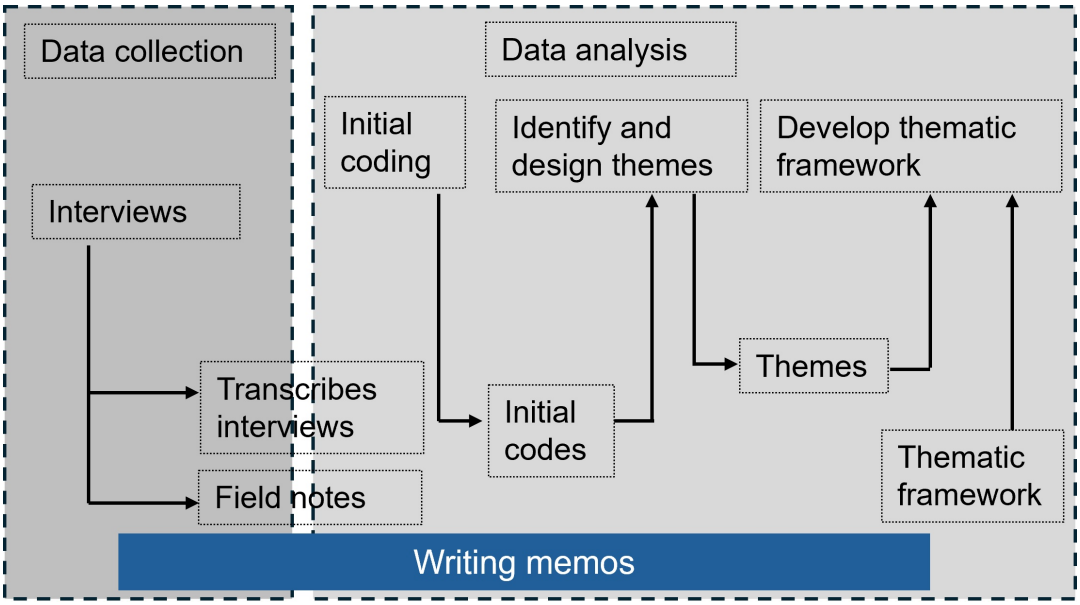
The research team invited interviewees whose skills are representative of the top three most demanded core skills found in Phase One. An email invite for participating the semi-structured interview was sent to selected participants to formally notify the objective of the study with a proper consent form and information sheet. Upon the acceptance of the invitation, the researcher co-ordinates with each interviewee for the timing for each interview. There are 39 interviewees recruited for this study. 26 of them are male while the remaining 13 are female. The interviewees and their respective job descriptions are listed in Table 3 below:

Table 3: Profile of Interviewees

Clustered groups	*No. of Interviewees*	*Job Roles of the Interviewees*
Front-liners	10	Taxi Driver, Admin Assistant, Shipping Agent Executive, Social Service Worker
Administrators	3	Business Development and Marketing, Financial Service Consultant
Deal-makers	4	Technical Executive, Bakers, Account Executives
Nurturers	10	School Teachers, School Support Officer, Senior Executive in IHLs
Managers	3	Centre Supervisor, Social Media Manager, Assistant Admin Manager
Analysers	4	Electrician, Sale Executive for Machinery, Project Officer
Way-finders	5	Hair and Make-up Artist, Auditor, Legal Consultant and Trader

3.3 Data Analysis

An inductive approach for thematic analysis proposed by Braun and Clarke (2006) is adopted. Data analysis procedures are represented in Figure 3. The analysis activities are presented in the rectangles and products of each activity are presented in the rounded rectangles. The final product of data analysis is a thematic framework with identified themes and their relationships.



Note. Reflection from the process (Braun & Clarke, 2006).

Figure 3: Data Analysis Procedure

This is a qualitative interpretative methodology that enables data analysis of unstructured text and identification of themes that reflect participants' experience about the investigated practice. The steps in data analysis are:

a. Familiarizing with the data. This step started immediately after conducting each interview by listening to the interview audio recording. After the interview transcription, reading and formatting the transcribed text helped in this step;

b. Initial coding. This stage included coding empirical data line by line in the Microsoft word document, which means assigning meaningful labels to the segments of the text. For each label, or initial code, a short theoretical memo was written to remark on the code and the text segment. The researcher performed initial coding independently, and after that, the next steps were performed through joint work with another researcher;

c. Searching for themes. This step involved collecting relevant text segments for each initial code and grouping the codes with the similar meaning into themes. Here, a list of initial and secondary codes will be discussed among researchers;

d. Reviewing themes. This stage included reviewing how collected text segments fit to the identified themes, and development of an initial thematic network with all identified themes and their relationships;

e. Defining themes. This step related to refining themes, which included defining their names and clear descriptions, and associating the text segment from interviews that will be used as verbatim quotations (Corden & Sainsbury, 2006). Verbatim quotations are a common tool for increasing evidential power in qualitative research; and

f. Writing the report. This stage related to writing documents about the research process and findings. It provided an additional opportunity to check the whole research process, and how research findings fit stated research objectives.

4 Findings

Drawing on the analysis of the interview transcripts and the theoretical discussion, the presentation of the development pathway of CCS for these interviewees is shown in Figure 4 below. All the interviewees shared that the drive to their CCS development is mainly from interests or concerts triggered from their job requirements, followed by some practice-linked learning by trial and error, interactions with peers, and reflections during work mostly initiated by their own agency. As a result of this process, they were able to achieve some improvement in their proficiency levels in the use of CCS at their different workplaces for both

personal development and also benefiting the enterprises they are in. After Figure 4, some vignettes are presented to illustrate this development pathway for some selected CCS. The two CCS selected here represented the development pathway most evidently.

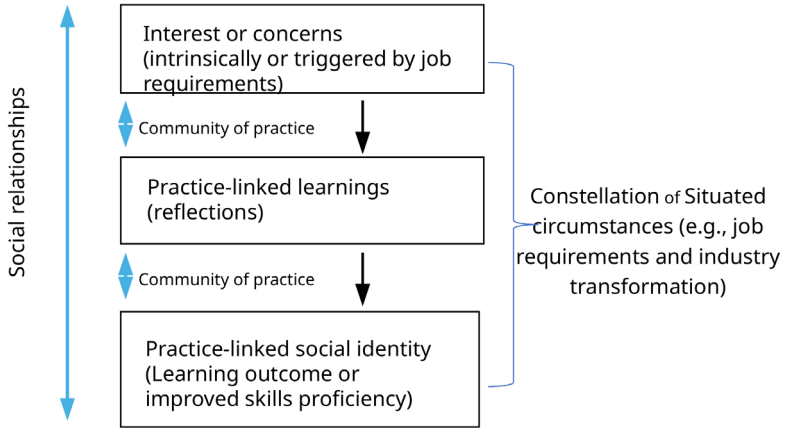


Figure 4: CCS Development Pathway in the Present Study

Table 4 depicts the pathway themes and the secondary codes of each participant to show how the development pathway was identified from our data analysis. We can observe that the themes surround on two major themes: Social relationships and practice-linked learning.

Table 4: Code Frequencies for Each Participant

Pathways themes	Albatross	Alice	Avocet	Alladin	Asuka	Ben	Daisy	Dale	Donald	Edna
Situated learning: social relationships	6	13	2	1	3	12	2	7	13	5
Everyday practice: on the job training	2	4	2	1	2	9	0	3	2	4
Situated learning: practice linked social identity	3	2	1	1	1	2	2	2	2	3
Situated learning: constellation of events	2	11	1	3	3	3	2	1	5	4
Situated learning: interest and concerns	2	3	4	3	2	4	1	2	7	3
Situated learning: practice linked learning	12	18	5	10	12	15	15	17	7	9
Situated learning: community of practice	3	5	0	4	3	7	6	3	7	5
Total secodary codes	30	56	15	23	26	52	28	35	43	33

Pathways themes	Eeyore	Elsa	Elmo	Flash	Frosty	Felix	Ikkl	Jack	Jerry	kermit
Situated learning: social relationships	4	10	3	3	6	4	8	2	3	6
Everyday practice: on the job training	4	3	3	3	6	4	8	2	3	6
Situated learning: practice linked social identity	4	1	1	1	4	2	3	1	4	4
Situated learning: constellation of events	8	5	2	0	1	1	1	2	2	2
Situated learning: interest and concerns	5	5	3	1	7	6	4	4	2	3
Situated learning: practice linked learning	11	15	3	2	4	3	3	1	3	5
Situated learning: community of practice	3	2	12	9	15	10	8	13	13	11
Total secodary codes	39	41	27	19	43	30	35	25	30	37

Pathways themes	Lapwing	Maggie	Minnie	Naruto	Nemo	Nightigale	Pokemon	Raven	Rapunzel	Shriek
Situated learning: social relationships	3	4	4	6	2	9	2	3	4	9
Everyday practice: on the job training	2	3	2	2	3	2	1	4	3	2
Situated learning: practice linked social identity	1	2	0	2	1	0	1	1	0	3
Situated learning: constellation of events	2	3	2	3	2	2	4	3	2	4
Situated learning: interest and concerns	2	4	0	2	2	1	3	3	4	6
Situated learning: practice linked learning	15	12	10	11	7	7	12	13	10	8
Situated learning: community of practice	1	7	1	4	4	3	4	4	1	3
Total secodary codes	26	35	19	30	21	24	27	31	24	35

Pathways themes	Sofia	Spiderman	Scooby	Snoopy	Tuk	Waldo	Wario	Yunihua	Zaran	Total
Situated learning: social relationships	5	3	3	2	3	14	9	3	3	204
Everyday practice: on the job training	1	2	1	1	2	3	4	2	2	98
Situated learning: practice linked social identity	1	2	2	2	2	2	2	3	0	62
Situated learning: constellation of events	2	1	8	6	2	4	3	3	1	135
Situated learning: interest and concerns	5	2	5	4	3	4	5	2	2	124
Situated learning: Practice linked learning	3	17	13	15	14	10	12	7	8	441
Situated learning: community of practice	4	4	4	3	4	4	6	2	2	142
Total secodary codes	21	31	36	33	30	41	41	22	18	1206

Customer Orientation (Use and Development) for Front-Liners

During one of the interviews, we noticed that the interviewee needs to deal with and manage unusual requests from passengers; as well as understand the needs of the shipping company to coordinate shipments for customers in her daily work. Her busy schedule resulting from having to deal with different types of customers has been described in the excerpt below.

> *Basically because our customers are overseas based, so we don't see them face to face. because everybody's busy in the shipping world, so they don't usually do Zoom. So, it's more of emails still because emails are black and white, you know, we get to know what exactly they want. Because sometimes through phone, you might misinterpret what they are talking, because they are Russians, some of them, or those ang moh, sometimes you just cannot get what they talk about. So, basically it's all emails, and ah (…) and after a while it's like I can somehow see their pattern of doing things. So, like for one customer they prefer to do everything, you know. They give us a list, then we just need to know this is done, this is done, this is taken care of, blah blah blah. But another customer, they might be those like, "Ok, this is my company, my vessel is coming. Doesn't matter what you do, but as long as the main points are there". The main points, that means whatever they come to Singapore for is already done, that's it. Then another customer, they want every single step to be jotted down. (20th interview, Turn101, page 7, Frosty, Shipping Executive)*

Frosty subsequently shared with us how she developed this customer orientation as below.

> *How do I learn to determine the needs? Uh, basically like I say, it's (…) it's, for me it's experience, ok. Experience because I don't know anything at all, my boss is the one who (…) of course initially I will ask my boss. Or even until now, sometimes if we can't or if we don't know, or we're not sure of what to do, I will ask my boss. Then my boss will say, Ok, maybe you try calling this person, try calling that person. And then we do the research and then you know, it's all a lot of communication ah. We don't decide on our own. So, like I say, because we are the middle man, we research, we research, and then whatever answer we have, we go back to the vessel master or the owner, to say that. (20th interview , Turn101, page 7, Frosty, Shipping Executive)*

When she started as a shipping executive with little experience in the shipping industry, she had a concern to provide timely information of ship details to customers that pushed her to take agency to pursue the development of customer orientation skills. Working closely with her bosses who are identified as members with whom she has a social relationship and also a member of the community of practice where she practices (coordinated participation) in, she started to develop her skills by coordinating in a social manner - the more clients she handled, the more experience (constellation of situated circumstances) she gained, and further developed a workflow (practice-linked learning) to determine their needs. More on-the-job training will help her perfect her practice as she matures to an advanced level of customer orientation skills (practice-inked social identity) in a peripheral manner. The agency Frosty took to initiate the social learning within the working context benefit both the learner herself in terms of personal development to a more advanced level of customer service and also the workflow to better serve the needs of different clients (Hodkinson et al., 2008).

Decision Making (Use and Development) for Analysers

Tuk, a technical executive working in a government agency, shared with us that in making decisions at work, he must refer closely to the "cardinal rules" and manage projects according to company targets of costs and profits, or municipal regulations, as shown in the excerpt below.

> *We go for many site meetings, need to make many decision on the spot specifically at the construction site, our job involves many municipal issues and cardinal rules very important to keep a calm mind to make decision that is beneficial to the project like issuing licence to contractors, when issuing licence, notice if there is any residential or commercial property for the licence, we cannot promise the licensee that we can process their application, need to consider all the rules (like noise, dust or other factors) for processing the licence application, timing for the licensee and the residents moving into the construction. (34th interview, Turn 30, Page 3,Tuk, Technical Executive)*

In terms of how to develop this CCS, Tuk shares with us as below.

> *As a technical executive, I need to issue licences for contractors to use vacant land of HDB. Use for marriage, use for storage or for other uses. We need to consider municipal issues and regulations on the site and decisions need to be made on site, on the spot. We need to consider, e.g., issue a licence to use vacant land for a contractor. If the land is very near to residential properties, will there be noise pollution, also to take note of residential moving in (…). So need to gauge the timing of licensee and the surrounding environment…takes lots of practice, usually on the job training. (34th interview, Turn 30, page 3, Tuk, Technical Executive)*

As a technical executive, his daily job involves managing the usage of vacant land. The concern to issue licences for contractors initiated the development pathways for his decision-making skill. He needs to refer to municipal regulations to issue licences for contractors. He

works closely with his boss and contractors (members of community of practice) to approve licences. He aims to be well-versed in the regulations with strong agency as decisions are made usually at the site for recommendation. If he encounters a new situation that he cannot decide, he executes the assignment in a socially coordinated manner (coordinated participation) with his boss. The more situations he encounters (constellation of situated circumstances), the more well versed he gets when referring to procedures to make decisions. Gradually, he builds his confidence by practising decision-making tasks from basic to advanced level to complete the work well. Again, Tuk's agency to excel his decision-making skill led him to get familiar with the regulation as soon as possible which excel his decision-making skills and also benefits the workplaces to complete the tasks excellently.

Two CCS development stories were selected to illustrate what were presented in Figure 3. Across the two stories, both the selected participants shared how their personal interests or job requirements drove them to further develop the specific CCS. The peripheral participation in workplace learning and learners' agency intertwined well in these four cases to show the reciprocal relationship as argued by researchers (e.g., Goh, 2013; Hodkinson et al., 2008). In developing each CCS, their personal agency, working experiences, situated working tasks and support from their peers or supervisors (social relationships) played together in shaping and developing the CCS needed by their job roles. Along the pathway, their proficiency in using the specific CCS were improved more effectively. At the same time, their improved CCS proficiency contributed to the development of their enterprises' business by competing the job tasks more efficiently.

5 Discussion

From the above findings, we observed that the selected participants have a similar skill development pathway across the diverse contextual working settings. The pattern of the overarching themes (as shown in Figure 4) appears to imply that there is a "must have time" space to practise the "executing them in a coordinated manner" Our observation lends evidence to a study by Noe (1986) and Russ-Eft (2002) who expressed that the extent to which trainees have sufficient time and resources available to practise and internalise what they have learnt determines the extent to which the training content will be used or constrained on the job.

In addition, we found that all the participants mentioned about support they received at the workplace. We infer that the social relationship in their communal settings plays a vital role to help each participant form development pathway by "experiencing each other's help, doing the tasks collectively, gaining a sense of belonging and achieving expertise in their specific skills". This conceptualisation reflects the four "interconnected and mutually defining" components of a situated theory of learning involves experiencing, belonging, doing and becoming, detailed from the works of Lave and Wenger (1991, p. 5). The social relationships

that are peripheral to the job design for the purpose of successful execution of the tasks, also influence the degree of motivation to develop critical core skills. When healthy relationships are fostered within an organization, they fuel the informal sharing amongst the community of practice.

These storylines then act as an enabler for the development of critical core skills. When conflictual and unhealthy relationships exist, they posed as a potential barrier for development of core skills. Similar studies have concluded similar findings as well (Contu & Willmott, 2003; Fox, 2000). The agency taken by these participants in this social learning process played an important role in improving their CCS proficiency. The reciprocal relationship between agency and learning context (Hodkinson et al., 2008) is illustrated by these participants seeking actively the support from their peers (social relationships) and looking for various learning opportunities through practices (practice-based learning) in the development of CCS required by the job roles.

Furthermore, the findings in the present study echo with an early study in Singapore (Sung et al., 2013) that core skills are work-based concepts. Therefore, it is indispensable to understand the development of CCS from the working contexts. From the sharing of the selected participants, practice-linked learning at workplaces occurs in all the cases to facilitate their development of CCS within their specific working contexts. Facing challenges in closing the deal with clients, managing stakeholders' expectations, etc, the participants have to find out the solutions during these tasks at work. In finding the solutions, they are both unconsciously and consciously practising the CCS that they used in the solutions. In this entire process, their CCS are developed closely linked the working context which required them to utilise the CCS to find out the solutions. In one word, such situated learning within the community of practice (Lave & Wenger, 1991) with the support from peers or seniors do help them develop the CCS required by their job roles.

More significantly, the findings in the present study are derived from a sample with seven diverse occupation groups in contrast to existing studies that investigate the development of core skills in a specific and single occupation such as the development of core skills for nurses by Onda (2012), development of core skills of fireman by Brooks et al. (2020), and project managers by Jugdev and Mathur (2013). The seven occupation groups are identified based on the similar patterns in the use of CCS by different occupations as shown in Table 2 which covers until four digits of Singapore Standard Occupational Classification (SSOC). The SSOC adopts the basic framework and principles of the International Standard Classification of Occupations (ISCO). It is reviewed and updated periodically to reflect developments in the labour market, particularly the emergence of new occupations, as well as to align with changes in the international standard.

Thus, the findings in the present study tend to show generalisability in terms of the development pathway of CCS as all the participants from different professional groups display

similar patterns in their development. The similar development pathway as identified across different participants in the study could be leveraged by general workforce from different working contexts worldwide.

Therefore, it would be appropriate to recommend that training of critical core skills be conducted through in-person (but not lecture style) contexts or e-learning portals to allow the individual the time and space to practise the tasks peripheral to their job design so that they can stay on task or continue to be on-the-job. Such a strategy is advised because of the emerging evidence that core skills are work-based concepts (Sung et al., 2013) as shown in this study as well. The in-person training could be informal sessions at workplaces to avoid unhealthy competition but be a safe environment to share storylines of development of core skills. Such informal sharing sessions can be spaced over a longer but targeted period to suit the needs of the training objectives. Another approach would be to leverage on e-learning portals that are used by companies for staff's professional development. The core skills learning program could be designed for these e-learning portals through working with training providers to design customised training programmes to suit the operating environment of each organisation. The employees could then work with their respective department heads to pace their learning pathways in a targeted manner to coincide with "must have time" space to practise. For example, Deep et al. (2016) carried out an empirical study using a 3-day module of e-learning adopting the Problem-based learning (PBL) approach found that PBL strategy on e-learning platform significantly developed conflict resolving skills and communication skills.

Specifically, the CCS development pathway can provide some guidance for training providers and employers in the development of CCS for employees. For example, employers could consciously design the job tasks by referring to the CCS instrument to better facilitate the development of the required CCS for their own staff more efficiently, together with appropriate practices and support at workplaces.

Last but not least, the mechanism to motivate learners' agency needs to be in place by both training providers and organizations. Triggering the learners' agency to find out where their CCS gap and what are the most effective way to develop such CCS would play a key role in their CCS development. Learners' agency cannot be submerged and downgraded in this social learning process (Goh, 2013; Hodkinson et al., 2008). The reciprocal relationship between leaners agency and working context needs to be navigated in depth by both parties.

6 Conclusions and Limitations

The development pathway as identified reinforces that concern or interest raised from the job requirements is the main drive for CCS development. The practice-linked learning, e.g., OJT, trial and error, observation of and support from peers or mentors at workplaces, are the

main route for their development of CCS. Through practice-linked learning and a series of constellation of situated events, the participants advanced to a person with a practice linked social identity such as being known as someone who has advanced level of the specific skill, e.g., communication skills, or decision-making skills within the community of practice.

The participants from across the seven profiling occupation groups shared such commonalities in their development pathway as illustrated in Figure 4.

In this development process, the learners' agency and dispositions tend to emerge as an important factor. Learner agency and contextualized working context are working mutually and reciprocally. Only with social learning within the working context, the learners may not be able to achieve their CCS development if they did not take the agency to find out where they are supposed to further develop. Conversely, if only with agency but without the support from the contextualized working settings, they are not able to develop their CCS effectively as well. What these findings imply to us may be how we as training providers or workplaces can integrate these two aspects well and trigger them for the CCS development for individuals.

The findings also imply to us the commonalities in the CCS development for individual from various professional groups. It is crucial for researchers and practitioners to have such an understanding in their intervention and deployment for CCS development for the workforce. This makes the findings from the present study more applicable as compared with earlier studies focusing on only one or a few specific CCS (e.g., Bolli & Renold, 2017; Eraut, 2007).

The study was conducted during the covid period, there are certain constraints in time and budget for the purchase of an additional sampling frame, substitution of non-responding unit with another unit of the same housing type was also implemented during the last two months of data collection, to achieve the target number of at least 2000 responses. The selection of the substitution may have some effect on the representativeness of our sample. In addition, the research team aimed to obtain five to six interviewees from each occupation group. However, due to the uneven distribution of participants in different occupation groups and also the high decline rate in certain groups, we did not manage to secure an even number across the groups. As a result, some groups have more interviewees than other groups, which may also affect the representativeness of the sample in the present study. Finally, the study analysed perceptions from the beneficiary participants and their personal experience but did not examine the micro-process of meaningful interaction associated to the constellation of situated events between the practicing participant and their community of practice, such as their immediate reporting officer or a peer.Further research investigating specific cases could be carried out for the extension of the developmental pathway found in this empirical study.

Acknowledgement

The authors wish to thank the anonymous reviewers, associate editors, and editors for their thoughtful reviews and suggestions for this manuscript. The appreciation shall be also given to Skills future Singapore (SSG) who have sponsored the project, and other researchers who contributed to this work.

Ethics Statement

The authors have sought ethics committee approval to ensure that the human dignity, integrity, welfare are upheld and safety of participants and to ensure that they are treated with respect and fairly. The authors wish to confirm that there are no known conflicts of interest associated with this publication.

References

Bi, X. F., Tan, B., & Freebody, S. (2023). Critical core skills profiling and development in the Singaporean workforce. *The IAFOR International Conference on Education – Hawaii 2023 Official Conference Proceedings* (pp. 599–617). IAFOR. https://doi.org/10.22492/issn.2189-1036.2023.50

Billett, S. (2004). Workplace participatory practices: Conceptualising workplaces as learning environments. *Journal of Workplace Learning*, *16*(6), 312–24. https://doi.org/10.1108/13665620410550295

Billett, S., & Choy, S. (2013). Learning through work: Emerging perspectives and new challenges. *Journal of Workplace Learning*, *25*(4), 264–276. https://doi.org/10.1108/13665621311316447

Billett, S., Smith, R., & Barker, M. (2005). Understanding work, learning and the remaking of cultural practices. *Studies in Continuing Education*, *27*(3), 219–237

Bolli, T., & Renold, U. (2017). Comparative advantages of school and workplace environment in skill acquisition: Empirical evidence from a survey among professional tertiary education and training students in Switzerland. *Evidence-Based HRM: A Global Forum for Empirical Scholarship*, *5*(1), 6–29. https://doi.org/10.1108/EBHRM-05-2015-0020

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Brooks, J., Grugulis, I., & Cook, H. (2020). Rethinking situated learning: Participation and communities of practice in the UK Fire and rescue service. *Work, Employment and Society*, *34*(6), 1045–1061. https://doi.org/10.1177/0950017020913225

Career Builder. (2014, April 10). Overwhelming majority of companies say soft skills are just as important as hard skills, according to a New CareerBuilder survey [Press release]. Career Builder.

Cinque, M. (2016). "Lost in translation". Soft skills development in European countries. *Tuning Journal for Higher Education*, *3*(2), 389–427. https://doi.org/10.18543/tjhe-3(2)-2016pp389-427

Contu, A., & Willmott, H. (2003). Re-embedding situatedness: The Importance of power relations in learning theory. *Organization Science*, *14*(3), 283–296. https://doi.org/10.1287/orsc.14.3.283.15167

Corden, A., & Sainsbury, R. (2006). *Using verbatim quotations in reporting qualitative social research: Researchers' views*. University of York.

Deeley, S. J. (2014). Summative co-assessment: A deep learning approach to enhancing employability skills and attributes. *Active Learning in Higher Education*, *15*(1), 39–51. https://doi.org/10.1177/1469787413514649

Deep, S., Othman, H., & Salleh, B. M. (2016). Potential causes and outcomes of communication conflicts at the workplace-a qualitative study in Pakistan. *Journal of Management Info*, *3*(3), 1–5.

Eraut, M. (2007). Learning from other people in the workplace. *Oxford Review of Education*, *33*(4), 403–422. https://doi.org/10.1080/03054980701425706.

Fox, S. (2000). Communities of practice, Foucault and actor-network theory. *Journal of Management Studies*, *37*(6), 853–868. https://doi.org/10.1111/1467-6486.00207

Goh, A. Y. S. (2013). The significance of social relationships in learning to become a vocational and technical education teacher: A case study of three individuals. *Studies in Continuing Education*, *35*(3), 366–378.

Hartigan, J. A. (1975). *Clustering algorithms*. Wiley.

Hay, D. B., & Kinchin, I. M. (2006). Using concept maps to reveal conceptual typologies. *Education+Training*, *48*(2/3), 127–142. https://doi.org/10.1108/00400910610651764

Hodkinson, P., Biesta, G., & James, D. (2008). Understanding learning culturally: Overcoming the dualism between social and individual views of learning. *Vocations and Learning*, *1*, 27–47.

Jugdev, K., & Mathur, G. (2013). Bridging situated learning theory to the resource-based view of project management. *International Journal of Managing Projects in Business*, *6*(4), 633–653. https://doi.org/10.1108/IJMPB-04-2012-0012

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Linkedin Talent Solutions. (2019). *Global talent trends: The 3 trends transforming your workplace*. https://business.linkedin.com/content/dam/me/business/en-us/talent-solutions/resources/pdfs/global_talent_trends_2019_emea.pdf

Low, S. P., Gao, S., & Ng, E. W. L. (2019). Future-ready project and facility management graduates in Singapore for industry 4.0: Transforming mindsets and competencies. Engineering. *Construction and Architectural Management*, *28*(1), 270–290. https://doi.org/10.1108/ECAM-08-2018-0322

Majid, S., Zhang, L., Shen, T., & Raihana, S. (2012). Importance of soft skills for education and career success. *International Journal for Cross-Disciplinary Subjects in Education*, *2*(2), 1036–1042. https://doi.org/10.20533/ijcdse.2042.6364.2012.0147

Manpower Group. (2015). *Manpower Talent Shortage Survey*. Manpower Group. https://www.manpower.com.sv/wps/wcm/connect/manpowergroup/2d26c038-b1ff-4372-a41e-f7ecbd525843/Talento2015.pdf?MOD=AJPERES

Manpower Group. (2022). *Manpower Talent Shortage Survey*. Manpower Group. https://workforce-resources.manpowergroup.com/infographics/q3-2022-employment-outlook-survey

Matteson, M. L., Anderson, L., & Boyden, C. (2016). "Soft Skills": A phrase in search of meaning. *Libraries and the Academy*, *16*(1), 71–88. https://doi.org/10.1353/pla.2016.0009

Marin-Zapata, S. I., Román-Calderón, J. P., Robledo-Ardila, C., & Jaramillo-Serna, M. A. (2021). Soft skills, do we know what we are talking about? *Review of Managerial Science*, *16*, 969–1000. https://doi.org/10.1007/s11846-021-00474-9

Melacarne, C., & Nicolaides, A. (2019). Developing professional capability: Growing capacity and competencies to meet complex workplace demands. *New Directions for Adult and Continuing Education*, *163*, 37–51. https://doi.org/10.1002/ace.20340

Noe, R. (1986). Trainees' attributes and attitudes: Neglected influences on training effectiveness. *Academy of Management Review*, *11*, 736–749.

Onda, E. L. (2012). Situated cognition: Its relationship to simulation in nursing education. *Clinical Simulation in Nursing*, *8*(7), e273–e280. https://doi.org/10.1016/j.ecns.2010.11.004

Parlamis, J., & Monnot, M. J. (2019). Getting to the CORE: Putting an end to the term "soft skills". *Journal of Management Inquiry*, *28*(2), 225–227. http://doi.org/10.1177/1056492618818023

Russ-Eft, D. (2002). A typology of training design and work environment factors affecting workplace learning and transfer. *Human Resource Development Review*, *1*(1), 45–65. https://doi.org/10.1111/j.1467-6486.2006.00618.x

Skillsfuture Singapore. (2023). *Critical core skills: Transferable soft skills and competencies critical for employability and career mobility*. Skillsfuture Singapore. http://www.skillsfuture.gov.sg/skills-framework/criticalcoreskills

Sung, J., Ng, M. C. M., Loke, F., & Ramos, C. (2013). The nature of employability skills: Empirical evidence from Singapore. *International Journal of Training and Development*, *17*(3), 176–193. https://doi.org/10.1111/ijtd.12008

van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2020). Determinants of 21st-Century skills and 21st-century digital skills for workers: A systematic literature review. *Computers in Human Behaviour*, *72*, 577–588

Wang, X., Lin, W., Xue, T., Green, A., Gu, L., He, Y., Huang, X., Jin, Z., & Wu, Y. (2022). Workplace learning in China: Transferring training into practice to improve performance. *International Journal for Research in Vocational Education and Training*, *9*(3), 294–315. https://doi.org/10.13152/IJRVET.9.3.1

Wenger, E. (1999). *Communities of practice: Learning, meaning, and identity*. Cambridge university press.

Biographical Notes

Dr Bi Xiao Fang is a lecturer and senior researcher in IAL, SUSS, Xiao Fang is experienced in conducting both qualitative and quantitative educational research. Her research interests include pedagogy in blended learning and skills profiling and development. Her most recent research is on Critical Core Skills profiling and development in the Singaporean workforce.

Lena Boo is a researcher at Learning Science assessment faculty, National Institute of Education, Nanyang Technological University of Singapore. Her research interest covers educational research (Learning science and assessment), workplace learning and persons with intellectual disabilities and communities.